Prontidão tecnológica e propensão de jovens a comprarem pela internet

Technological readiness and propensity of young people to online purchases

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Resumo

Novas tecnologias estão mudando constantemente os padrões de comportamento do consumidor. As investigações sobre a aceitação do consumidor e prontidão para adotar novas tecnologias são vitais para o desenvolvimento de uma melhor compreensão do seu comportamento. Este estudo objetivou analisar a relação entre as dimensões da prontidão para a adoção de tecnologia e da propensão para compras on-line de universitários. Foi conduzido um levantamento com 224 estudantes onde o instrumento de coleta foi composto pela escala TRI e itens para a avaliação da propensão de compras online. Foram conduzidas análises descritivas, análise fatorial exploratória e análise de regressão múltipla. Os resultados sugerem que experiências anteriores de compras online impactam negativamente a propensão para compras online. Também foi observado que o otimismo adaptativo e o pioneirismo têm um impacto positivo sobre a propensão para compras online. O despreparo apresenta um impacto negativo e significativo na propensão de compras online. No entanto foi constatado que a insegurança com o serviço e a insegurança transacional não impactam significativamente na propensão de compras online. A maior limitação deste estudo é a pequena amostra de um grupo muito específico. Com isso, são sugeridos estudos futuros.

Palavras-chave: escala TRI, comportamento do consumidor, compras online, modelos de regressão

múltipla, estudantes universitários.

Abstract

New technologies are constantly changing patterns of consumer behavior. Investigations about consumer acceptance and readiness to adopt new technologies are vital to the development of a better understanding of their behavior. This study aimed to analyze the relation between the dimensions of readiness for the adoption of technology and propensity to perform online purchases of undergraduate college students. It was surveyed 224 college students and the instrument of data collection comprised the TRI scale (Technology Readiness Index) and items for the assessment of propensity to online purchases. Analyses were performed through descriptive statistics, exploratory factor analysis and multiple regression analysis. Results suggest that past experiences related to online purchases impact negatively on the propensity to online purchases. It was also observed that adaptive optimism and pioneerism impacts positively on propensity to online purchases. Thus, unpreparedness presents a significant negative impact on propensity. However, transactional and service insecurities do not have significant impact on the propensity to purchase online. The major limitation of this study is the small sample of a very specific group. So, some suggestions regarded to future investigations are made.

Keywords: TRI scale, consumer behavior, online

shopping, multiple regression models, undergraduate students.

1. Introduction

Technological advances often impact on consumption habits of people. Besides, technological advances and informational systems allow the development of new products and services. Technologies that have affected the service sector as well as consumption habits are the information and communication technologies, where the central element is the Internet. Based on this kind of technology, new products and services were created as well as other services have been improved in terms of convenience, efficiency and flexibility. However, consumers can show different degrees of acceptance and resistance for these new technologies.

Purchases over the Internet have reached growing acceptance and adoption levels possibly caused by a weakening of resistance by consumers as technological advances and security systems used by companies. However, new technologies can, eventually, result in a resistance behavior in consumer. Researches on behavioral aspects related to acceptance and adoption of new technologies by consumers are essential to understand how consumers react towards technological innovation and related to online shopping.

A model that has achieved interest of researchers integrating technology and consumer behavior is the TRI scale (Technology Readiness Index). It is seen that this scale was already adopted in a great number of studies focused on human behavior and its relation with marketing issues (LIN and HSIEH, 2007; WALCZUCH, LEMMINK and STREUKENS, 2007; MENG, ELLIOTT and HALL, 2010). Despite the fact that this scale has been already applied in a great number of academic researches, we can consider that the investigation of the impact of its dimensions on specific groups of consumers is still needed. This scale

developed by Parasuraman (2000) measures individual's readiness in the adoption of new technologies and evaluate consumer characteristics through four personality traits: optimism, innovativeness, discomfort and insecurity. In accordance with some assumptions proposed by the developer of the TRI scale, a consumer with a high degree of innovativeness and optimism, and a low degree of discomfort and insecurity are more likely to use new technologies (PARASURAMAN, 2000).

This study aims to analyze the influence of the dimensions of readiness for adoption of technologies in the propensity of college students to purchasing over the internet. In addition, this study also aims to evaluate the influence of demographic variables (gender, age and income) and the past experience of college students in purchasing over the internet in the dimensions of TRI scale and the propensity to shopping over the internet. So, we can assume that the main proposal of this research is to investigate the influence of readiness for the adoption of technologies in the propensity to shopping over the internet.

Technological advancement can be considered a research topic with great academic interest and enables the emergence of new products and services. Technological innovation affects every consumer and business product or services. So, constant studies and analysis about these issues are still necessary. Additionally, this study seeks a better theoretical and empirical understanding about undergraduate college consumer behavior and the use of Internet to purchases. It also can help to develop additional studies that may use the results presented here leading to new insights for other researches.

2. On-line purchasing behavior

Assuming that electronic commerce

can be defined as any transaction that occurs through the Internet, the behavior of consumers who practice this kind of transaction requires clarification and specific inquiries. These online transactions may involve money or simply exchange of goods as well as can involve a physical product to be delivered, services to be acquired and even transference of intangible goods as document, music and software.

The use of the Internet presents significant growth in South America. In the year of 2011 the population of South America with access to Internet reached 40.7%, showing a growth of 1,039% from 2000 to 2011. This growth of Internet users in South America is much superior to the average values of the rest of the world in the same period from 2000 to 2011. The rest of the world showed an average growth of 457.3% from 2000 to 2011 and 29.6% of world population (excluded South America's population) are using the Internet (INTERNET WORLD STATS, 2011).

In Brazil, the population of Internet user observed in 2011 was 37.4%, and showed a growth of 1,419.6% from 2000 and 2011 (INTERNET WORLD STATS, 2011). Thus, Brazil represents a great portion of Internet users in South America and shows a superior growth comparing to the rest of this continent. Referring to e-commerce, online sales in 2008 reached R\$ 8.2 billion, in the year of 2009 online sales were about R\$ 10.6 billion, and in the first half of 2010, online sales summarized R\$ 6.7 billion in Brazil (E-BIT, 2011). There is a sharp increase in online sales in Brazil, which reinforces the increasing need to understand consumer behavior in the virtual environment.

Studies that investigate behavioral aspects of online consumers are quite numerous and diversified. Among these, is possible to identify research studies that examine the relationship between demographic particularities such as gender

(ALRECK and SETTLE, 2002; BROWN, POPE and VOGES, 2003; RODGERS and HARRIS, 2003; SLYKE, COMUNALE and BELANGER, 2002), age (BHATNAGAR and GHOSE, 2004; DONTU and GARCIA, 1999; JOINES, SCHERER and SCHEUFELE, 2003; KORGANKAR and WOLIN, 1999; ROHM and SWAMINATHAN, 2004) and education (MAHMOOD, BAGCHI and FORD, 2004; LIAO and CHEUNG, 2001; SUSSKIND, 2004) of users and the propensity for consumption over the Internet. Other studies aim to identify the relationship between frequency of Internet use and online consumer behavior (BHATNAGAR and GHOSE, 2004; CHO, 2004; LIAO and CHEUNG, 2001; NYSVEEN and PEDERSEN, 2004).

However, some authors also dedicated efforts to examine some behavioral characteristics and traits of personality that influence consumer behavior on the Internet. An important trait is the innovativeness that presents a positive influence on intentions of purchasing over the Internet (CITRIN, SPROTT, SILVERMAN and STEM Jr, 2000; GOLDSMITH, 2002; LIMAYEM, KHALIFA and FRINI, 2000; SIN and TSE, 2002). Another important aspect that has been researched by many authors and contributes to the objectives of the present study is the perceived risk of consumers. Studies suggest that perceived risk impacts negatively on the psychological perception and likelihood of purchasing over the Internet (BAE and LEE, 2011; BHATNAGAR and GHOSE, 2004; BHATNAGAR, MISRA and RAO, 2000; FEATHERMAN and PAVLOU, 2003; GARBARINO and STRABILEVITZ, 2004; HUANG, SCHRANK and DUBINSKY, 2004; JOINES *et al.*, 2003; KOLSAKER, LEE-KELLEY and CHOY, 2004; LIAO and CHEUNG, 2001; PARK, LEE and AHN, 2004; PAVLOU, 2003; PIRES, STANTON and ECKFORD, 2004).

Regarding the analysis of consumer behavior on the Internet related to gender, studies suggest that men purchase more and spend more money on the Internet than women [LI, KUO and RUSSELL, 1999; MAHMOOD *et al.*, 2004; SUSSKIND, 2004). These results may be influenced by a search for greater convenience by men (RODGERS and HARRIS, 2003). Another reason that may explain this difference between genders is the feeling of apprehension and unpreparedness involved where women have more severe levels of such behavior (SUSSKIND, 2004). Also, risk perception influences the propensity to perform online purchases and women demonstrate to have higher degrees of risk perception (BAE and LEE, 2011). Moreover, the best selling products over the Internet present characteristics of low need for experimentation, such as books and electronic devices. On the other hand, women have a major need for experimentation and physical contact at the moment of purchasing some kind of products (such as clothes and foods) (CITRIN, STEM JR., SPANGENBERG and CLARK, 2003) and women consider return labels significantly more important than men (ULBRICH, CHRISTENSEN and STANKUS, 2011). This may also influence the findings that men spend more money over the internet than women.

Referring to the age of the Internet users, recent studies suggest a positive relationship between age and propensity to consumption online (STAFFORD, TURAN and RAISINGHANI, 2004). However, other studies show a negative relationship (JOINES *et al.*, 2003) and still others have demonstrated no significant relationship between age and online purchases (LI *et al.*, 1999; ROHM and SWAMINATHAN, 2004). Obviously, the studies correlating age with the propensity of Internet shopping are affected by other important variables such as types of products demanded and income of buyers. In addition, as great part of Internet purchases are made through credit cards, it

is necessary to investigate and relate the adoption of this payment mechanism for users of different age groups.

Other important aspects that impact the propensity to buy in the online environment are psychological and behavioral aspects of individuals. The innovativeness is characterized as one of those aspects of great relevance and measures how fast and to what extent an individual adopts innovations (ROGERS, 1995) such as the technologies of e-commerce. Some studies found positive relationship between innovativeness and intention to purchase on the Internet (DONTHU and GARCIA, 1999; LIMAYEM *et al.*, 2000). On the other hand, sensation seeking and interest for products related to leisure can impact on e-commerce propensity (LÓPEZ-BONILLA and LÓPEZ-BONILLA, 2008).

The perceived risk is also a topic of great importance to be investigated that impact on intention of individuals to purchasing online. The perceived risk can be defined as the subjective belief of consumers in suffering loss in pursuing desirable results (PAVLOU, 2003) and has a negative impact on the intention of online shopping (BHATNAGAR *et al.*, 2000; FEATHERMAN and PAVLOU, 2003; JOINES *et al.*, 2003; KOLSAKER *et al.*, 2004; PARK *et al.*, 2004; PAVLOU, 2003; RUYTER, WETZELS and KLEIJNEN, 2001). The lack of trust between commercial entities and purchasers can restrict the potential of e-commerce and personal information required by commercial entities can impact negatively on the propensity to purchase on the internet (ANTONIOU and BATTEN, 2011). The perceived risk can be related conceptually to insecurity and unpreparedness of individuals involved in online shopping. So, it is possible to presume that insecurity and unpreparedness impacts negatively on the intentions of shopping online.

3. Readiness for the adoption of techno-

logy

The technological revolution that has been experienced modifies drastically the way negotiations are made. End users can count nowadays with technological tools and mechanisms, provided mainly by Internet, to search for products, compare prices, organize buying groups and obtain preferential discounts beyond in the comfort of their own home. This technological revolution, not only facilitates the consumption of people, but also requires them to adapt to this new reality often having to face their own personal resistances. Although we observed a high growth in the number of products and services based on technology, often they do not bring the expected benefits to customers (PARASURAMAN, 2000). Products and services that require the adoption of self-service systems (such as online shopping) may cause some degree of frustration, increasing the resistance behavior of consumers (MEUTER, OSTROM, ROUNDTREE and BITNER, 2000).

Technological evolution can be considered as paradoxical in the perspective of consumers (MICK and FOURNIER, 1998), since it can generate positive and negative feelings in customers that use technological functionalities such as online shopping. When consumers that adopt technology to purchase have a negative experience, this might result in to a "no-purchase" behavior of a product as well as an increase of the resistance degree of the consumer which may affect negatively other potential customers with their negative evaluation. Additional studies that aim to understand both positive and negative factors regarding consumer behavior related to self-service technologies and online shopping is still needed.

A study published by Chen and Li (2010) attempted to integrate the TRI scale and the theory of planned behavior. Investigating a sample of college students,

they found that the effects of technology on attitude and perceived behavioral control are very important. However, they also find that subjective norms do not influence the continuity of an individual's intention in adopting the Internet services. Besides, they also observed that the readiness to adopt technology impacts significantly in the constructs of the theory of planned behavior (attitude, subjective norms and perceived behavioral control).

In another study, Walczuch, Streukens, and Lemmink (2007) integrated the TRI model with the TAM model (Technology Acceptance Model) and studied the behavior of employees of a company of financial services. The results found by the authors revealed that some personality traits have significant impact on users' perception about technology, besides the fact that innovativeness is negatively related to perceived utility.

Another study aims to identify the propensity to adoption of self-service technology (LILJANDER, GILLBERG, GUMMERUS and RIEL, 2006). This research was conducted with clients of an airline company at Europe and the service investigated was the self-service check-in available through Internet. The authors noted that the readiness for adoption of technology has a low impact on the attitude of consumers to adopt that kind of service. Optimism had a major significant impact while innovativeness showed only a marginal effect.

Some studies have been done in Brazil dealing with the issue of readiness for the adoption of technologies under different approaches. In a study conducted by Pires and Filho (2008) the subject of the research was Internet users and adoption of online banking services. The authors observed that there is a significant difference between users and non-users of internet banking related to optimism, insecurity and discomfort. They also noted that optimism is a significant antecedent of the intention to adoption of internet

banking services.

In another study that uses the TRI scale, also conducted in Brazil, Souza and Luce (2005) developed a survey where they found significant differences between groups surveyed. In addition they proposed a new structure with five latent variables for the TRI scale. Rita, Araújo, Paula, Lima, and Filho (2010) presented results of an application of the TRI scale which suggests that people who deal with technology in their workplace have an index of readiness for adoption of technologies significantly higher. Also, the authors observed that the influence of family is considered a significant factor that influences the readiness for adoption of technology. It was also noted that several studies relate the TRI model of readiness for adoption of technologies with the technology acceptance model (TAM) (PIRES and FILHO, 2008; WALCZUCH, LEMMINK and STREUKENS, 2007; LIN, SHIH and SHER, 2007). The original TRI scale was adopted in this study as instrument of data collection.

3.1 Technology readiness index (TRI Scale)

Consumers who demonstrate a higher intimacy with new technologies are considered more likely to use these tools and technological facilities. It is considered that an individual's readiness to interact with products and services with a strong technological foundation is a consequence of mental conducting and inhibiting mechanisms (PARASURAMAN, 2000) which are represented by four dimensions: (1) optimism, (2) innovativeness, (3) discomfort and (4) insecurity (PARASURAMAN and COLBY, 2001). The TRI scale is faced as an instrument used for measurement and evaluation of the readiness for the adoption of technologies by consumers, originally developed by Parasuraman (2000) and Parasuraman and Colby (2001). The four dimensions mentioned are featured as conductors (optimism and innovativeness) and inhibitors (discomfort and

insecurity), which together determine the readiness for the adoption of technology. These dimensions are described below.

The Optimism represents positive views of consumers about technology and is considered the first conductor dimension. Individuals considered optimists believe that technology offers control, flexibility and efficiency to people (PARASURAMAN, 2000). Thus, these individuals have a positive and predetermined understanding about the technology, even before they take advantage of its features. Yet they believe that they have greater control over their actions and these individuals are also interested in the prestige that the adoption of new technologies can bring them. Innovativeness demonstrates a tendency for individuals to become early adopters of certain technologies and/or opinion leaders influencing other consumers. Innovative individuals have a strong intrinsic motivation to adopt new technologies, despite the difficulties and risks involved. The discomfort is related to the perceived lack of control and feeling of oppression experienced by consumers related to specific technologies. People with high sense of discomfort with technology believe that they are controlled by it (PARASURAMAN, 2000). The Insecurity denotes the degree of consumer distrust related to the technology evaluated. Insecurity is also related to the level of consumer skepticism regarded to their abilities. Unsecured consumers have a lack of confidence in the technology security levels and require self-assertion in order to use them.

Parasuraman and Colby (2001) giving continuity to their studies about readiness for adoption of technologies defined, in a survey conducted in United States, five distinct segments of consumers. The first segment, the explorers, is formed by individuals with a greater readiness for adoption of technology and they are usually the first ones to adopt new technologies presenting strong motivations and low in-

hibitions. The second group, the pioneers, is formed by highly motivated individuals to adopt new technologies, but also they have strong inhibiting traits. The third segment, the skeptics, is formed by people with a profile of low motivation and weak inhibition for the adoption of technologies. The fourth group, the paranoids, is formed by people who believe in the benefits of technology but are endowed with a high degree of discomfort and uncertainty (inhibiting factors). And finally the fifth group, the laggards, is a segment of people who have low motivation and high inhibition for the adoption of technology.

4. Methodological Procedures

This study is characterized as descriptive conducted toward a survey research (BABBIE, 1990). Surveys are used when the study involves the collection of information from a large sample of individuals (HAIR, ANDERSON, TATHAM and BLACK, 1998). The present research was conducted considering undergraduate students of a private university from Santa Maria/RS/Brazil. The population considered was all undergraduate students enrolled at this private university (about 7,000 students). However, for accessibility reasons, this survey was directed to business students. The sample of 224 students obtained by convenience represents a significant part of all business students of the private university (nearly 700) at the moment of this research.

4.1. Instrument and data collection

The data collection instrument of this study was elaborated using the TRI scale (Technology Readiness Index) originally developed by Parasuraman (2000) and Parasuraman and Colby (2001). This scale comprises four dimensions. Two of them are considered as conductor factors (optimism and innovativeness) and the other two are faced as inhibitor factors (discomfort and insecurity). Those

dimensions - optimism, discomfort, insecurity and innovativeness - are originally composed by ten items, ten items, nine items and seven items respectively. Another construct was developed to measure the propensity for consumption over the internet using adapted items of Vankatesh, Morris, Davis, and Davis (2003), Parasuraman and Colby (2001) as well as items created for the purposes of this study. This last construct was elaborated with five items. The propensity of consumption in this study relates to the intentions of adoption and using a particular product or technological tools. In this case, the tool is the internet adopted to make purchases. So, the propensity of Internet shopping, therefore, is related to the willingness of consumers to use the Internet to make their buys. All items of the instrument of data collection were measured through a Likert scale of 5-point. One last question of the instrument aimed to identify if the respondents already had made purchases over the internet. The possible answers for this last question were "yes" or "no". So, these last evidences were used to perform a comparison between the resulting two groups.

The period of data collection occurred in October and November of 2011. It was adopted procedures of convenience sampling. The questionnaire was applied to undergraduate business students at her classes and also sent by e-mail. At the first week of data collection it was performed a pre-test. The instrument of data collection was considered well adjusted, so these initial respondents were considered valid and incorporated to the final sample. The sample was composed by 224 respondents that voluntarily joined the study and returned fulfilled and valid questionnaires.

4.2. Data analysis, method of estimation and adjustment measures

For data analysis, distributions

were first checked for normality of data through observation of the values of skewness, kurtosis and Lilliefors test. There were no values greater than 2 for skewness and greater than 7 for kurtosis. The results of the Lilliefors normality test showed that just a few of the distributions of the variables investigated were normality distributed. However, standardization was adopted to fit the database to the statistical procedures applied in this study. It was also analyzed the arithmetic mean and standard deviation values of distributions of the relevant items of each construct.

Through an exploratory factor analysis (EFA) with the 36 original items in the TRI scale, it was extracted five principal components that were observed as most appropriate to the data collected. It was accepted components with eigenvalues greater than 1. Each one of these components (latent variables) became an independent and exogenous variable of the reference model. The sixth latent variable, the propensity to purchase on the Internet, was considered as endogenous and dependent variable of the reference model.

A multiple linear regression was performed to determine the degree of association between the variables of this study. First of all, respondent characteristics like gender, age, income and past experience were treated as independent variables. Thus, latent variables obtained from EFA (Unpreparedness, Adaptive Optimism, Service Insecurity, Transactional Insecurity and Pioneerism) were treated as independent variables. The dependent variable of the model was Propensity to purchase over the internet. Considering the possibility of multicollinearity in the multiple linear regression performed in this investigation, it was calculated the tolerance and the variance inflation factor (VIF-test). A tolerance value less than 0.20 and/or a VIF value superior to 5 indicate a multicollinearity problem (O'BRIEN, 2007). Results indicate that the regression performed in

this study do not presents multicollinearity problem.

To assess the validity and efficiency of the dimensions and the regression models, it was also observed some indexes. The first one is the AVE (Average Variance Extracted) that represents the evaluation of convergent validity of latent variables and should have values greater than 0.5, in order to explain more than half of the variance of their items (HAIR *et al.*, 1998). The composite reliability should present values above 0.7, and evaluate the accuracy that the latent variable measures what it proposes to measure. The composite reliability, similarly to AVE, is also calculated through the standard factor loads and standard errors of latent variables obtained in the factor analysis (FORNELL and LARCKER, 1982). The value of R^2 (coefficient of determination) is the index value that indicates the percentage of the total variance of the dependent variable that is explained by the regression equation. Also, it was evaluated the Cronbach's alpha that determines the internal validity of the construct and it is acceptable values above 0.7 (HAIR *et al.*, 1998). The results of this investigation and its statistical evaluation are presented in the following section.

5. Results

This section initiates presenting the information regarding the profile of university students who joined this research. Then it is analyzed the data obtained from items of the TRI scale. Finally, it is presented the results of the analysis of the reference model as the result of hypothesis testing.

5.1 Demographic characteristics of respondents

Regarding to profile features of

respondents, related to gender it was observed that 66% of the respondents were women and 34% were men. It was also observed that most respondents have age between 20 and 25 years, with 47.5%. College students with age between 17 and 20 years were 37% of all respondents. Finally, individuals with ages from 30 to 35 years and between 35 and 48 years achieved respectively 2.5% and 2.5% of the public respondent. Obviously 95% of respondents are young people because the public researched was undergraduate students.

From the analysis of the income of respondents, it was observed that 25.5% gain between four and six minimum wages. However, other 23% earn more than eight minimum wages. People with an income between one and two minimum wages correspond to 17.5% of the respondents. And 17% of the respondents showed an income between 2 and 4 minimum wages. Respondents who gain less than one minimum wage correspond to 2.5%.

The undergraduate college students

that participate of this study were also asked whether they had purchased online. It was observed that more than half of respondents had already bought over the Internet, representing 67%. Respondents who have never made online purchases accounted for 33%. This result can be linked to the fact that most respondents are young and they probably shows lower degrees of technological resistance. However, this assumption could count with further scientific investigation.

5.2 Descriptive statistics and exploratory factor analysis

This section presents the descriptive statistics obtained for the selected items through the EFA of the TRI and for the construct of propensity to purchase over internet. It was obtained and selected, from the EFA six latent variables. The table 1 presents the arithmetic means, standard deviations and factor loadings for each item of their respective latent variables. Also the values of Cronbach's alpha, composite reliability and AVE (Average Variance Extracted) are showed.

Table 1 - Exploratory Factor Analysis with six dimensions (principal components)

Dimensions	Itens	Mean	Standart Deviation	Factor Loadings	Cronbach's Alpha	Composite Reliability	AVE
Adaptive Optimism (4.031)	OTI3	3.955	1.140	0.827 *	0.762	0.832	0.503
	OTI4	3.720	1.161	0.736 *			
	OTI2	4.010	0.897	0.513 *			
	OTI6	4.295	0.782	0.715 *			
	OTI5	4.175	0.953	0.717 *			
Pioneerism (3.335)	INO3	2.595	1.272	0.803 *	0.7579	0.8454	0.578
	INO7	3.655	1.078	0.786 *			
	INO4	3.580	1.091	0.742 *			
	INO5	3.510	1.080	0.707 *			
Service Insecurity (R) (3.858)	INS3	3.585	1.212	0.694 *	0.702	0.805	0.512
	INS7	4.210	1.025	0.712 *			
	INS9	3.975	1.188	0.598 *			
	INS4	3.645	1.231	0.838 *			
Unpreparedness (R) (3.113)	DES2	3.170	1.300	0.689 *	0.708	0.814	0.523
	DES4	2.865	1.329	0.722 *			
	DES1	3.420	1.301	0.692 *			
	DES5	2.995	1.354	0.786 *			
Transactional Insecurity (R) (3.742)	DES10	3.965	1.123	0.630 *	0.695	0.811	0.526
	INS1	3.870	1.183	0.802 *			
	INS2	3.625	1.313	0.867 *			
	DES8	3.510	1.089	0.557 *			

Propensity to purchase on the Internet (3.466)	PCI1(R)	3.280	1.474	0.591 *			
	PCI2	3.330	1.338	0.712 *			
	PCI3	3.100	1.341	0.789 *	0.801	0.863	0.561
	PCI4	3.805	1.235	0.822 *			
	PCI5	3.815	1.224	0.809 *			

Note: * p<0,001; (R) Reverse items or dimensions. Values under the dimensions name are their respective general means.

Through the evaluation of the values presented in table 1 it is possible to observe that the internal reliability (Cronbach's alpha) and the composite reliability of all constructs are satisfactory since they have values greater than 0.7. Also, all AVE values are satisfactory since they are higher than 0.5. The factor loadings of all items of the constructs showed statistical significance ($p < 0.001$) which is considered highly positive for the constructs and the reference model. Items with factor loadings lower than 0.5 were excluded of the Factorial Analysis. Through an initial analysis based on mean and standard deviation values it is observed that respondents have a positive degree of adaptive optimism, service insecurity, transactional insecurity as well as propensity to purchase on the Internet. However, considering a general evaluation of mean values of items, the pioneerism and unpreparedness showed intermediate degrees.

Regarding the results obtained

through the EFA, in a similar study Souza and Luce (2005) also obtained better results with the subdivision of the TRI scale in six principal components. The six dimensions founded by them are: (1) optimism, (2) innovativeness, (3) insecurity with information, (4) discomfort with constraints, (5) insecurity due to lack of personnel contact, and (6) discomfort with functional and physical risk. It is also possible to observe some similarities between the constructs obtained by Souza and Luce (2005) and those obtained in this particular study, mainly referring to constructs related to optimism and insecurity.

Table 2 below shows the correlation values between the latent variables of the reference model. The bold values placed on the main diagonal are the values of the square root of AVE of each latent variable and those values are considered satisfactory when they are higher than the correlations with the other variables.

Table 2 - Correlation between latent variables and square root of the AVE (diagonal)

	1.	2.	3.	4.	5.	6.
1. Unpreparedness	0.723					
2. Adaptive Optimism	-0.099	0.709				
3. Service Insecurity	0.206 **	-0.223 **	0.715			
4. Transactional Insecurity	0.105	-0.206 **	0.399 ***	0.725		
5. Pioneerism	-0.161 *	0.418 ***	-0.349 ***	-0.268 ***	0.760	
6. Propensity	-0.270 ***	0.448 ***	-0.401 ***	-0.389 ***	0.409 ***	0.749

Note: * p<0.05; ** p<0.01; *** p<0.001.

It is noted that the values of the square root of the AVE associated to each latent variables is greater than all correlations with other variables, considering it highly positive for the adjustment of the model. Also we can notice that there are highly significant correlations between the latent variables of

the model except for the correlation between unpreparedness associated with adaptive optimism as well as with transactional insecurity.

The results of the analysis performed by the Kolmogorov-Smirnov test (nonparametric test) applied to identify if there were significant differences

between genders showed significant differences for some of the latent variables of the referenced model. The results suggest that the adaptive optimism and pioneering are significantly higher for women than to men ($p < 0.005$ and $p < 0.001$ respectively). It was also founded that the service insecurity and transactional insecurity are significantly higher in men ($p < 0.05$ for both comparisons). The differences between genders for the unpreparedness and propensity for purchase on the internet showed no statistical significance. These findings contradict some studies that say that men have a greater propensity to shop on the internet (LI, KUO and RUSSELL, 1999; STAFFORD *et al.*, 2004; SUSSKIND, 2004) and have lower levels of insecurity as higher levels of innovativeness.

In examining other demographic characteristics of undergraduate college

students it was found that the results were inconclusive to the identification of significant differences related to the variables of the study model. The age and income of the participants do not represent significant factors, influencing none of the six variables studied. Evidences that suggest that age does not influence the propensity of purchase on the internet corroborate the results of other previous studies (LI *et al.*, 1999; ROHM and SWAMINATHAN, 2004).

The Table 3 shows the results for the regression analysis performed to test the relations between the variables investigated. It was performed six regression models, each one with a different dependent variable obtained from the factor analysis. Also, it is presented the coefficient of determination and the significance of each model tested.

Table 3 - Results for the Regression Analysis (six models)

6. Propensity		Collinearity statistics	
Intercept	0.991 **	Tolerance	VIF
Gender^a	0.076	0.857	1.167
Age	-0.020	0.913	1.095
Income	-0.028	0.829	1.207
Past experience^b	-0.702 ***	0.762	1.313
1. Unpreparedness	-0.162 **	0.788	1.269
2. Adaptive Optimism	0.152 *	0.730	1.369
3. Service Insecurity	-0.078	0.755	1.324
4. Transactional Insecurity	-0.119	0.927	1.079
5. Pioneerism	0.249 ***	0.786	1.273
R	0.665		
R²	0.442		
Adjusted R²	0.415 ***		

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; ^a dummy variable (0=female; 1=male); ^b dummy variable (0=never bought over the internet; 1=already bought over the internet).

The regression model presented above has the propensity to purchase on the internet as the dependent variable. Regarded to consumer's characteristics we observed that past experience has a negative and significant impact on propensity ($p < 0.001$). This evidence has important implications given the fact that young consumers investigated might had bad experiences in the past. However,

purchases over the internet are growing sharply, what suggests that, despite the evidence that the young consumers that already bought over the internet present lower levels of propensity to purchase online, they might present a sharper prudence and caution in their evaluations. This assumption deserves additional empirical investigations. Furthermore, it was observed, as expected, that

unpreparedness presents a negative impact on the propensity ($p < 0.01$). However, adaptive optimism and pioneerism has a positive and significant impact on propensity ($p < 0.05$ and $p < 0.001$ respectively), and such results were already expected too. Also, we can observe that this model has statistical significance ($p < 0.001$).

An overview analysis of the results obtained suggest that adaptive optimism of college students surveyed influences significantly and positively the propensity to purchase on the internet. This result corroborates similar results already reported in other studies that affirm that the convenience strongly influences the intention of consumption over the internet (KORGAONKAR and WOLIN, 1999; SCHAUPP and BÉLANGER, 2005; SWAMINATHAN, LEPKOWSKAWHITE and RAO, 1999). Evidences also shows that pioneerism influences significantly and positively the propensity to purchase on the internet. This finding is also corroborated by other studies that investigate the relationship between innovativeness and intention of shopping online (DONTHU and GARCIA, 1999; LIMAYEM *et al.*, 2000). Thus, results suggests that unpreparedness affects significantly and negatively the propensity to purchase on the internet of the undergraduate college students. It is considered that the lack of preparation affects the propensity to online purchases confirming similar results already reported in previous studies (BHATNAGAR *et al.*, 2000; FEATHERMAN and PAVLOU, 2003; JOINES *et al.*, 2003; KOLSAKER *et al.*, 2004; PARK *et al.*, 2004; PAVLOU, 2003; RUYTER *et al.*, 2001).

The regression model tested in this study showed a coefficient of determination (R^2) of 0.415, which can be considered positive regarding the fact that there are a large number of other variables that may influence the propensity to purchase on the internet. Through the coefficient of determination it is possible

to affirm that the five latent variables obtained through the EFA and the other four variables related to consumer's characteristics explain about 41.5% of the propensity for online purchases. However, 58.5% remains unexplained for this specific survey and consumers investigated. This suggests that the independent variables of the regression model, mostly unpreparedness, adaptive optimism and pioneerism, are important factors explaining the propensity of young consumers to purchase over the internet. Considering the R^2 , the tested model is highly significant.

6. Conclusions and Discussions

This study aimed to identify the readiness for the adoption of technologies by undergraduate college students, analyzing the relationship between this readiness and the propensity to online purchasing. As results presented, this study suggests that the students surveyed have an intermediate readiness for adoption of technologies. Also, it was observed that individuals surveyed have higher levels of optimism and insecurity as lower levels of discomfort and innovativeness. Therefore, it is considered that college students have a median readiness for the adoption of technology, considering the general means obtained for the five dimensions of the TRI scale.

The multiple linear regression technique adopted in this study was performed after conducting an exploratory factor analysis (EFA) with the items of the instrument of data collection. Through the EFA, it was obtained five constructs that assess readiness for adoption of technologies by consumers surveyed that was called (1) optimism adaptive; (2) pioneerism; (3) service insecurity; (4) unpreparedness; and (5) transactional insecurity. These initial results show that the TRI scale is appropriate to the evaluation of technological readiness and can be easily applied to online behavioral researches.

Considering the empirical eviden-

ces, it was observed the correlation coefficients between the constructs. Through this analysis it was found that all correlations were significant except the correlation between adaptive optimism and unpreparedness as the correlation between transactional insecurity and unpreparedness. In addition, the regression model shows that undergraduate student's past experiences impact negatively on the propensity to purchase on the internet. This evidence suggests that past online purchases experienced by undergraduate students was not satisfactory. This might be caused by an inadequacy of companies and available services. Gender and income of students do not impact in a significant way the propensity to purchase on-line. It was also observed that adaptive optimism and pioneerism impacts positively on propensity to purchase on the internet. These two behavioral aspects are related to an individual profile that presents a higher propensity to purchase over the internet. Thus, unpreparedness presents a negative impact on propensity to purchase online, suggesting that the students surveyed are aware to the need of a certain preparedness level to purchase online. However, the variables related to insecurity (service and transactional insecurity) do not presented significant impact on propensity.

It is important to highlight the limitations of this study, considering that one of the major fragilities that must be emphasized is the limited focus on a very specific audience. Replication of this study with other groups of consumers might bring interesting contributions and better understanding about the relationship between consumer behavior and technology. It is suggested, therefore, studies with other consumer groups as well as the development of new models that include other relevant constructs as psychological traits, adoption levels of social networks and word-of-mouth practices. In addition, the relation between service quality variables (SERVQUAL scale) and techno-

logical readiness variables (TRI scale) in a future survey investigation might bring interesting evidences. Also, the focus on specific product types, alternative technologies and managerial issues related to technological readiness and online purchases can also be considered as interesting academic research fields.

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APPENDIX: Items of the instrument of data collection

Dimension: **Adaptive Optimism**

- OTI3 - You like the idea of doing business via computers because you are not limited to regular business hours;
OTI4 - You prefer to use the most advanced technology available;
OTI2 - Products and services that use the newest technologies are much more convenient to use;
OTI6 - Technology makes you more efficient in your occupation;
OTI5 - You like computer programs that allow you to tailor things to fit your own needs;

Dimension: **Pioneerism**

- INO3 - In general, you are among the first in your circle of friends to acquire new technology when it appears;
INO7 - You find you have fewer problems than other people in making technology work for you;
INO4 - You can usually figure out new high-tech products and services without help from others;
INO5 - You keep up with the latest technological developments in your areas of interest;

Dimension: **Service Insecurity**

- INS3 - You worry that information you send over the Internet will be seen by other people;
INS7 - The human touch is very important when doing business with a company;
INS9 - If you provide information to a machine or over the Internet, you can never be sure it really gets to right place;
INS4 - You do not feel confident doing business with a place that can only be reached online;

Dimension: **Unpreparedness**

- DES2 - Sometimes, you think that technology systems are not designed for use by ordinary people;
DES4 - When you get technical support from a provider of a high-tech product or service, you sometimes feel as if you are being taken advantage of by someone who knows more than you do;
DES1 - Technical support lines are not helpful because they do not explain things in terms you understand;
DES5 - If you buy a high-tech product or service, you prefer to have the basic model over one with a lot of extra features;

Dimension: **Transactional Insecurity**

- DES10 - Technology always seems to fail at the worst possible time;
INS1 - You do not consider it safe giving out a credit card number over a computer;
INS2 - You do not consider it safe to do any kind of financial business online;
DES8 - Many new technologies have health or safety risks that are not discovered until after people have used them;

Dimension: **Propensity to purchase on the Internet**

- PCI1 (R) - It's likely that I do not buy over the internet and continue to buy through traditional ways;
PCI2 - I intend to purchase over the internet in the next six months;
PCI3 - I believe that purchase over the internet is a safe way to purchase;
PCI4 - I intend to purchase over the internet in the next two years;
PCI5 - I am in favor of purchases over the internet.
-