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A MODEL FOR EVALUATING B2C E-COMMERCE WEBSITES: APPLICATION IN THE CD E-RETAILING INDUSTRY IN BRAZIL

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Abstract

The scope of this research is to develop and test a model for evaluating B2C e-commerce websites quantitatively. Consequently, this study seeks to investigate the relationship between the website interface of B2C e-commerce and virtual customer behavior, emphasizing the purchasing attitude and intention. The objective of this paper is, therefore, to research which features of a virtual store effectively influence the user purchasing process via the Internet. In order to achieve this aim, the Technology Acceptance Model (TAM) was adapted for pertinent theoretical references about consumer behavior on the web. The model developed was then tested and validated through a Structural Equation Modeling (SEM) approach. An empirical analysis of the CD e-retailing industry in Brazil was then conducted, as this is one of the most important areas of the B2C e-commerce realm. The study concludes that, for the electronic commerce of CDs, ease of use, trust, pleasure and attractiveness as perceived by visitors to CD e-retailing websites are key issues for understanding customer attitude and purchasing intention. Lastly, recommendations associated with the conclusions of this research are made, and further research options are proposed.

Key-Words: B2C E-Commerce; Website Evaluation; E-Retailing; CD Industry; Brazil

1 INTRODUCTION

In a virtual enterprise, most of the contact with customers hinges on the interaction between the customer and the website. However, most B2C e-commerce websites were not developed to cater to this aspect, thus creating obstacles to conquering user trust in order to make the customer feel sufficiently comfortable to conduct a commercial transaction (Zhang *et al*, 2000). Indeed, some websites effectively discourage the purchase, producing results that are diametrically opposed to those desired (Nielsen, 2001).

Furthermore, the Brazilian on-line retailing industry has experienced sustained growth due to the Internet. This digital channel has increased market-share in the retailing industry as a whole (Parente, 2000). However, very little is yet known about how this virtual environment affects customer behavior, i.e. customer attitude and intention throughout the course of the purchasing process. Moreover, it is important to stress that in this specific scenario, all interaction between the customer and the digital company is developed via the website. So, its characteristics are linked to the subjective and objective elements that will influence the purchase, which makes careful planning of the website of paramount importance, as this will either lead to the success or failure of a virtual enterprise (Nielsen, 2001).

Hence, the scope of this article is to build a B2C e-commerce website evaluation model that makes it possible to pinpoint the website characteristics that contribute to improving the virtual customer's attitude and purchasing intention. This model will be applied in the Brazilian CD e-retailing industry. Similar studies regarding B2C e-commerce website evaluation have already been undertaken by several authors (Lohse & Spiler, 1999; Turban & Gehrke, 1999; Zhang *et al*, 2000; Zhang & Dran, 2001; Schubert & Selz, 1999; Lederer *et al*, 2000; Heidjen, 2001, to name a few), though all of them use different methodologies and pursue varied objectives. In this research, different facets of these models are blended in such a way as to make it possible to establish the relationships between the several factors that enable an on-line transaction.

This paper is structured as follows. Firstly, the theoretical background used to develop the model is presented. The Technology Acceptance Model (TAM) adapted to B2C e-commerce, as well as the classification of on-line customers, is then stressed. Using this bibliographical review, the research methodology adopted, the hypotheses to be tested in the paper and the model developed to evaluate the influence of the e-retailing website on the increase of customer attitude and purchasing intention are set forth. The model developed is then tested, validated and reviewed through its application in the Brazilian CD e-retailing industry. Finally, the contributions and limitations of the study are presented, in addition to recommendations for further research addressing this area.

2 BIBLIOGRAPHICAL REVIEW

2.1 Consumer Behavior on the Web

The behavior of on-line customers is central to this study, as it is important to understand the mechanics of purchases made via the Internet. One of the major challenges in studying this channel is to grasp how the consumers will act in this environment, as it cannot be taken for granted that they will behave as in the traditional channel. Indeed, as argued by Kotler & Armstrong (1999), several issues (cultural, social, personal and psychological) influence the client. Zellweger (1997) was a pioneer in the study of differences between traditional and virtual consumers.

Hoffman *et al.* (1998) tackled the challenge of measuring the relationship between purchase and consumer trust via a website. Although security is a key issue in commercial transactions, a study by e-BITS (2001) revealed that the Brazilian customer is fairly cautious in an on-line environment.

Virtual buyers are more concerned with security issues than with their privacy (Nielsen, 1999). Furthermore, they are less tolerant with websites that are slow to capture their attention (Mouty, 2001).

The conversion rate of visitors into clients and the reasons why they use the Internet are both tracks of academic research. Moe & Fader (2001) identified two patterns of customer behavior on the web, namely exploratory search or objective search. Turban *et al.* (2000) classified these behavior modes as hedonist or utilitarian. Wolfinbarger & Gilly (2001) called these two forms of behavior as experience or objective-based. All in all, it is possible to identify two different profiles in Internet users – a relevant fact for the evaluation of a B2C website

In their research into lifestyle and purchaser profile, Bellman *et al.*(1999) concluded that there is a set of indicators associated with how connected (wired) users are that makes it possible to assess their inclination to undertake an on-line purchase. Kim *et al.*(2000) elaborated on this conclusion, including the risk and benefit perceived by users in a digital transaction as critical issues in a virtual purchase.

2.2 TAM – Technology Acceptance Model

Davis (1989) developed the original version of the Technology Acceptance Model. His intention was to explain the use of Information Technology by users, adopting a causal relationship based on beliefs, perceptions, attitudes, intentions and behavior. According to the model, these concepts should be linked to the Theory of Reasoned Action developed by Fishbein & Ajzen (Heidjen, 2000a), which contends that a person's perceptions are responsible for his/her attitudes towards a given object. These attitudes, in turn, were thought to define the consumer's intentions, thereby modifying his/her behavior.

The TAM model has been applied as a way of explaining customer satisfaction in relation to a specific website by several researchers, including Heidjen (2000b), Ledered *et al.*(2000), Venkatesh (2000), to name but a few. Each researcher has different objectives, placing varying emphasis on each of the factors involved and including or excluding new explanatory components.

According to the model proposed by Heidjen (2000b), perceived utility and ease of use are the main factors influencing a person's attitude in the use of information systems. These factors might change the user's behavior, generating either positive or negative motivation. The user's final behavior therefore determines the success or failure of information system use. The model assumes that all the factors can be measured and are positively associated with the use of the information system, i.e. the more users perceive the utility of the information system, the more they use it, and vice-versa. The perceived utility was defined as the expectation a person has about how a particular information system can improve his/her performance. The perceived ease of use, on the other hand, would be the time spent by users to learn how to use a specific information system. The attitude related to the use of the information system is represented by the users' evaluation about their desires to employ the technology (Ledered *et al.*, 2000). Moreover, the behavior accrued from the use would be the attitude in action, i.e. the accomplishment of the desire to use the technology (Heidjen, 2000b). Venkatesh (2000) adapted the model aggregating the concepts of perceived pleasure and risk by users, as a way of explaining their attitudes and intentions regarding use of the system. To measure trust and risk, Hoffman *et al.*(1998) developed a framework addressing the influence of these factors in the user's purchasing attitude and intention, also including the size and reputation of a virtual store.

3 THE PROPOSED MODEL

The model proposed in this research unites the security and trust features proposed by Hoffman *et al.*(1998) with the characteristics proposed by the Technology Acceptance Model (TAM) adapted to the web by Heidjen (2001). In order to complement the study, the users' characteristics (Zhang *et al.*, 2000), their life style (Bellman *et al.*, 1998) and their behavior associated with searching and purchasing in the Internet (Wolfinbarger & Gilly, 2001; Moe & Fader, 2000) were also considered.

The model is based on existing correlations between issues associated with the user/enterprise, namely external factors not controlled by the graphical interface, and issues related to the website design, i.e. internal factors controlled by the virtual enterprise. Therefore, user style, user behavior orientation, and size and reputation of the virtual store are factors considered external to the graphical interface (antecedents to the model). On the other hand, the website design influences the consumer's perceptions in relation to four aspects: i) perceived utility; ii) ease of use; iii) perceived pleasure and attractiveness; and iv) trust and risk associated with the purchase, all considered internal factors related to the design of the website. Hence, the combination of these two main tracks (internal and external factors) would determine user attitudes related to their virtual consumption in a specific store, i.e. the attitudes that would lead the customer to a behavior mode inclined to purchasing and, finally, to an intention to buy.

3.1 External Factors

Regarding the external factors associated with commercial transactions on the web, customers can be classified according to their browsing objectives, their search for sales, their life styles, etc. They have unique needs and desires, and behave according to their past purchasing experiences (Kotler & Armstrong, 1999). Besides, their concern with trust and risk in the website (Jarvenpaa *et al*., 2000) depends on their perception associated with the size and reputation of the store (Hoffman & Novak, 1998).

Hence, the hypotheses to be tested statistically related to the external factors of the website are presented below:
- H1: A wired user's style is associated positively with his/her idea of the perceived utility of a website.
- H2: A wired user's style is associated positively with his/her idea of the perceived ease of use of a website.
- H3: A wired user's style is associated positively with his/her idea of the perceived pleasure and attractiveness of a website.
- H4: A wired user's style is associated positively with his/her idea of the perceived trust in a website (less risk for the user).
- H5: A user's orientation based on objectives is associated positively with his/her idea of the website's perceived utility.
- H6: A user's orientation based on objectives is associated positively with his/her idea of the website's perceived ease of use.
- H7: A user's orientation based on objectives is associated positively with his/her idea of the perceived pleasure and attractiveness associated with the website.
- H8: A user's orientation based on objectives is associated negatively with his/her idea of the perceived trust in a website (higher risk for the user).
- H9: The store's size and reputation is associated positively with the perceived trust a user has in the store's website (less risk for the user).

3.2 Internal Factors

The analysis of the key success factors of a CD e-retailing website is the main scope of this research. This purpose leads to the hypotheses below associated with the internal factors of a website:
- H10: The user's idea of the perceived utility and relevance of information is associated positively with his/her attitude and intention to purchase CDs on an e-retailing website.
- H11: The user's idea of the perceived ease of use is associated positively with his/her attitude and intention to purchase CDs on an e-retailing website.
- H12: The user's idea of the perceived pleasure and attractiveness is associated positively with his/her attitude and intention to purchase CDs on an e-retailing website.

- H13: The user's idea of the perceived trust (and reduced risk) is associated positively with his/her attitude and intention to purchase CDs on an e-retailing website.

As stated above, the proposed model combines/includes certain characteristics of the Technology Acceptance Model (TAM), making it easier to understand the critical success factors associated with a graphical interface. However, all these elements must be tested according to the data collection and sample evaluation. Only after that, is it possible to verify whether or not the model tallies fully with the hypotheses presented above.

In Exhibit 1 below, the model is depicted as a whole, through the relationships among the hypotheses already presented above.

4   RESEARCH METHODOLOGY

The research follows the procedure suggested by Trochin (2001), splitting the validity into four main groups: conclusion validity (investigating the relationships among the variables), internal validity (analyzing the causality of these relationships), construct validity (assessing the reliability of the measures) and external validity (establishing how the conclusions can be generalized). Thus, in this section the measures used are presented and the sampling stages, data collection procedure and statistical techniques are set forth.
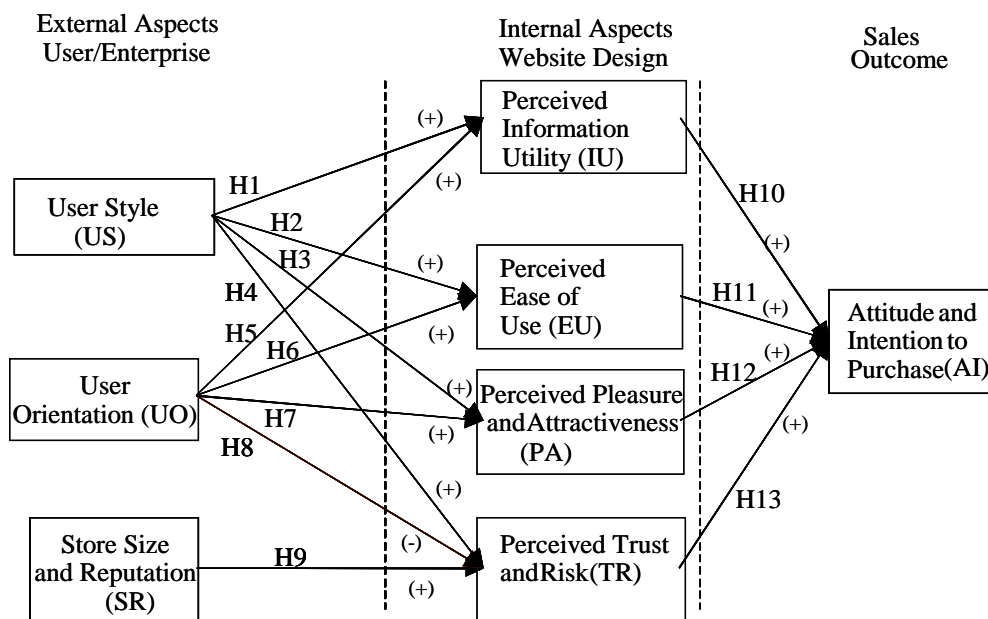
Based on Hoffman & Novak (1998); Jarvenpaa *et al.*(2000); Turban *et al.*(2000); Zhang *et al.*(2000); and Heidjen (2001).

Exhibit 1 – Proposed Model for Website Evaluation

4.1   Sampling Procedures

The population of this study encompasses all Brazilians who have purchased a CD at least once using the Internet as their transaction/information channel. A sample of 2,000 subjects was taken from web-based community groups, discussion groups on the Internet and other digital sources. From this sample, a group of 1,500 subjects was randomly selected. From this group, 496 subjects agreed to participate in this research (33.07% conversion rate).

An on-line form to be filled out by the subjects via the web was used, following the recommendations of Taylor (2000) regarding e-surveys. Since this research deals with electronic commerce, it was assumed that using the web to collect data would not generate any kind of bias in the sample. Indeed, every on-line purchaser is an Internet user and could consequently access the forms on the web.

The techniques used for data analysis in this research presuppose that the sample is both normal and random. In order to assess the former premise, tests to evaluate the sample's kurtosis and skewness were conducted. In addition to this, an analysis of the normality of the sample was carried out (Sharma, 1996) as well as the chi-square goodness of fit test (Snedecor & Cochran, 1989). In order to test whether the sample was random, the Run Test (Wonnacott, 1972) was used. None of the above tests indicated that the premises were violated.

The questionnaire used a five-point Likert scale, in which all the variables were considered ordinals for statistical purposes. In this kind of measurement, the variables can be adequately ordered, though no inferences can be drawn about the distances between them. The scale used is discussed in the next section.

4.2 Data Measurement and Collection

One of the greatest challenges in collecting data for research is the creation and formatting of a questionnaire. In order to avoid misinterpretations in this endeavor, a preliminary questionnaire was initially distributed to a pilot group of 14 subjects. This group not only answered the questionnaire, but could also suggest changes in fuzzy points and in the order of the questions. This process had a great impact on the original document, narrowing the scope of the questions and eliminating redundant and/or useless questions. This initiative solved problems of scale, the ordering of items and questions, as well as making it easier to fill out the form.

The modified questionnaire was then submitted to a pre-test involving the same pilot group, in order to conduct initial data analysis. In this way, it was possible to estimate the sample size and verify whether the statistical tools to be applied complied with the research objectives. The definitive questionnaire was developed using the contributions of this pilot group, as well as the contributions made by the following authors: i) Moe & Fader (2000); ii) Bellman *et al.*(1999); iii) Hoffman & Novak (1998); iv) Heidjen (2001); v) Zhang *et al.*(2000); vi) Turban & Gehrke (1999); and vii)Zhang & Dran (2001).

4.3 Statistical Analysis Processing

In order to analyze the data accrued from this research, statistical methods and multivariate analysis techniques were used. The former are useful for analyzing each variable graphically, identifying outliers and confirming the necessary premises. The latter are useful for validating the hypotheses and the proposed model as a whole, as well as the relationships among the constructs. In order to achieve this, the SAS 8.2 and LISREL 8.51 statistical packages were used to perform the factorial analysis and structural equation modeling (SEM).

The use of SEM gives flexibility to the data analysis, making it possible to confirm the existence of relationships among constructs (confirmatory model strategy). Furthermore, SEM permits the development of a more complex structure of both observed variables (indicators) and latent variables (constructs) (Hair *et al.*, 1998). The analysis process starts with the evaluation of the reliability of the measures and the validation (convergent and discriminant) of the indicators in relation to the constructs. In order to achieve this, factorial analysis was used to verify the reliability and validity of the constructs. After this analysis, the structural model itself was investigated, whereby its goodness of fit, as well as the proposed relationships among the latent variables, was duly established.

5   DATA ANALYSIS

The data analysis followed the procedure suggested by Hair *et al.*(1998). First, the coherence of the estimates and the goodness of fit of the model were evaluated. This was followed by an analysis of the measurement model, i.e. the relationships between the indicators and the constructs (observed and latent variables). Finally, the results of the structural model analysis were reported, as well as the evaluation of the hypotheses used to test the relationships among the constructs and considerations about the relationship levels among them.

5.1   Estimates and Goodness of Fit of the Model

The structural equation model can be analyzed either using the correlation matrix or the covariance matrix. In order to achieve the proposed outcomes, the correlation matrix was used in this research. The first obstacle to determine this matrix lies in the use of ordinal variables. The correlation among continuous variables is measured by the Pearson coefficient. However, when dealing with correlations among ordinal variables, the Polyserial/Polychoric Correlation Matrix must be used (Jöreskog & Sörbom, 1993). Furthermore, it is necessary to calculate the asymptotic covariance matrix, to be used as a weighting matrix associated with the correlation measures. Besides, according to Jöreskog & Sörbom (1993), the model must be estimated by the Minimum Weight Least Square method (MWLS), instead of the traditional Maximum Likelihood Estimator method (MLE).

The first analysis to be made addresses the coherence of the estimates. In order to achieve this, three items must be verified: i) negative error variance (also known as "Heywood Case" variance), ii) standard coefficients greater than 1.0, or iii) very high standard error. The "Size and Reputation" (SR) construct revealed the "Heywood Case" variance problem and was consequently dropped from the model. This error usually derives from the specification of indicators associated with latent variables. After eliminating some indicators, the model became stable without any offending estimate or identification error.

The next step was to evaluate the model validity, which was achieved by analysis of several goodness of fit indexes, as presented in Table 1 below.

The model is well adjusted to the data collected, as the NFI, TLI and CFI indexes are above the suggested minimum of 0.9, according to Klem (1995). Also, the AGFI calculated was close to 0.86, again confirming the goodness of fit of the model, as the closer the value is to 1.0, the better the model. The residuals seem to be small, as the value of the RMSR (Root Mean Square Residual) was around 5%, confirming yet again the goodness of fit of the model according to Hair *et al.*(1998). The value of the adjusted residual index (RMSEA) must lie between 0.00 (perfect fit) and 0.08 (at a 5% level of significance), which occurs with the calculated value of 0.0582. The sample size is also adequate, as it is greater than the critical value presented in the Hoelter index (Hair *et al.*, 1998). Hence, it can be concluded that the model cannot be rejected as invalid for explaining the observed data.

The chi-square test alone does not support the validity of the model. The index accrued from this statistic is a measure of the badness of fit of the model, measuring the unexplained variation of the residuals. However, as argued by Jöreskog & Sörbom (1993), the calculation of this measure is based on the sample size (N-1 times the minimum value of the Fit Function, as N is the size of the sample), being overestimated for samples having more than 200 observations (such as this one). In order to avoid this kind of problem, it is better to use measures that offset the size of the sample, such as AGFI, RMSEA, NFI and CFI.

Goodness of Fit Indexes of the Model	Value	Goodness of Fit Indexes of the Model	Value
Final Fit Function	0.302	Normed Fit Index (NFI)	0.9788
Goodness of Fit Index (GFI)	0.9246	Tucker-Lewis Index (TLI)	0.9962
GFI Adjusted for df (AGFI)	0.8573	RMSEA Estimate	0.05815
Root Mean Square Residual (RMSR)	0.0526	RMSEA 90% Lower Confidence Limit	0.0331
Chi-Square	198.39	RMSEA 90% Upper Confidence Limit	0.0832
Chi-Square DF	170	Bentler's Comparative Fit Index (CFI)	0.9351
Pr > Chi-Square	0.07	Hoelter's Critical N	52

Source: SAS 8.2 Output, The CALIS Procedure.

Table 1 – Results of the Analysis of the Model's Goodness of Fit

5.2 Measurement Model

Analysis of the measurement model starts with the assessment of the significance level of the indicators, followed by verification of the scale validation. In the t-test applied to the coefficients of the indicators, at a 1% level of significance, all the indicators were considered statistically significant in relation to their associated constructs. After that, it is necessary to evaluate the reliability of each construct. A construct is said to be reliable when its indicators explain most of its variation. Three independent methods are usually used to evaluate reliability of a construct: Cronbach's α-value; composite reliability; and analysis of the extracted variance (Sharma, 1996). The extracted variance is used to verify the discriminant validity (Pedhazur & Schmelkin, 1991).

According to Nunnally (1978), Cronbach's α-value must be higher than 0.7, whereas the composite reliability must be above 0.6. Another important measure is the extracted variance. This measure is the existing rate of dispersion among the indicators for a specific construct. According to Klem (1995), this measure must be higher than 0.5, for a level of significance of 5%. The three measures quoted are useful for explaining how the indicators confirm the construct. Higher values of these measures demonstrated that the construct was well measured (Sharma, 1996). Table 2, below, depicts Cronbach's α-value, the composite reliability and the extracted variance for the sample used in this research.

| Construct	Cronbach's α-value	Composite Reliability	Extracted Variance
US	0.70	0.62	0.51
UO	0.77	0.70	0.58
IU	0.75	0.70	0.54
EU	0.81	0.77	0.59
PA	0.89	0.84	0.69
TR	0.92	0.87	0.72
AI	0.98	0.91	0.80

Source: SAS 8.2 Output, The CALIS Procedure.

Table 2 – Reliability of the Indicators

5.3 Hypothesis Test

Once the goodness of fit values of the model were calculated and the measurement model evaluated, it was possible to test the relationships between the constructs and their related hypotheses. The following path diagram (Exhibit 2) is used to depict the values calculated.

Based on the results obtained by SEM, the hypotheses were tested (at a 1% level of significance) and the coefficients obtained are depicted below in Table 3.
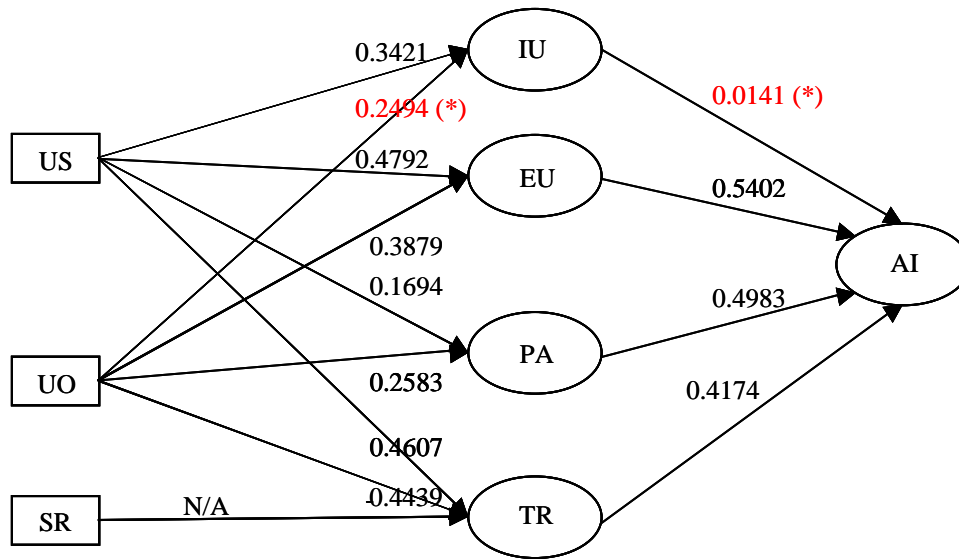
(*)Not significant at 1% level
Source: SAS 8.2 Output, The CALIS Procedure.

Exhibit 2 – Path Diagram: Final Solution Coefficients

Structural Path	Hypothesis	Coefficients	t-Test	Decision
User Style -> Information Utility	H1	0.3421	6.0533	Supported
User Style -> Ease of Use	H2	0.4792	8.7907	Supported
User Style -> Pleasure and Attractiveness	H3	0.1694	3.6932	Supported
User Style -> Trust and Risk	H4	0.4607	7.1701	Supported
User Orientation -> Information Utility	H5	0.2494	2.2857	Not Supported
User Orientation -> Ease of Use	H6	0.3879	4.0621	Supported
User Orientation -> Pleasure and Attractiveness	H7	0.2583	2.7272	Supported
User Orientation -> Trust and Risk	H8	-0.4439	-3.5794	Supported
Size and Reputation -> Trust and Risk	H9	N/A		
Information Utility -> Attitude and Intention	H10	-0.0141	0.1731	Not Supported
Ease of Use -> Attitude and Intention	H11	0.5402	6.5388	Supported
Pleasure and Attractiveness -> Attitude and Intention	H12	0.4983	8.3099	Supported
Trust and Risk -> Attitude and Intention	H13	0.4174	10.0312	Supported

Source: SAS 8.2 Output, The CALIS Procedure.

Table 3 – Results of the Structural Model

Ten out of the thirteen proposed relationships revealed statistical significance, confirming the hypothesis presented. Two hypotheses were not supported (H5 and H10), and one hypothesis could not be evaluated (H9). According to Table 3, the user's orientation (UO) was not supported as related to the user's perception of information utility (IU). Similarly, the information utility (IU) does not seem to affect the user's attitude and intention to purchase (AI).

The hypothesis regarding the size and reputation of the store (SR) influencing the trust and risk (TR) perceived by the user was derived from Hoffman & Novak's research (1998). This hypothesis could not be tested, as the structural equation model wasn't able to establish a valid measurement model for this construct. Thus, no conclusions can be drawn about this construct in this research.

According to the tests, the ease of use, the user's perceived pleasure and the trust and risk perceived by the user in the website cause a positive attitude, increasing the user's intention to purchase CDs via the Internet. In other words, the greater the user's perceived ease of use, perceived pleasure and trust in

the website, the better the user's attitude in relation to the website and the greater the user's intention to purchase/return to the virtual store.

Based on the data analysis conducted by the authors and the information accrued from the structural model, it can be concluded that virtual stores should concentrate on continuous enhancement of their websites, so as to increase both traffic and sales. In order to accomplish this, the research showed which indicators are more relevant for each construct, as well as the effects of each valid construct within the model (including the priority among them), so as to improve the user's attitude and intention of purchasing CDs on an e-retailing website.

6   CONCLUSIONS, RESEARCH LIMITATIONS AND FURTHER STUDIES

Based on the theoretical background outlined, a causal model was proposed and tested, blending several characteristics of other models currently in use. Each part of the proposed model was supported by components of other models, which explains how and why all these parts are consolidated in this new enlarged model. These elements were divided into internal and external facets of a website. Naturally, this research seeks to evaluate the existing features of a virtual store that improve the user's attitude towards the website, as well as his/her intention to purchase CDs. Indeed, as explained earlier, it is of paramount importance to consider the external aspects of this virtual arena, so as not to miss important explanations about the website's performance. Moreover, the user's characteristics must be established, in order to better understand his/her behavior in a digital environment. Several models do not take these issues into consideration, which is why this research offers original contributions for understanding this environment.

The goodness of fit analysis of the model showed that it was adequate, with a well-dimensioned sample size. The indexes calculated (NFI, TLI, AGFI, RMSEA and CFI) indicated a very good match between the model and the collected data of the sample. This goodness of fit was even greater than that obtained by Heidjen (2001) in his proposed model. Furthermore, the reliability of the measurement scale was also adequate, as Cronbach's α-values were all greater than 0.7 (Nunnally, 1978), reflecting the goodness of fit between the scale and the constructs measured.

The SEM structural equation supported the contention that user style (US) and user orientation (UO) are relevant to understanding the behavior of an on-line customer. The data proved that the user's attitude and intention is modified by the way he/she perceives the interface. As explained earlier, the ease of use (EU) related to the website presented the highest relationship coefficient along with the user's attitude and intention to purchase (AI), as this factor results in a 54% increase in this scale (AI). Another important factor in this research is the pleasure and attractiveness (PA) perceived by the users, which is also an important component in the purchase pattern of a virtual consumer. This construct contributes with a weight of nearly 50% in the user's attitude and intention to purchase (AI) via the website. Lastly, the relationship between perceived trust and risk (TR) and user attitude and intention to purchase (AI) achieves a value of 42%. Thus, a digital store's investment in user-friendliness, a visually pleasing lay-out, and a safe transaction process results in improved expectations related to sales, as the user's attitude and intention to purchase are increased. Moreover, depending on the user's style and orientation, his/her perceptions of the website characteristics are different.

The relationship between Size and Reputation (SR) and Trust and Risk (TR) could not be evaluated in this research. In this case, due to the kind of analysis undertaken, this construct (SR) had to be dropped from the original model. Hence, notwithstanding the studies of Hoffman & Novak (1998), this relationship could not be inferred.

Although supported by theory, only two relationships were not supported by the data collated, namely that between user orientation (UO) and perceived information utility (IU), and that between

information utility (IU) and user attitude and intention to purchase (AI). Despite existing theory (Turban *et al*., 2000, Zhang *et al*., 2000, Heidjen, 2001a), the data collected did not support these relationships. Possibly, a rapid change in virtual customer characteristics, with customers tending to search for useful and relevant information in the easiest and fastest way available, can render these constructs and their associated relationships redundant to the respondents. However, further research addressing this specific issue is required.

A limitation of the method adopted is related to the use of the Attitude and Intention (AI) variable as a single construct. Based on the studies of Fishbein & Ajzen (Heidjen, 2000a), this construct encompasses different theoretical concepts. However, if this construct were divided in two, there would not be sufficient indicators to assess discriminant validities, which would lead to measurement errors. Thus, the option chosen by the authors was to measure them jointly.

Refinement of measurement of these constructs, by performing similar analysis addressing other segments of B2C e-commerce, is a recommended area for further research. This would permit verification of whether or not the same pattern occurs in other industries. Furthermore, incorporating new theoretical concepts to the model, as well as fine tuning of the measurement of constructs, could confirm the external validity of this model, making it possible to extend the conclusions drawn in this paper to all areas of the e-commerce realm.

A significant improvement in this study would be the inclusion of the CD digital store's mark-up as a dependent variable. This would permit not only validation of the model *vis-à-vis* the website's actual financial performance, but also measurement of the return in profits on CD sales associated with each change in website features. However, barriers involved in obtaining such data may hamper future researchers in their attempt to achieve this.

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