Chinese Market Research on VR's Loyalty to Cross-Border E-Commerce Consumers

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ABSTRACT

The main purpose of this study is to investigate its innovative technology VR (virtual reality) and its application in consumer shopping on e-commerce platform. We investigated their consumers' shopping behavior in e-commerce platform through the survey method, and whether the introduction of VR will further enhance their consumers' shopping and application on the platform. The application of VR is mainly to help consumers simulate the effect in the process of shopping. Our research mainly understands consumers' perception, purchasing behavior and purchasing intention, which are the main targets of this research. Our research focuses on the survey of Chinese consumers in 2020. The reliability of the questionnaire was investigated mainly through questionnaire survey.

Keywords: virtual reality; consumer perception; purchase behavior; purchase intention

INTRODUCTION

In recent years, highly visual issues have been proliferating and innovating throughout the market. Our research is mainly through the virtual model, to achieve its e-commerce through the virtual way to attract its consumers to continue shopping loyalty. Simulation situation is a new topic in recent years. We use VR technology to introduce its application in cross-border e-commerce shopping situation model. VR is a new high-tech technology. It is hoped that through the application of VR in e-commerce shopping, consumers' perception of shopping can be investigated, and the risk of shopping can be further reduced. The application of virtual reality technology to consumers allows consumers to combine technology tools to compensate for the risks of shopping online. In traditional website shopping, consumers can only see pictures, but can't touch the actual goods. Through the application of VR technology, consumers can truly simulate their shopping in different countries. Nenonen (2006) mentioned that online shopping is a kind of risk for consumers. Perceived risk for consumers will affect whether consumers will go shopping. Therefore, trust considerations are one of the key factors for consumers shopping online. Tan and Theon (2001) mentioned that trust is a key factor in consumer transactions. Through the application of VR tools to consumers, the ultimate goal of our research is to achieve that consumers can simulate real online shopping and further achieve the cognitive gap between buyers and sellers. Sirdeshmukh (2002) proposed that the establishment of consumers' trust degree will affect the final consumer loyalty before, during and after purchase. We use VR technology to increase the relationship between buyers and sellers and reduce the risk of buyers. The VR tool can indirectly affect the trust between buyers and sellers. The combination of interdisciplinary subjects, this study, the algorithm of management, information technology, marketing and other related disciplines, the main purpose is to discuss the

cross-border electricity a new business model, how to through the import of VR technology, further make consumers shopping in the virtual world, find a suitable for their own goods, solved in virtual shopping can only look to the pictures of goods, but there's no way to really practical in a store shopping.

In recent years, the issue of cross-border e-commerce has obviously begun to attract attention and discussion. We can clearly understand that the design of cross-border e-commerce mechanism is a very important key factor.

The most important concept of e-commerce platform is to standardize the system of its platform, so that users can feel at ease on the platform. Mintzberg (1987) proposed that management system and style would affect the strategy of the whole organization. Therefore, the management standard of the platform is very important. How to let the platform users can get their belief and identity relationship is very important. Such beliefs, norms and values enable users to constantly expand and accumulate their popularity through the use of the platform and the connection on the platform, which becomes one of the important factors of community power. This series of user beliefs can make the use of user beliefs on the platform continue to increase and expand, and become a key factor in the accumulation of traffic on the platform.

Research on some platform, there are many just mentioned platform user how to use some of the mechanisms of platform and the terms and conditions, and our belief concept is to break through the traditional concept, improve its mechanism can have flexible and nimble name again, to regulate the system for different users, further allows users to get their belief in the platform.

Mostafa (2007) proposed that personal beliefs and values can influence users' decision-making views. Therefore, the belief in a platform is to establish its main key concepts through the overall platform norms and mechanisms. Many journals refer to the concept of faith, and our understanding of faith is cooperated and applied through mutual trust (TRSUT). Belief mainly refers to the concept of human perception and perception, so the idea and application of use also become important concepts.

The evaluation of seller information is attached great importance to the e-commerce platform, and buyers will pay attention to and observe the evaluation of online messages. The higher the evaluation score, the more positive evaluation the seller has received from many buyers. However, there will also be uncertainty on the Internet, that is, whether the authenticity of the information will cause its error. Therefore, in such a situation, it is best to have a third-party impartial unit to evaluate the seller's sales behavior, and indirectly establish the relationship between the seller and the seller.

LITERATURE REVIEW
• Consumer loyalty
In recent years, there has been a lot of literature on the relationship between brand loyalty and consumer loyalty. In the process of literature review, this study mainly looked at their consumer loyalty from the perspective of emissaries. The most important concept of consumer loyalty lies in the establishment of the relationship between the platform and users, and the further establishment of consumer loyalty. Consumer loyalty is not only the establishment of users' perception of the platform, but also the establishment of the emotion of consumer loyalty to users. It can be seen that consumer loyalty is an important concept and application for the platform to connect users. It is important that users not only use the platform, but also identify with the platform.

Alker (1995) defined that consumer loyalty is not only a product substance, but also includes the relationship between the two attributes. Padberg et al. (1974) mentioned that a consumer loyalty can provide economic information. Therefore, how to establish mutual relationship and loyalty with platform users is one of the key important factors. Consumer loyalty enables users to identify with their platform emotions and perceptions, and users can continue to maintain their consumer loyalty. The establishment of customer loyalty can enable different user groups to share their information through the platform, and through the mode of information sharing, get the recognition of the platform users. This series of connections enables consumer loyalty to build long-term relationships and brand commitment. Some scholars have spoken of a consumer passion for their products. For example, Fournier (1998) mentioned that consumer loyalty, like love, is one of the important factors that can maintain the relationship with consumers. Wernerfelt, 1991 mentioned the concept of consumer loyalty becoming an important asset and willing to use the brand. Jacoby (1973) mentioned that consumer loyalty has been described as a psychological and functional process. Therefore, we can clearly understand the consumer loyalty needs through the user's perception of cognition and emotion. Bolton (1998) proposed that consumer satisfaction would affect the profitability of sellers, and consumers' relatively high loyalty could bring economic effects for sellers.

• Trust perceived value and mechanism establishment
Karrh (2003) put forward the important concept of generating positive consumer response and reaction. Therefore, how users on the platform are recognized and recognized is one of the key factors. Perceived value is often mentioned in psychology and consumer behavior. Perceived value represents a person's identity and idea, which can bring its value after continuation. This series of processes becomes perceived value.

Yoon, Choi, & Song (2011) mentioned that consumers' perception can be understood by systematically sorting out their cognitive resources and motivations. Passa et al. (2003) mentioned the idea that we should focus on cognition. From the above discussion, we can clearly understand the concept that perceived value is very important to platform users. Why do users identify with your platform? This is also where we apply the perceived value factor to discuss the content of the article. Trust is an important concept for the platform. How to provide a trust mechanism environment for both buyers and sellers, the platform is equivalent to a third-party impartial unit of supervision. Such a trust mechanism is not only for domestic e-commerce platforms, but also for local cross-border e-commerce platforms to establish a trading platform mechanism between buyers and sellers through its cross-border trust mechanism.

• Sellers Information Evaluation
One of the key concepts is that the seller's information is evaluated on the Internet. In this study, consumers' satisfaction was achieved mainly through the sellers' reviews and evaluation scores on the platform. Alba et al., (1997) mentioned that the credibility of the Internet will affect whether consumers buy or not. Ba (2002) mentioned one of the factors that the information of sellers can affect the purchase of consumers. Therefore, we can clearly understand that the evaluation of information on the platform has a certain influence on consumer loyalty. McKinney et al. (2002) mentioned that users just start to use their platform, assuming that the information provided by the seller is correct and provided to consumers, consumers will continue to buy.

RESEARCH MODEL
This study designed four hypotheses, the main purpose of which is to do exploratory research, hoping to verify and analyze whether the hypotheses are relevant through hypothesis verification analysis. We evaluate whether the technological innovation, cross-border mechanism, trust and seller information of the hypothesis verification platform have correlation with consumer loyalty. The hypothesis testing of this study is as follows:

H1：Platform technology innovation has a significant effect on consumer loyalty

H2：Cross-border mechanisms have significant credibility for consumer loyalty

H3：The degree of trust has a significant effect on consumer loyalty

H4：The evaluation of seller information has significant effect on consumer loyalty

The main purpose of this study is to test the significance of the four hypotheses, and to find out whether VR can be applied to cross-border e-commerce platforms. The ultimate purpose is to satisfy the loyalty of consumers.
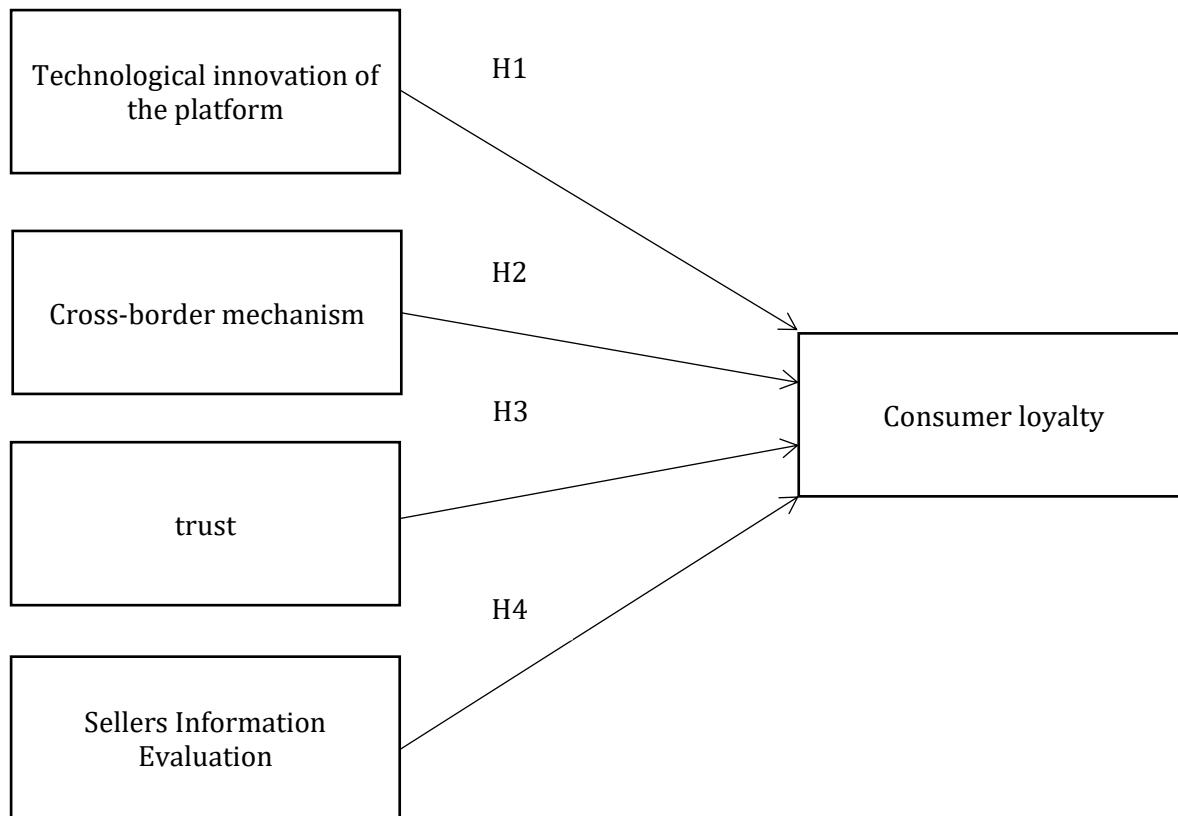
FIGURE 1: RESEARCH MODEL

RESEARCH METHOD
Introduction of The Technique

Factor analysis is a statistical procedure that simplifies and abstracts the data of many related variables in order to grasp the general situation and strength of the clustering of variables Degrees. Factor analysis assumes that correlations between observed variables have underlying common factors that can be reduced to account for a large number of common variations between observed variables.

The overall process of factor analysis is as follows:
1) sample number test
2) assumption testing
3) test of appropriate
4) factor number
5) factor loading
6) factor score
7) reliability, validity if need
8) name it

Comparison with Other Techniques

Cluster analysis refers to the simplification of a large amount of data into a few homogeneous subgroups to achieve the goal of classification and clustering. Cluster analysis and factor analysis are as follows:

Cluster analysis: classify different observation values into different clusters according to the relative distance, and then summarize and name the characteristic degree of different clusters;

Factor analysis: the different variables according to the degree of correlation to be extracted into a few factors, and then according to the variables contained in the factors to be named.

Description of Data Set
1) Data Analysis

In this study, the subject of data analysis is "Virtual Reality Survey on Cross-border E-commerce Consumer Loyalty". A total of 23 variables are dealt with, and the Scale is 7, which is sorted out in Table 1 below

TABLE 1: VARIABLE DATA

Variable item	Questionnaire topic
C1	The platform's technological innovations will attract customer loyalty
C4	The introduction of VR increases consumer loyalty
C7	VR applications in e-commerce allow consumers to increase their shopping loyalty
C10	Cross-border mechanisms have a correlation effect on consumer loyalty
C13	Cross-border mechanisms are correlated with consumer trust
C16	From past interaction and trading experience, the e-commerce platform provides a good reputation
C19	From past interaction and transaction experience, the e-commerce is trustworthy
C22	The electronic commerce transaction process and mechanism has the importance
C25	The e - business deals with me dishonestly and I no longer deal with it
C28	I learned about the e-commerce network platform from an AD link on a well-known portal site
C31	My familiarity with this e-commerce comes from the introduction of media and magazines

Variable item	Questionnaire topic
C34	I think transaction security comes from the e-commerce platform to provide the successful results of past transactions
C37	I think transaction security comes from the comments of consumers on the e-commerce platform
C40	I am quite satisfied with the product information provided by this e-commerce
C43	E-commerce platform has the protection consumer data
C46	The platform generates its good quality services
D1	Adopting platform services is a good idea
D4	The adoption of platform shopping is the new trend
D7	The people who influence me want me to use e-commerce platform services
D10	Most of my bosses or friends around me approve of my use of e-commerce services
D13	Most of my classmates agree with my use of e-commerce services
D16	I have enough hardware and software resources to use e-commerce services

2) Analytical Data Processing

First, through UNIVARIATE analysis, observe the "Extreme Observations" of the variables to examine the Wild Code deviation values in the data, as shown in the Extreme Observations of variable C1 in Table 2.

The scale of the analysis questionnaire should be 1 to 7. By analogy, the deviation values of all variables and their revisions are sorted out as shown in Table 2.

TABLE 2: VARIABLE DEVIATION CORRECTION TABLE

Face visit _ variable deviation correction table				On-line _ Variable Deviation Correction Table			
Variable	Observations	Deviating from the value	Revised	Variable	Observations	Deviating from the value	Revised
C1	13	66	6	C4	4	66	6
C4	222	55	5	C7	98	55	5
C10	196	66	6	C13	37	66	6
C13	88	66	6				
C16	190	66	6				
C19	70	33	3				
C19	212	55	5				
C22	256	44	4				
C22	53	66	6				
D7	115	22	2				

Analysis of Results

1) Sample number test

Factor analysis requires minimum sample size requirement = variable number * 10

In this analysis, there were 266 sample data access volumes and 170 online questionnaires. The total number of samples was 436, and 23 variables were processed. 23*10=240 met the requirement of minimum sample size.

2) Assumption test

a. Normality

The P value of Shapiro-Wilk test data in the normality test table of analysis variables is all less than α (0.05), and the test quality of 23 variables observed is all less than α, indicating that the rejected data is normally allocated, as shown in Fig. 1.

When the sample size is large enough (n BBB 0 30), the sampling distribution of the sample mean will be close to the normal distribution regardless of the probability pattern of the mother. 23 variables, the analysis of population distribution probability model is not present normal distribution, a normal probability chart and histogram showed not present normal distribution, but due to the sample of each variable to 30, 436 > 23 variables,

therefore, can be shown as normal distribution, met the requirements of factor analysis, solve the problem of data assumes the normal distribution of.

3) Test of appropriate

a. Correlation Matrix

Correlation matrix table 4 shows the correlation between each variable, the variables related to tightness can be made of the correlation coefficient r value (> = 1 rxy > = 1), in order to justify the application of factor analysis to verify the goodness of fit must be in 50% of correlation matrix r value is greater than 0.3, the analysis of the variables in 23, r value total number (23 * 23-23) / 2 = 253, from table 5 that is greater than 0.3 r value only 107, clear r is greater than 0.3 is not up to 50%.

b. MSA（Kaiser's Measure of Sampling Adequacy）

The overall MSA value was 0.87077620; The MSA of some variables were all greater than 0.5, indicating that they were suitable for factor analysis. If the individual MSA value is not greater than 0.5, the lowest variable below 0.5 can be deleted first and the individual MSA can be recalculated until all individual MSA values reach an acceptable range.

4) Factor number

The determination of the number of factors is described as follows.

a. Eigenvalue criterion

In this report, there are 5 Eigenvalue ≧1, which will be retained through the Mineigen criterion.

5) Factor loading

In this stage, the correlation between variables and factors is confirmed, and the variables should be assigned to which factor. In exploratory factor analysis, each variable analyzed will be loaded under each factor, but with different intensities. The higher the loading, the stronger the loading, while the lower the loading, the weaker the loading. Based on the maximum factor loading of each variable in Table 7, the attributive factor is found and the following data is sorted out:

Factor1: C1 C4 C7 C10 C13 C16 C19 C22 C34
Factor2: D1 D4 D7 D10 D13 D19
Factor3: C37 C40 C43 C46
Factor4: C25 C28 C31
Factor5: D16

6) Factor score

Through the factor loading step, after confirming the factors belonging to the variable, and then combining with the factor score value obtained from the standardized scoring coefficient in Table 8, the linear combination of factors can be calculated as follows:

$Factor1 = 0.18766*C1 + 0.19263*C4 + 0.19193*C7 + 0.17449*C10 + 0.14440*C13 + 0.11479*C16 + 0.17199*C19 + 0.12955*C22 + 0.18341*C34$

$Factor2 = 0.21576*D1 + 0.22310*D4 + 0.16062*D7 + 0.29187*D10 + 0.27839*D13 + 0.16087*D19$

$Factor3 = 0.17924*C37 + 0.22158*C40 + 0.45534*C43 + 0.38926*C46$

$Factor4 = 0.15766*C25 + 0.40649*C28 + 0.35482*C31$

$Factor5 = 0.51644*D16$

7) Reliability and validity test

a. Reliability

Reliability requires data consistency. This is an exploratory study, and the factor reliability requires Cronbach α value to be greater than 0.6, and the five factors are 0.891745, 0.821830, 0.829481, 0.732700 and 0.714659. Because there is only one variable in FCTOR5, α cannot be compared, so it does not meet the requirement.

Each table also shows the Cronbachα after the deletion of the variable in each factor. Since the Cronbachα is higher than the required value in this time, there is no need to delete the variable and start sensitivity analysis.

b. validity test

For the test of convergence validity and discriminant validity, the convergence validity table shows the degree of correlation between the measured values of variables and other measured values under the same factor; Differential validity table the degree to which a variable measurement differs from other measurements for different factors. According to the data in Table 3, the R value of each variable under the same factor exceeds 50% to produce significant (0.05), so it has convergence validity. By comparing the R-values of each variable with those of other variables under different factors and calculating the violation situation where the R-value of the latter is greater than the R-value of the former, it can be seen that the calculated result values of the violation times divided by the comparison times are all less than 1/2, so it has the discriminant validity. N/n < 1/2; N: number of violations N: number of comparisons.

TABLE 3: CONVERGENT VALIDITY

Factor	Number of comparisons N	Number of violations n	n/N
Factor1	504	6	0.011
Factor2	255	4	0.015
Factor3	114	10	0.087
Factor4	57	5	0.087
Factor5	0	0	0

RESULTS AND DISCUSSIONS

It can be found in this study that platform technological innovation, cross-border mechanism, trust degree and seller information evaluation have correlation with consumer loyalty. Therefore, we can clearly understand that these five factors (platform technological innovation, cross-border mechanism, trust, and seller information evaluation) will generate the loyalty of consumers on the entire cross-border platform.

So, we can get the whole data and run the results through the SAS software, and we can clearly see the causal logic, and through such a coherent design, we can see whether the correlation holds. The sample size of this study was N=436, 266 sample data surface access volumes and 170 online questionnaires were used to examine the correlation through a small sample size. Our ultimate goal is to test the whole model building through such model building and analysis.

We can clearly see that the success of a cross-border platform is related to the interconnection of various factors that influence its customer loyalty.

This series of processes, through the introduction of VR high-tech into the e-commerce platform, truly achieve the target of cross-border e-commerce sales growth.

CONCLUSIONS AND FUTURE RESEARCH

The greatest contribution of this study is to fill in the research on consumer loyalty of its cross-border e-commerce platform. In recent years, few scholars have studied the impact of VR functions of its cross-border e-commerce platform on consumer loyalty. Most of the researches mainly focus on the security and application of the platform, while our research is a combination of cross-field researches, such as the combination of psychology, behavioral science and information technology management. The ultimate purpose of our research design is to conduct innovative research on cross-border e-commerce, mainly to study how to connect the word of mouth of consumers on cross-border platforms, and to further create the ability of consumers to buy goods in different countries, which is also through the function of VR to achieve its goal.

The biggest limitation of this study is that it only focuses on the e-commerce platform market in Taiwan.

The relatively small market in Taiwan is a major problem. If consumers from different countries can be included, the direction of the survey will be different. It is suggested that future researchers can add other market areas to the list, so as to conduct further research and investigation and do innovative work.

The following are my suggestions for future researchers, which I hope will be helpful to future researchers:

(1) The object of the questionnaire survey：
This research mainly focuses on the platform market in Taiwan, and it is suggested that future researchers can expand to foreign countries (such as the United States, Japan, and mainland China, etc.). Such research will contribute more to the research value of data survey for the whole cross-border platform research. Our research only focuses on the Taiwan market, so the total sample size will be relatively small. In the future, researchers can consider expanding the research objects to foreign markets. Such a survey method can make the research more perfect. In the process of distribution, we use the Internet questionnaire to fill in the questions for online users, and then there will be errors in the process of filling in the questions. We have adjusted the errors of the questionnaire through some methods, so as to avoid the situation of filling in the questions on the questionnaire. In the questionnaire, it is suggested to add more negative questionnaire questions to the questionnaire design to reduce its errors.

(2) The study of objects allows one to distinguish between different variables：
Our research mainly focuses on the loyalty status of some consumers to the platform. It is suggested that future researchers can investigate the cross-border purchase status of different consumer groups on the platform. The subdivision of variables will lead to different research results, which is also recommended for subsequent researchers to view different variables from such a dimension.

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