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# EVALUATING CUSTOMER SATISFACTION WITH E-COMMERCE WEBSITES OF ENTERPRISES A STUDY AT TNG THAI NGUYEN INVESTMENT AND TRADING JOINT STOCK COMPANY

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*The paper focuses on a number of factors, affecting customer satisfaction on e-commerce websites of manufacturing and trading enterprises through studying factors such as the appearance of the website, the content of the website, the level of updating information of the website, the degree of association of the website with other websites. To accomplish this, the author has researched records and documents, plus collected data through survey questionnaires and direct interviews. After that, statistics and data analysis were obtained by Cronbach's alpha reliability analysis method, EFA discovery factor analysis, and SEM linear structure model analysis. From there, the author gives the results and recommendations, helping businesses overcome the shortcomings of the website, helping businesses have a quality website, full of information, making a good impression on customers, in order to attract customers to businesses, improve sales and revenue in business activities of the business. Piloting specific cases at TNG Thai Nguyen Investment and Trading Joint Stock Company.*

**Keywords:** Satisfaction, customers, website, business.

## 1. Introduction

The problem of approaching and attracting customers in production and business activities is a very important problem for any business, it determines the existence and development of each business. In fact, in order to reach and attract customers, each business has different solutions associated with the characteristics of its strengths. However, one of the current effective solutions that most businesses in the country or around the world use is through the enterprise's official e-commerce website channel to provide information on production and business

activities, product types, prices, different marketing strategies and solutions to access and collect attract customers to know, choose, decide to buy products of their business and become the official customers of the business.

Besides, the strategies of promoting, reaching and attracting customers through e-commerce websites are not always well implemented by enterprises. E-commerce website strategy is a double-edged sword, if the websites have good information content, it will be a good advertising model for businesses and the voice of businesses. However, with

bad websites, the content is not guaranteed, it will hinder the development of the business and customers will return to the business. Therefore, how to evaluate the effectiveness of a website for businesses, the research, evaluation is essentially the website that businesses are exploiting and operating now in production and business activities of the enterprises consider that the information and website content are really bring satisfaction and satisfaction to customers, when customers come and decide to buy the products of the business and cooperate with the business.

Today, in the world and in the country, many authors and managers are interested in researching and offering solutions to evaluate the effectiveness of e-commerce websites of enterprises through customer satisfaction criteria, specifically:

In the world, there have been many businesses focusing on researching and evaluating customer satisfaction on their e-commerce websites in order to find out the causes, defects and adjustments to satisfy customer satisfaction such as: Yoo & Donthu (2001) evaluating website quality [3], Tianxiang & Chunlin (2010) evaluating website satisfaction [4], Seto-Pamies (2012) [5] measures customer loyalty and tends to buy products from the web (Loiacono & Director-Watson, 2000) [6].

These studies mainly focus on different criteria that have been used to measure variables such as quality as satisfaction. Santos (2003) has provided a comprehensive framework for e - service quality and their criteria. In this study, using interviews, questionnaires and information gathering, a conceptual model of electronic service quality was provided [7].

Delone & Mclean (1992) proposed an updated model to measure the success of information systems. The quality of information is an important factor in the success of an online travel booking website. Relevant and understandable information significantly affects customer satisfaction [9]; Lee (2005) & Lin (2007) find that information quality is the most important factor influencing customer buying behavior, according to them a customer visits the site as a searcher and then, if he finds the related product, he buys it [11,12]; De Marsico et al. (2004) conducted studies on website evaluation such as exploiting user expectations [16]; Westbrook, RA

(1981) studies the source of consumer satisfaction with retail stores [17].

Lee & Kozar (2006) investigated the factors that influence site selection [10]. The success model of (Delone & Mcleone, 2003) has been used and commodity sales websites are only considered for research [8]. The findings of the study suggest that online shopping websites must provide a more convenient and aesthetic shopping experience. The relevance of information is the most important factor in choosing a website.

Kuan et al. (2008) found that site quality was directly related to the initial purchase intent and continued [13]. The quality of the system is very important for converting a website to customers. However, research shows that system quality has a limited impact on purchase intent once customers have significant trust in the site. E-commerce websites should not only provide information, but also convert information seekers to online shoppers. When buyers buy from the same site, the system quality is very important. Similarly, for a customer buying a travel product, the information quality is significant.

Chang et al. (2009) studied the impact of electronic service quality, customer satisfaction and loyalty on e-marketing, in this article, the authors delve into the censorship effect of perceived value to adjust the website to suit the feelings of customers [14]; Cho et al. (2009) studied and evaluated the role of cognitive user interface design in the intention of continuous use of electronic learning tools [15].

Chang et al. (2011) studied the direct effects of web site quality on customer satisfaction and purchase intent, perceived playfulness and flow when the intermediary confirmed that Website quality affects the playfulness and customer perception. Notably, this study shows that service quality is more important than information and system quality in influencing customer satisfaction [18].

Rasli et al. (2015) studied the effect of trust on the service quality on customer satisfaction and found that it significantly influenced purchasing intent. This current study is limited to the age group of 18 to 40 years old. But in the actual scenario, there are people over 40 using online travel booking websites. In future studies, people over 40 may be

taken into account. Current research is limited to identifying 4 factors. In the future, other factors that affect website quality may be considered for research [23].

A number of previous studies have tested customer satisfaction by focusing on the service quality of the site (Pawlasova & Klezl, 2017) [21], (Rahman et al. 2018) [22]; Customer expectations also have a positive impact on customer satisfaction (Sarkar & Khare, 2018) [24].

Based on the above studies, it can be commented that the research and evaluation of e-commerce websites is very important, especially if the website is satisfied and attractive to customers in order to attract customers to come and intend to choose, decide to buy products of the business.

In Vietnam, the research and proposal of works and solutions on assessing customer satisfaction and satisfaction with the website of the enterprise is very limited, and almost none, if any, only focus on assessing the satisfaction of websites in the field of education, namely: In 2013, the authors Trinh Quang Thoai and Chu Thi Hong Phuong studied a number of solutions to attract students to join the Forestry University [19]. In 2019, the authors Tran Van Quy and Cao Hao Thi published a research paper on the factors affecting high school students' decision to choose a school [20]. However, these studies in the country mainly focus on enrollment work at universities and high schools.

Thus, it is recognized that the research on customer satisfaction with websites of Vietnamese businesses is still one of the issues posed to managers and scientists to assess objectively and truthfully about customer satisfaction with the interface, content of information, quality of information, timeliness, reliability or accuracy of production and business activities and products of enterprise. From there, help businesses have the right view of their website, draw changes, adjust appropriately and appropriately to meet consumers' belief in information exploitation, searching for products of businesses, contributing to increased sales and revenue of the business.

Stemming from that fact, the article will focus on studying a number of factors affecting customer satisfaction on e-commerce websites. Thereby, in order

to offer solutions to overcome shortcomings, e-commerce websites of enterprises still exist.

## 2. Theoretical basis and research model

### 2.1. Theoretical basis

*Customer satisfaction:* Customer satisfaction is their response to perceived differences between known experience and expectations (Parasuraman et al., 1988, 1994) [30,31]. Different from the quality of tangible products measured by these parameters, technical characteristics, service quality as analyzed above, are determined by customers.

Customers assess the quality of service through their subjective perception of the service delivery process. Therefore, measuring service quality is often based on the relationship between customer expectations and the actual perception of customers about the service.

Some models of service measurement are:

+ Model of functional quality and technical quality of Gronroos [28].

+ Theoretical model of customer satisfaction index.

+ Service quality model SERVQUAL [29].

+ Model of secondary service quality [30].

### 2.2. Research model

2.2.1. *The basis for determining the research factors*

*Factors affecting customer satisfaction on e-commerce websites of businesses:* E-commerce websites are important factors, aiming to connect customers with businesses. Depending on the vision and capacity of each business, each e-commerce website of each business will have different forms and content. A well-designed e-commerce website in form and content will play an important role in reaching and attracting customers. So to investigate whether an e-commerce website of a Vietnamese business is truly satisfied or not, the paper focuses on researching and surveying a number of factors affecting customer satisfaction on e-commerce websites of Vietnamese enterprises and piloting a specific case is TNG Thai Nguyen Investment and Trading Joint Stock Company. Specifically:

(1). *Form factor; interface of website:* This factor is a potential variable of the problem, not directly measured, so to evaluate customer satisfaction about the form, website interface, the author uses the observed variables as shown in Table 1.

(2). *Website content factors*: Similarly, customer satisfaction with website content is assessed through several variables as shown in Table 1.

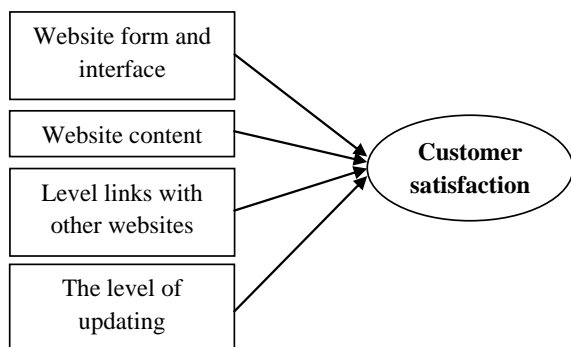
(3). *Factors of the link level of the website*: To know how customer satisfaction about the link element of the website like, need to rely on the factors as in Table 1.

(4). *Factor in the level of website information updating*: The level of updating of website information is measured by factors as shown in Table 1.

2.2.2. *Research model*

In fact, an e-commerce website will have many factors that affect customer satisfaction. However, within the scope of this study, the authors focus on studying the following four main factors: Website appearance and interface, Website content, Website link level, Website information updating level. From there, the research results will show the results and know what factors the customer is satisfied or not. On that basis, the author will make recommendations to help overcome the shortcomings that the website of the business exists, with the purpose of building a quality website, satisfying customers, contributing to increasing the number of the number of customers who know, intend to buy and decide to choose, buy products of the business.

Based on the above factors, we identify the research model as follows:



(Source: Author proposed)

**Figure 1:** Conceptual model of customer satisfaction with website

In the research model on enterprise e-commerce website satisfaction, the paper identifies the following hypotheses:

*H1: Website appearance and interface have the same impact on customer satisfaction.*

*H2: Website content has the same impact on customer satisfaction.*

*H3: The level of linking with other websites of the website has a positive impact on customer satisfaction.*

*H4: The level of website update information has a positive impact on customer satisfaction.*

**3. Research Method**

In this study, quantitative methods with the survey were applied. The main data was collected from a sample of 220 respondents in Thai Nguyen City who are all customers who have been using the products of TNG Thai Nguyen Investment and Trading Joint Stock Company. The target population for the survey is people living in Thai Nguyen City from 18 to 45 years old.

Using Likert's 5-level scale (1932) [34] to measure the level of customer satisfaction with the company's products, specific answers (distributed among target users using intentional sampling) recorded with 1 = Completely disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Totally agree. Subsequently, using SPSS statistics, AMOS [32,35] was applied for the purpose of analyzing the main data collected from field research. Cronach values such as alpha are determined by reliability test analysis.

The analysis and verification process includes the following steps:

**Step 1: Test the scale using Cronbach's alpha reliability coefficient**

The scale is assessed reliability by Cronbach's Alpha coefficient [33]. The Cronbach's Alpha coefficient is used to eliminate variables that do not meet the condition. Variables whose total correlation coefficient is less than 0.3 are excluded and the scale is selected when Cronbach's Alpha coefficient is greater than 0.6.

Below is a summary of Cronbach Alpha coefficient analysis

According to Table 1, the Cronbach's Alpha coefficients for the variables are 0.874, 0.893, 0.762, 0.862, 0.823 and all are greater than 0.6. Therefore, it can be commented that all variables of this study are reliable. Accordingly, no variables are

**Table 1:** Summary table of Cronbach Alpha coefficient analysis

No	Observed variables	Coefficient of correlation of total variables	Cronbach's Alpha coefficient if variable type
<b>Factor 1: Website appearance and interface</b>			
1	Website has an easy-to-see and user-friendly interface (GD1)	0.804	0.763
2	Website has beautiful colors, harmonious, elegant (GD2)	0.792	0.779
3	Website has a scientific and reasonable layout (GD3)	0.775	0.824
4	Website has beautiful interface, easy to interact and use (GD4)	0.694	0.857
<b>Cronbach's Alpha coefficient = 0.874</b>			
<b>Factor 2: Website content</b>			
1	Website provides complete information about the image, organizational structure, mission, vision, core values of the business (ND1)	0.685	0.870
2	Website provides complete content about the product (ND2)	0.812	0.775
3	Website provides content about product pricing information (ND3)	0.806	0.798
4	Website provides full contact information of the business (ND4)	0.798	0.816
5	Website provides full information about promotions (ND5)	0.786	0.834
6	Website provides complete information about product standards (ND6)	0.817	0.754
<b>Cronbach's Alpha coefficient = 0.893</b>			
<b>Factor 3: The degree of linking with other websites</b>			
1	Website has a link to the website about registering to receive product information, prices and personal pages of customers (MDLK1)	0.501	0.736
2	Website has links with other websites to provide information about products and prices to customers (MDLK2)	0.675	0.649
3	Website has links with other websites to provide information about suppliers, material products (MDLK3)	0.591	0.689
4	Website linked to electronic trading platform (MDLK4)	0.501	0.736
<b>Cronbach's Alpha coefficient = 0.762</b>			
<b>Factor 4: Website update information</b>			
1	Website regularly updates new information on prices, products of the business (CNTT1)	0.691	0.823
2	Website regularly has new updates, if the business changes in business locations, product models, product quality... (CNTT2)	0.766	0.753
<b>Cronbach's Alpha coefficient = 0.862</b>			
1	Customers feel satisfied with the website of the business (SHL1)	0.764	0.745
2	Website of a quality enterprise, improving the image and position of the business to its customers (SHL2)	0.692	0.797
<b>Cronbach's Alpha coefficient = 0.823</b>			

excluded from the model because the total correlation coefficient of the variables is > 0.3. So, we can see that the scales of are consistent with the research model.

**Step 2: Test the scale by EFA discovery method**

After evaluating the variables and the scales of the variables in accordance with the model and data of the study by the method of analyzing alpha reliability coefficient. We conduct EFA discovery factor analysis to further eliminate variables from the model. According to this method, the research model must satisfy certain conditions. The KMO coefficient must be in [0.5; 1] and the sig-

nificance of the Bartlett test must be statistically significant at 5%, with variables weighing <0.5 in EFA that will be excluded from the research model.

- Factor analysis with scales of independent variables:

KMO coefficient = 0.763 > 0.5: factor analysis appropriate to the research data. Bartlett's test result is 978.461 with sig = 0.000 < 0.05, this proves that the data used for factor analysis is quite appropriate.

- Factor rotation matrix:

From the factor rotation matrix, it shows that the initial 16 independent scales are of practical significance (> 0.5) and are summarized into 4 factors as shown in Table 3.

**Table 2:** KMO and Barlett test results for independent variables

**KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.763	
Bartlett's Test of Sphericity	Approx. Chi-Square	978.461
	Df	220
	Sig.	0.000

- Factor analysis with dependent variable scale:

This part of the paper analyzes factors with 16 observed variables of 4 independent variables and 2 observed variables (SHL1, SHL2) of a dependent variable (SHL). Specific results:

KMO coefficient = 0.769 > 0.5: factor analysis appropriate to the research data. Bartlett's test result is 253,685 with significance level sig = 0.000 <



**Table 3:** Matrix rotation independent variables (EFA)

	Component			
	1	2	3	4
GD2	.932			
GD4	.924			
GD1	.895			
GD3	.786			
ND1		.905		
ND5		.893		
ND6		.835		
ND4		.793		
ND3		.768		
ND2		.712		
MĐLK1			.874	
MĐLK4			.858	
MĐLK2			.791	
MĐLK3			.736	
CNTT2				.893
CNTT1				.865

Extraction Method: Principal Component Analysis.  
 Rotation Method: Varimax with Kaiser Normalization.  
 a. Rotation converged in 4 iterations.

16 independent scales (observed variables of independent variables) and 2 observed variables (SHL1, SHL2) of dependent variables (SHL).

With the results in Table 4, used to make CFA confirmatory factor analysis data in AMOS software. The results are as follows:

This model has Chi-square/df = 1.262 < 3 with value p = 0.000. However, other indicators show that this model is suitable for research data (CFI = 0.914; TLI = 0.935; RMSEA = 0.067 < 0.08). The scales of GD, ND, MĐLK, CNTT, SHL all have no correlation between the errors of the variables, so all achieve unidirectional.

The correlation coefficient between components smaller than 1 with standard errors (p-value) is less than 0.05. So the scale GD, ND, MĐLK, CNTT, SHL has achieved distinct value. The standardized weights are up to the permissible standard ( $\geq 0.5$ ) and statistically significant (p equals 0.000). Therefore, it is possible to conclude variables used to measure the research model to achieve convergent values.

**KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.769
Bartlett's Test of Sphericity	Approx. Chi-Square	253.685
	Df	16
	Sig.	0.000

0.05, this proves that the data used for factor analysis is perfectly appropriate.

**Step 3: Test the scale by CFA affirmative factor analysis method**

To measure the relevance of the model to the survey data set, the researchers used several evaluation indicators such as Chi-square; df; Chi-square/df; GFI; AGFI; CFI; RMSEA. If a model receives value: Chi-square/df < 3; GFI, AGFI, CFI from 0.9 to 1; RMSEA < 0.08 is considered as a model that fits well with the survey data set.

After the results of factor analysis discovered EFA, we proceed to the next step is analysis of positive factors CFA. Using the research data we analyze based on SPSS, by principal axis factoring method with promax and the achieved results, we take the rotation matrix of

**Table 4:** Matrix rotates the scales (CFA)

	Factor				
	1	2	3	4	5
GD1	0.932				
GD3	0.878				
GD4	0.756				
GD2	0.682				
ND3		0.887			
ND5		0.813			
ND6		0.776			
ND4		0.737			
ND1		0.694			
ND2		0.626			
MĐLK2			0.918		
MĐLK1			0.880		
MĐLK4			0.769		
MĐLK3			0.693		
CNTT2				0.783	
CNTT1				0.680	
SHL1					0.859
SHL2					0.727

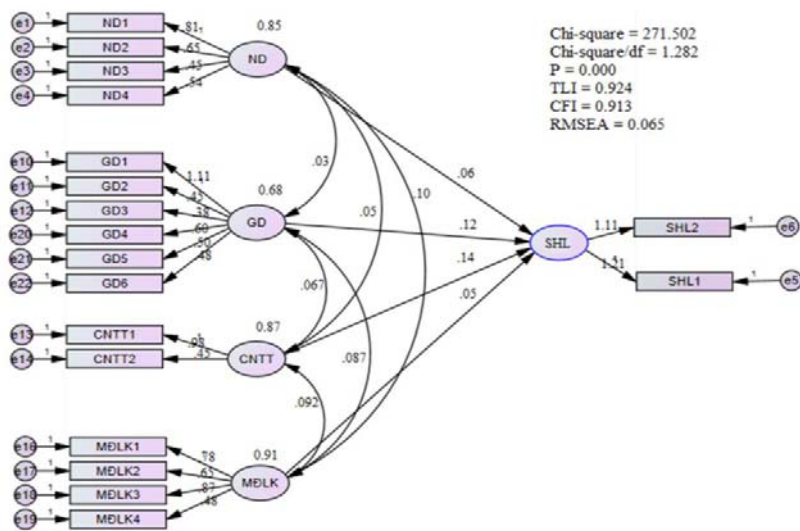
Extraction Method: Principal Axis Factoring.  
 Rotation Method: Promax with Kaiser Normalization.  
 a. Rotation converged in 5 iterations.



In addition, the total reliability coefficient and the total variance extracted of the 5 scales are > 0.5 so these components all achieve reliability.

**Step 4: Testing the research model**

After evaluating the scales, we test whether the model is suitable by running on AMOS software. The results are standardized research model as follows:



**Figure 2:** Linear structure model SEM

The estimated results of the standardized research model have value  $P = 0.000$  (Chi-square = 271.502) and Chi-square/df = 1.282 < 3, RMSEA = 0.065 < 0.08; TLI = 0.924; CFI = 0.913. With this standardized result, we can see that RMSEA meets the required standards; TLI, CFI is higher than 0.9. So the research model is satisfactory.

**Step 5: Test the hypothesis of the research model**

The results of testing the causal relationship between the research factors, showing that all relationships in the research model are statistically significant or hypotheses from H1 to H4 are accepted through the Regression weights normalize the relationship between positive factors. This proves that the relationships among these factors have a proportional influence.

Analysis of model test results: From Table 5 above, it shows

H1: The hypothesis about the relationship between form, website interface (GD) and customer satisfaction (SHL). The estimated value of this relationship is 0.138 (se = 0.061), so this hypothesis is accepted. This means that the interface of the website affects customer satisfaction to the business.

H2: The hypothesis of the relationship between Website Content (ND) and Customer Satisfaction (SHL). The estimated value of this relationship is 0.081 (se = 0.072), so this hypothesis is accepted. This means that the content of the website affects customer satisfaction to the business.

H3: The hypothesis of the relationship between Website Linkage (MDLK) and Customer Satisfaction (SHL). The estimated value of this relationship is 0.125 (se = 0.058), so this hypothesis is accepted. This means that the

**Table 5:** Testing the causal relationship between factors

			Estimate	S.E.	C.R.	P	Hypothesis testing
SHL	<---	GD	0.138	0.061	2.557	0.076	H <sub>3</sub>
SHL	<---	ND	0.081	0.072	0.912	0.361	H <sub>1</sub>
SHL	<---	MDLK	0.125	0.058	3.227	0.676	H <sub>2</sub>
SHL	<---	CNTT	0.045	0.062	0.376	0.634	H <sub>4</sub>

(Source: Authors' calculation results)

degree of link of the website affects customer satisfaction to the business.

H4: The hypothesis of the relationship between website information update (CNTT) and customer satisfaction (SHL). The estimated value of this relationship is 0.045 (se = 0.062), so this hypothesis is accepted. This means that updating website information affects customer satisfaction to the business.

*Comment:* Based on the above analysis, the activities on the website of the enterprise such as designing appropriate forms, interfaces (GD), website content is rich and full of useful information



(ND), the level of website links (MĐLK) or timely and complete information updates (CNTT) for the website of the business is influential and creates satisfaction or satisfaction, as well as trust for customers.

#### 4. Conclusions and Recommendations

##### 4.1. Conclusions

With these results, the study has sketched an overview of customer satisfaction (SHL) for the website of the business, namely TNG Thai Nguyen Investment and Trading Joint Stock Company, as well as identified the main factors affecting customer satisfaction. From there, help businesses propose solutions to improve the quality of the website, attract more customers, increase sales and revenue in production and business activities of the Company.

##### 4.2. Recommendations

*For the website interface form:*

- Website should have a more diversified form such as for many images of the company's products as well as the font and background color of the website. The background color of the website is mainly green, highly elegant. However, the company's website is still monotonous, has not caused a real attraction to users.

- Business website needs to focus on the market segment of your business, such as the high-end segment, when designing a website to note about sophistication, elegance, class will bring customers confidence in the products/services of the business.

*For website content:*

Currently, the website of TNG Joint Stock Company is very sketchy, the only focus information is the product model, the price on the home page and the product classification on the horizontal menu. Therefore, it is difficult to find information about products, prices, categories or product groups. Content displaying each product is not really easy for customers to find.

Therefore, the website content of the company needs to add a left menu system, including a list of products and product groups suitable for each object and price group to cater for easy searching.

*For the level of website links:*

In order to create diversity, the opportunity to compare the strengths and differences of the compa-

ny's products compared to other brands, so the company also needs to create opportunities for businesses to associate and compare with other brands.

The company should strengthen the link to other websites so that customers can get more information about products, prices, supplier information, product materials or other electronic trading platforms of the business to create diversity.

*For the level of information updates:*

Make sure the website is always new, with the information updated regularly and continuously. Regular updates of new products, promotions, design changes or new changes to the company's products, or new trends. ♦

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## Summary

Bài báo tập trung nghiên cứu về một số nhân tố, ảnh hưởng tới mức độ hài lòng của khách hàng về website thương mại điện tử của doanh nghiệp sản xuất và kinh doanh thông qua nghiên cứu các yếu tố như Hình thức giao diện của website, nội dung của website, mức độ cập nhật thông tin của website, mức độ liên kết của website với các trang web khác. Để thực hiện được tác giả đã nghiên cứu hồ sơ, tài liệu, cộng với thu thập số liệu thông qua phiếu khảo sát, bảng hỏi và phỏng vấn trực tiếp. Sau đó thống kê, phân tích số liệu thu được bằng phương pháp phân tích hệ số tin cậy Cronbach's alpha, phân tích nhân tố khám phá EFA, phân tích dựa trên mô hình cấu trúc tuyến tính SEM. Từ đó, tác giả đưa ra những kết quả và kiến nghị, giúp doanh nghiệp khắc phục những điểm bất cập của website, giúp doanh nghiệp có một website chất lượng, đầy đủ thông tin, tạo ấn tượng tốt cho khách hàng, nhằm thu hút các khách hàng đến với doanh nghiệp, nâng cao doanh số và doanh thu trong hoạt động kinh doanh của doanh nghiệp. Thí điểm trường hợp cụ thể tại Công ty Cổ phần Đầu tư và Thương mại TNG Thái Nguyên.

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