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A MODEL OF WEBSITE QUALITY-BASED E-COMMERCE SATISFACTION INDEX

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Abstract

In the contemporary highly competitive e-business market, organization's success depends on satisfaction and loyalty of its customers. Whereas the differentiation of the determinants and their impact on customer satisfaction in different countries exists, the research aims at developing a model of website quality-based e-commerce customer satisfaction index. While achieving the aim of the article, the analysis and synthesis of scientific literature is provided. Furthermore, quantitative research and the analysis of the research results by means of principle component analysis, structural equation modelling using partial least squares path modelling methodology, and Importance-Performance matrix are applied. As a research result, the model of website quality-based e-commerce customer satisfaction index is elaborated. Latter model indicates the factors, which are worth investments in order to gain customer satisfaction and loyalty. As a result, not profitable investments might be avoided, which could contribute to the growing competitiveness of e-business.

Keywords: Website quality, e-commerce, customer satisfaction, structural equation modelling

JEL classification: M310, M390

1. INTRODUCTION

In recent decades, as a result of globalization, increasing pace of life, growing ownership of technologies, and the spread of the infrastructure of information technologies, the electronic space has become undeniably important for both businesses and consumers. An increasing number of consumers shift their buying activities from physical stores to retail websites and the reasons for this changed purchase behavior range from lower prices, greater convenience, and time savings, to better product and service selection available on the websites (Brunner-Sperdin *et al.*, 2014). Online customers can more easily compare alternatives than offline customers can; and a competing offers are just a few clicks away on the Internet with highly competitive prices. Consequently, competition between different websites is high in order to attract the users' attention and make them repeat a purchase, i.e.,

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become loyal (Barrera *et al.*, 2014), which is the main factor for the success of the online business (M. H. Hsu *et al.*, 2015). In general, customer satisfaction is regarded as the prerequisite for customer loyalty (Chen, 2012), because customer satisfaction mediates the relationship between perceived quality and customer loyalty (S. H. Hsu, 2008). Thus, it is essential to provide well-perceived website quality, satisfy customers, and build loyalty for long-term customer value in the virtual environment (Bai *et al.*, 2008). Therefore, as authors (Al-Qeisi *et al.*, 2014; Barrera *et al.*, 2014) point out, firms apply a substantial proportion of efforts to improve the design of their websites, to enhance the quality of customers' interaction experiences, and to deliver a superior service quality, which are the key determinants of online retailers' success. It could be stated, that investments into the technical as well as service quality of the website increase the possibility of attaining satisfied customers, which in turn contributes in building loyal customers. The main problem why not all of the investments into the technical as well as service quality of the website are successful is the differentiation of the determinants and their impact on customer satisfaction regarding the different segments of the customers. Therefore, the *problem* solved in the article is: what are the website quality-based factors determining e-commerce customer satisfaction? The *object* of the research is: e-commerce customer satisfaction.

The *aim* of the research is to develop a model of website quality-based e-commerce customer satisfaction index concerning Lithuanian customers' perspective.

To meet the aim of the article following *tasks* were set:

- To reveal website quality-based factors affecting e-commerce customer satisfaction;
- To perform the research on e-commerce customer satisfaction in Lithuania;
- To design the model of website quality-based e-commerce customer satisfaction index.

Research methods. Achieving to build research model, theoretical analysis and synthesis are provided. Consumers' evaluations towards retail websites were determined providing the questionnaire research. Principle component analysis, structural equation modelling using partial least squares path modelling methodology and Importance-Performance matrix are provided for statistical analysis.

2. SCIENTIFIC SUBSTANTIATION

Customer satisfaction is considered as key factor determining organization's success in today's competitive market place. Knowing the level of customer satisfaction can help an organization to assess the efficiency of its activities, set future goals, and take necessary actions to maintain or increase it. In scientific literature (Cassel and Eklöf, 2001; Lee and Bellman, 2008), customer satisfaction is often measured and analyzed as an antecedent of customer loyalty; moreover, to assess satisfaction, its determinants (factors influencing customer satisfaction) have to be evaluated.

In recent years, various authors have identified many determinants of customer satisfaction regarding electronic commerce (further – e-commerce) (see Table no. 1). Despite this, many of these factors correspond to each other or some factors are included as manifest variables of the other factors. For example, variables *fast and easy payment*, *product and service information*, *less time transaction* manifest the variable *transaction ease*. Moreover, variable *visual design* corresponds to the variable *engagement* (as latter variable is defined as an overall image or personality that the e-business projects to customers through effective use of inputs such as text, style, graphics, colors, logos, slogans, and themes in the website (Anderson and Swaminathan, 2011).

Table no. 1 – Determinants of satisfaction in e-commerce

Authors	Determinants
D. Cyr (2008)	Navigation Design; Visual Design; Information Design
R. E. Anderson, S. Swaminathan (2011)	Commitment; Engagement; Assortment; Network; Interactivity; Transaction Ease; Nurturing; Adaptation
G. Christodoulides, N. Michaelidou (2010)	Convenience; Information Seeking; Variety Seeking; Social Interaction
M. I. Eid (2011)	User Interface Quality; Information Quality; Perceived Security; Perceived Privacy
M.-J. Kim *et al*. (2011)	Navigational Functionality; Perceived Security; Transaction Cost
C.-C. Lin *et al*. (2011)	Information Quality; System Quality; Service Quality; Product Quality; Delivery Quality; Perceived Price
N. S. Safa, M. A. Ismail (2013)	Perceived site quality; Customer experience in e-commerce; Less time transaction; Perceived usefulness; Perceived ease of use; Customer segmentation; Customize products; Fast response to customer inquiries; Variety of goods and services; Rewards and discounts; System quality; Information quality; Personalized web feature; Language options; Search and comparing facilities; Product and service information; Using other systems; Collecting and analyzing customer information; Fast and easy payment; Buying and selling 24 h and 7 days

Thus, though all of the e-commerce satisfaction models provided by these authors are different in their determinants of e-commerce satisfaction, but it can be stated that many determinants of customer satisfaction regarding e-commerce identified by different authors could be considered as synonymous.

It is well established in literature that quality has high positive and direct influence on customer satisfaction. Subsequently, most of the well-known customer satisfaction indexes (e.g. European Customer Satisfaction Index, American Customer Satisfaction Index) contain variable *quality* (Johnson *et al.*, 2001). Likewise, in the case of e-commerce, e-quality has high positive influence on e-satisfaction (Subramanian *et al.*, 2014). Accordingly, there are customer e-satisfaction indexes that contain variable *quality* itself (e.g., information quality, interface quality, etc.) (Chang *et al.*, 2009). Furthermore, these dimensions of quality are related to the website.

Nevertheless, there are e-commerce customer satisfaction models where variable *quality* itself is not directly included, but it is implicit and measured through other variables, e.g., ease of use, website design, interactivity, etc. (Loiacono *et al.*, 2002; Ribbink *et al.*, 2004), thus associated with the quality of the website in a broad sense. Consequently, it could be stated that many of the determinants of customer satisfaction regarding e-commerce either directly contain variable *quality* or contain variables that determine website quality. Therefore, many of the e-commerce satisfaction indexes may be considered as website quality-based e-commerce customer satisfaction indexes, where website quality is implied in a broad sense including technical as well as service quality.

Variables as determinants of satisfaction in e-commerce are selected based on these criteria: specific variable has to correspond to some other variables that are indicated by the other authors; specific latent variable has to differentiate from the other latent variables that are already chosen for the research. Moreover, variables have to determine website quality-based customer satisfaction with e-commerce. Consequently, preferred 8 determinants of satisfaction in e-commerce are established: *commitment* (efforts of the company to ensure

that there is no breakdown in customer service and the responsiveness to customer concerns, problems, and complaints), *engagement* (overall image projected through the website), *assortment* (variety of products or services provided in the website), *network* (customer communication among themselves through the website), *interactivity* (two-way communication through the website among company and customers), *transaction ease* (extent to which a customer feels that the website is simple, intuitive, and user-friendly.), *nurturing* (relevant post purchase information provided for customers from the website), and *adaptation* (customer's feeling that value propositions in the website are adapted to him) (Anderson and Swaminathan, 2011).

On the other hand, customers' values, attitudes, habits, beliefs, way of life, and experience with the technologies differ in different countries (thus, customers may perceive chosen determinants of satisfaction with e-commerce differently in various countries).

Authors N. Jahangir and N. Begum (2008) highlighted that *perceived usefulness* has positive influence on variable *adaptation*. Therefore, the assumption is made that latter variable is endogenous, because the rest of the determinants of customer satisfaction may also have direct effect on *adaptation*. Hence, *adaptation* is more in place of affective perception than a basic determinant. Even though, latter variable theoretically still influences customer satisfaction. In contrast, the remaining determinants are considered as exogenous.

It is well established in the literature, that customer *satisfaction* directly and positively affects customer *loyalty* (S. H. Hsu, 2008). *Inertia* influences customers' *loyalty* as well (Kuo *et al.*, 2013). Authors (Ribbink *et al.*, 2004;Kim *et al.*, 2011; M. H. Hsu *et al.*, 2015) argued that *trust* is a consequence of customer *satisfaction*. Moreover, all of the remaining determinants of *satisfaction* may influence *trust* and *inertia* as well.

Loyalty is divided into three dimensions: *attitudinal loyalty* (intention to recommend), *behavioral loyalty* (repeat purchase intentions), and *composite loyalty* (attitudinal and behavioral) (Zhang *et al.*, 2014). Thus, authors (Eid, 2011) highlighted that *trust* does not influence *composite loyalty*, or, more precisely, does not influence *repeat purchase intentions*; *trust* influences only *intentions to recommend* (L. C. Hsu and Wang, 2008; Kassim and Abdullah, 2010). Consequently, it could be hypothesized that *trust* has influence either on *composite loyalty* or on *intentions to recommend* only.

Trust is formed directly (by evaluating past experiences) or indirectly (by recommendations); e.g., consumers who have no experiences can create first time experience by relying on a recommendation from a trusted entity (indirectly formed trust) (Abdul-Rahman and Hailes, 2000; Almenarez *et al.*, 2004). Consequently, latter consumers evaluate their experience, form trust directly (assuming positively evaluated experience) and create indirectly formed trust for other potential customers who have no experiences. Thus, the cycle of *trust formation-experience* is formed. This theory also substantiates the assumption that *trust* influence *recommendations*.

Theoretically, in the website quality-based e-commerce satisfaction index, *commitment*, *engagement*, *assortment*, *network*, *interactivity*, *transaction ease*, *nurturing* are the determinants of customer *satisfaction*, *adaptation* (latter variable also has influence on customer *satisfaction*), *trust*, and *inertia*; *composite loyalty*, *trust*, and *inertia* are the consequences of customer *satisfaction*; *recommendations* are the consequence of direct customers' *trust*. This theoretical model differs from the analyzed ones in its relations between variables (based on literature review, e.g. adaptation is influenced by other determinants of customer satisfaction) and / or latent variables (based on literature review as well, e.g. recommendations are analyzed as different variable influenced by trust).

3. RESEARCH METHODOLOGY

Structural model. All the theoretically described relations between the latent variables are included in the structural model. Moreover, endeavoring to make a deeper analysis, the assumption was made that a possibility of customer satisfaction determinants' direct effect on loyalty can exist. Thus, the hypothesized model of website quality-based e-commerce satisfaction index is expressed by six structural equations:

$$Adaptation = \beta_{60} + \beta_{61}\, Purchase\ ease + \beta_{62}\, Assortment + \beta_{63}\, Interactivity + \beta_{64}\, Network + \beta_{65}\, Nurturing + \zeta_6 \quad (1)$$

$$Inertia = \beta_{70} + \beta_{71}\, Purchase\ ease + \beta_{72}\, Assortment + \beta_{73}\, Interactivity + \beta_{74}\, Network + \beta_{75}\, Nurturing + \beta_{76}\, Adaptation + \beta_{78}\, Satisfaction + \zeta_7 \quad (2)$$

$$Trust = \beta_{90} + \beta_{91}\, Purchase\ ease + \beta_{92}\, Assortment + \beta_{93}\, Interactivity + \beta_{94}\, Network + \beta_{95}\, Nurturing + \beta_{98}\, Satisfaction + \zeta_9 \quad (3)$$

$$Satisfaction = \beta_{80} + \beta_{81}\, Purchase\ ease + \beta_{82}\, Assortment + \beta_{83}\, Interactivity + \beta_{84}\, Network + \beta_{85}\, Nurturing + \beta_{86}\, Adaptation + \zeta_8 \quad (4)$$

$$Recommendations = \beta_{100} + \beta_{109}\, Trust + \zeta_{10} \quad (5)$$

$$Loyalty = \beta_{110} + \beta_{111}\, Purchase\ ease + \beta_{112}\, Assortment + \beta_{113}\, Interactivity + \beta_{114}\, Network + \beta_{115}\, Nurturing + \beta_{116}\, Adaptation + \beta_{117}\, Inertia + \beta_{118}\, Satisfaction + \beta_{119}\, Trust + \zeta_{11} \quad (6)$$

Measurement model. All of the latent variables are measured by their corresponding manifest variables. Considering that when manifest variables are manifestations of the construct (not the defining characteristics of the construct), changes in the construct do cause changes in the indicators, indicators share a common theme, dropping an indicator do not alter the conceptual domain of the construct and indicators covariate with each other, indicators should be regarded as reflective indicators (Petter *et al.*, 2007), it was decided to maintain the preferred model for the research with the reflective measurement model.

All of the manifest variables constituted a questionnaire for the respondent's evaluations of retail websites. Each latent variable had 2–5 corresponding manifest variables. Questionnaire was elaborated based on various authors (Eklöf and Selivanova, 2008; Anderson and Swaminathan, 2011; Eid, 2011; Kuo *et al.*, 2013; Hung *et al.*, 2014) and adopted to Lithuanian consumers' market (the questionnaire is available from the authors upon request). 5-point evaluation scale was applied for the questionnaire.

The Sample. The total sample size was 300. The survey was conducted from 28th July until 14th August (2014). The survey was handled in person; since the object of the research contains Lithuania's level, which is divided into 10 counties with different population, the number of respondents was estimated according to the population in each county. 27 percent of male and 73 percent of female participated in the survey. 49 percent of the respondents were at the age group of 18-25 years old, 25 percent – at the age group of 26-35, 12 percent – at the age group of 36-45, 9 percent – at the age group of 46-55 years old, and 5 percent of respondents were more than 55 years old.

Methods of data analysis. Principle component analysis (PCA), structural equation modelling (SEM) using partial least squares (PLS) path modelling methodology, and Importance-Performance matrix were applied for statistical analysis. IBM SPSS Statistics V. 20, SmartPLS V. 3 (Ringle *et al.*, 2014), Matlab R2012b software products were used for the statistical analysis of the research results.

4. ANALYSIS OF THE RESEARCH RESULTS

Analysis of the research results revealed that 30 percent of respondents are shopping only at foreign retail websites, 38 percent of respondents are shopping only at Lithuanian retail websites, and 32 percent of respondents are shopping at both foreign as well as Lithuanian retail websites.

Lithuanian customers' preferences for the country of origin of the retail website reveal that it is important to enhance website quality factors that have influence on customer satisfaction as well as loyalty not only for the Lithuanian companies, but also for the foreign companies, which market consists of Lithuanian customers as well.

Thus, principal component analysis and structural equation modelling are further provided in order to elaborate website quality-based customer satisfaction with e-commerce index model.

In order to determine website quality-based factors of Lithuanian customer satisfaction with e-commerce, principal component analysis is applied for the variables that theoretically determine customer satisfaction with e-commerce: *assortment*, *adaptation*, *nurturing*, *interactivity*, *network*, *commitment*, *transaction ease*, and *engagement*.

To determine if the sampling is adequate for analysis, Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy is used. Latter measure compares the observed correlation coefficients to the partial correlation coefficients. As presented in Table no. 2, KMO measure is above 0.9, thus data is appropriate for factor analysis. Furthermore, Bartlett's Test of Sphericity is used to determine if the correlation matrix in the factor analysis is an identity matrix. In this case, Bartlett's Test is statistically significant. Consequently, correlation matrix is not an identity matrix and variables will load together properly.

Table no. 2 – KMO and Barlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	**Bartlett's Test of Sphericity**		
	Approx. Chi-Square	df	Sig.
0.949	7681.477	741	0.000

Principle component analysis method is used for extracting factors. Kaiser's rule of retaining factors with eigenvalues larger than one is used in the analysis as the default. Eigenvalues associated with each factor after extraction and after rotation are presented in Table no. 3 below. The initial eigenvalues are presented only for the significant factors. Consequently, six factors are extracted which explain more than 62 percent of the total variance. The eigenvalues of the factors after rotation have changed and optimized the factor structure: first factor accounts for more than 24 percent of the variance, while each of the remaining five factors accounts from more than 6 to more than 8 percent of the variance.

All of the communalities of the manifest variables are higher than 0.4; thus the sufficient amount of the variance in the variables is accounted for by the extracted factors.

Table no. 3 – Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	16.919	43.383	43.383	16.919	43.383	43.383	9.660	24.769	24.769
2	2.190	5.614	48.997	2.190	5.614	48.997	3.131	8.028	32.797
3	1.605	4.117	53.114	1.605	4.117	53.114	3.113	7.981	40.779
4	1.277	3.276	56.389	1.277	3.276	56.389	2.997	7.685	48.464
5	1.220	3.128	59.517	1.220	3.128	59.517	2.894	7.421	55.885
6	1.129	2.894	62.411	1.129	2.894	62.411	2.545	6.526	62.411

Rotated components matrix with the entire factor loadings being above 0.4 (above the threshold value) is presented in Table no. 4 (Rotation Method: Varimax with Kaiser Normalization). As is could be seen, five factors remain the same as in the theoretical analysis:

Factor 2: *assortment*;

Factor 3: *adaptation*;

Factor 4: *nurturing*;

Factor 5: *interactivity*;

Factor 6: *network*.

On the other hand, questions regarding *commitment*, *transaction ease*, and *engagement* highly load onto the same factor. Consequently, according to the essence of these variables, the new variable is formed – *purchase ease* – which is applicable for the market of Lithuanian customers.

Table no. 4 – Rotated Component Matrix

Variable	Component					
	1	2	3	4	5	6
COMMITMENT1	0.618					
COMMITMENT2	0.569					
COMMITMENT3	0.616					
COMMITMENT4	0.602					
COMMITMENT5	0.672					
TRANSACTIONease1	0.526					
TRANSACTIONease2	0.541					
TRANSACTIONease3	0.683					
TRANSACTIONease4	0.760					
ENGAGEMENT1	0.727					
ENGAGEMENT2	0.697					
ENGAGEMENT3	0.696					
ASSORTMENT1		0.487				
ASSORTMENT2		0.553				
ASSORTMENT3		0.494				
ASSORTMENT4		0.560				
ADAPTATION1			0.588			
ADAPTATION2			0.814			
ADAPTATION3			0.690			
ADAPTATION4			0.641			

Variable	Component					
	1	2	3	4	5	6
ADAPTATION5			0.494			
NURTURING1				0.596		
NURTURING2				0.505		
NURTURING3				0.707		
NURTURING4				0.685		
INTERACTIVITY1					0.406	
INTERACTIVITY2					0.668	
INTERACTIVITY3					0.603	
INTERACTIVITY4					0.547	
INTERACTIVITY5					0.539	
NETWOR1						0.617
NETWOR2						0.656
NETWOR3						0.741

As factor analysis revealed, there are six determinants of website quality-based e-commerce satisfaction regarding Lithuanian customers: *assortment*, *adaptation*, *nurturing*, *interactivity*, *network*, and *purchase ease* (formed of variables *commitment*, *transaction ease*, and *engagement*). Therefore, later variable adopts all the relations that *commitment*, *transaction ease*, and *engagement* had: *purchase ease* is assessed as the determinant of customer satisfaction in the case of Lithuanian customers.

The analysis of the research results revealed that the theoretical model contains statistically non-significant direct causal relations between latent variables. According to J. F. Hair *et al*. (2011), non-significant path coefficients do not support the proposed causal relationship. Particularly, as presented in Table no. 5, *adaptation* has no direct effect on *loyalty* and *satisfaction* in the case of Lithuanian customers; *assortment* has no direct effect on *trust*, while *trust* has no direct effect on *composite loyalty*. *Interactivity* has no direct effect on *inertia*, *loyalty*, *satisfaction*, and *trust*; *nurturing* has no direct effect on *inertia*, *satisfaction*, and *trust* as well. Moreover, *purchase ease* has non-significant direct effect on *adaptation* and *inertia*. Based on latter results, hypotheses regarding these direct relations are rejected and these direct causal relationships are eliminated from the model. Furthermore, variable *network* has no direct and no total hypothesized effects at all; this variable is removed from the model. Consequently, the elimination of the non-significant relations led to the creation of the new PLS Path model.

Table no. 5 – Path Coefficients and their significances at the theoretical model

Paths	Path Coefficient	Sample Mean	Standard Error	T Statistics	p Values
Adaptation -> Inertia	0.107*	0.108	0.054	1.976	0.048
Adaptation -> Loyalty	-0.047	-0.048	0.039	1.219	0.223
Adaptation -> Satisfaction	0.058	0.056	0.044	1.319	0.188
Assortment -> Adaptation	0.150*	0.152	0.075	1.998	0.046
Assortment -> Inertia	0.179*	0.179	0.068	2.636	0.009
Assortment -> Loyalty	0.127*	0.125	0.056	2.246	0.025
Assortment -> Satisfaction	0.250*	0.253	0.057	4.408	0.000
Assortment -> Trust	0.072	0.073	0.063	1.158	0.247
Inertia -> Loyalty	0.265*	0.263	0.051	5.249	0.000

Paths	Path Coefficient	Sample Mean	Standard Error	T Statistics	p Values
Interactivity -> Adaptation	0.254*	0.250	0.065	3.920	0.000
Interactivity -> Inertia	-0.056	-0.053	0.063	0.883	0.378
Interactivity -> Loyalty	-0.027	-0.023	0.057	0.464	0.643
Interactivity -> Satisfaction	0.076	0.076	0.050	1.531	0.126
Interactivity -> Trust	0.031	0.034	0.059	0.520	0.603
Network -> Adaptation	0.091	0.092	0.061	1.487	0.137
Network -> Inertia	0.101	0.104	0.053	1.903	0.057
Network -> Loyalty	0.036	0.035	0.043	0.827	0.408
Network -> Satisfaction	-0.012	-0.010	0.050	0.234	0.815
Network -> Trust	-0.002	-0.001	0.049	0.044	0.965
Nurturing -> Adaptation	0.251*	0.251	0.061	4.093	0.000
Nurturing -> Inertia	0.104	0.103	0.053	1.956	0.051
Nurturing -> Loyalty	0.102*	0.103	0.041	2.511	0.012
Nurturing -> Satisfaction	0.038	0.037	0.043	0.893	0.372
Nurturing -> Trust	-0.026	-0.026	0.055	0.478	0.633
Purchase ease -> Adaptation	0.083	0.085	0.076	1.089	0.276
Purchase ease -> Inertia	-0.069	-0.071	0.078	0.884	0.377
Purchase ease -> Loyalty	0.368*	0.366	0.075	4.889	0.000
Purchase ease -> Satisfaction	0.529*	0.529	0.061	8.694	0.000
Purchase ease -> Trust	0.422*	0.416	0.077	5.448	0.000
Satisfaction -> Inertia	0.531*	0.528	0.077	6.910	0.000
Satisfaction -> Loyalty	0.258*	0.262	0.077	3.369	0.001
Satisfaction -> Trust	0.390*	0.389	0.074	5.259	0.000
Trust -> Loyalty	-0.101	-0.104	0.062	1.640	0.101
Trust -> Recommendations	0.620*	0.618	0.044	14.052	0.000

*Note: *p < 0.05*

All of the indicators' loadings are statistically significant regarding the new PLS Path model; thus, are assessed as reliable. Moreover, measurement model is considered as displaying sufficient degree of convergent validity based on average variance extracted (AVE) values being above 0.5 (see Table no. 6).

Table no. 6 – AVE, Composite Reliability, and Cronbach's Alpha values

Variables	AVE	Composite Reliability	Cronbach's Alpha
Adaptation	0.619	0.866	0.794
Assortment	0.610	0.860	0.784
Inertia	0.741	0.896	0.826
Interactivity	0.610	0.886	0.838
Loyalty	0.722	0.929	0.904
Nurturing	0.622	0.868	0.798
Purchase ease	0.563	0.939	0.929
Recommendations	1.000	1.000	1.000
Satisfaction	0.721	0.928	0.902
Trust	0.863	0.950	0.920

As Composite Reliability measure does not assume that all indicators are equally reliable and prioritize indicators according to their reliability during model estimation, latter

measure is estimated for evaluating internal consistency reliability of the measurement model. All of the Composite Reliability values are higher than 0.7, as well as Cronbach's Alpha values. Thus, internal consistency reliability of the measurement model is sufficient.

Discriminant validity of the measurement model is estimated based on two criteria: Cross Loadings and Fornell-Larcker criterion. Regarding Cross Loadings, all indicators' loadings with their corresponding latent constructs are higher than their loadings with all the remaining constructs. Regarding Fornell-Larcker criterion, each construct's squared root AVE value is higher than its correlations with other latent variables (see Table no. 7).

Latent constructs share more variance with their assigned indicators than with another latent variable in the structural model. Consequently, the validity of the individual indicators and of the constructs is verified.

Table no. 7 – Fornell-Larcker criterion

Variables	Adaptation	Assortment	Inertia	Interactivity	Loyalty	Nurturing	Purchase ease	Recommendations	Satisfaction	Trust
Adaptation	**0.787**									
Assortment	0.571	**0.781**								
Inertia	0.559	0.656	**0.861**							
Interactivity	0.637	0.630	0.554	**0.781**						
Loyalty	0.562	0.724	0.749	0.637	**0.850**					
Nurturing	0.604	0.539	0.554	0.645	0.627	**0.789**				
Purchase ease	0.611	0.730	0.649	0.735	0.749	0.647	**0.750**			
Recommendations	0.470	0.581	0.619	0.574	0.849	0.502	0.724	**1.000**		
Satisfaction	0.597	0.731	0.745	0.678	0.805	0.593	0.749	0.741	**0.849**	
Trust	0.521	0.669	0.647	0.632	0.687	0.536	0.739	0.620	0.793	**0.929**

The standardized root mean square residual (SRMR) value is equal to 0.05, thus model predictions match the data good enough. Moreover, predictors' variables' variance inflation factor (VIF) is lower than 5, therefore there is no multicollinearity.

R Square values of endogenous variables are substantial; hence, proportion of variance explained by the fit regarding these variables is sufficient. Moreover, all cross-validated redundancy values (Stone-Geissers' Q^2) for endogenous latent variables are above zero (see Table no. 8). Consequently, model exhibits predictive relevance.

All of the exogenous variables' effect sizes on the endogenous variables range from small to very high. The highest effect sizes are made by variable *trust* to variable *recommendations* and by variable purchase ease to variable satisfaction. Variable *nurturing* to variable *loyalty* makes the lowest effect size. Despite this, later effect size is around 0.02 and the Beta of this relation is significant, implying that this effect is meaningful.

Table no. 8 – R Square, Q Square and f Square values

Variables	R^2	Q^2	f^2					
			Adaptation	Inertia	Loyalty	Recommendations	Satisfaction	Trust
Adaptation	0.497	0.299		0.027				
Assortment			0.055	0.043	0.024		0.128	
Inertia	0.762	0.432			0.113			
Interactivity			0.094					
Loyalty	0.712	0.546						
Nurturing			0.087		0.018			
Purchase ease					0.111		0.616	0.221
Recommendations	0.593	0.384						
Satisfaction	0.762	0.512		0.276	0.045			0.189
Trust	0.384	0.595				0.623		

Table no. 9 – Path Coefficients and their significances at the general model

Paths	Path Coefficients	Sample Mean	Standard Error	T Statistics	p Values
Adaptation -> Inertia	0.136*	0.138	0.053	2.548	0.011
Assortment -> Adaptation	0.220*	0.223	0.061	3.600	0.000
Assortment -> Inertia	0.201*	0.203	0.064	3.132	0.002
Assortment -> Loyalty	0.120*	0.118	0.053	2.264	0.024
Assortment -> Satisfaction	0.281*	0.281	0.054	5.236	0.000
Inertia -> Loyalty	0.257*	0.255	0.052	4.967	0.000
Interactivity -> Adaptation	0.317*	0.318	0.058	5.457	0.000
Nurturing -> Adaptation	0.280*	0.279	0.057	4.885	0.000
Nurturing -> Loyalty	0.088*	0.087	0.040	2.200	0.028
Purchase ease -> Loyalty	0.318*	0.319	0.066	4.824	0.000
Purchase ease -> Satisfaction	0.616*	0.617	0.052	11.844	0.000
Purchase ease -> Trust	0.455*	0.456	0.068	6.664	0.000
Satisfaction -> Inertia	0.518*	0.513	0.061	8.462	0.000
Satisfaction -> Loyalty	0.212*	0.215	0.075	2.813	0.005
Satisfaction -> Trust	0.420*	0.418	0.071	5.906	0.000
Trust -> Recommendations	0.620*	0.619	0.042	14.709	0.000

*Note: *p < 0.05*

Path Coefficients and their significances at the general model are provided below in Table no. 9. As it could be seen, all of the Path Coefficients are statistically significant ($p < 0.05$) and positive. *Adaptation* influences *inertia*, which influences customer *loyalty*. *Assortment* has direct effect on *adaptation*, *inertia*, *loyalty*, and *satisfaction*. *Interactivity* directly and statistically significantly influences only customers' *adaptation*. *Nurturing* influences *adaptation* as well as *loyalty*; *purchase ease* influences *loyalty*, *satisfaction*, and

trust. *Satisfaction* has very strong direct influences on *inertia*, *loyalty*, and *trust*, while *trust* has a very strong direct influence on *recommendations*.

Regarding Total Effects and their significances at the general model (see Table no. 10), only one effect is non-significant: variable *interactivity* has neither direct nor total impact on variable *loyalty*. On the other hand, all of the remaining Total Effects are statistically significant ($p < 0.05$) at the general model. Furthermore, *assortment* influences *inertia* and *loyalty*, *nurturing* influences *loyalty*, *purchase ease* influences *loyalty* and *trust*, *satisfaction* influences *loyalty* not only directly, but indirectly as well. The remaining Total Effects are based on the indirect relations; however, they are statistically significant.

Table no. 10 – Total Effects and their significances at the general model

Variables	Total Effect	Sample Mean	Standard Error	T Statistics	p Values
Adaptation -> Inertia	0.136*	0.138	0.053	2.548	0.011
Adaptation -> Loyalty	0.035*	0.035	0.016	2.140	0.033
Assortment -> Adaptation	0.220*	0.223	0.061	3.600	0.000
Assortment -> Inertia	0.376*	0.378	0.054	6.952	0.000
Assortment -> Loyalty	0.276*	0.276	0.051	5.398	0.000
Assortment -> Recommendations	0.073*	0.073	0.021	3.429	0.001
Assortment -> Satisfaction	0.281*	0.281	0.054	5.236	0.000
Assortment -> Trust	0.118*	0.118	0.033	3.607	0.000
Inertia -> Loyalty	0.257*	0.255	0.052	4.967	0.000
Interactivity -> Adaptation	0.317*	0.318	0.058	5.457	0.000
Interactivity -> Inertia	0.043*	0.044	0.019	2.235	0.026
Interactivity -> Loyalty	0.011	0.011	0.006	1.952	0.051
Nurturing -> Adaptation	0.280*	0.279	0.057	4.885	0.000
Nurturing -> Inertia	0.038*	0.039	0.017	2.179	0.030
Nurturing -> Loyalty	0.098*	0.097	0.041	2.415	0.016
Purchase ease -> Inertia	0.319*	0.316	0.045	7.161	0.000
Purchase ease -> Loyalty	0.531*	0.532	0.053	10.097	0.000
Purchase ease -> Recommendations	0.442*	0.442	0.043	10.361	0.000
Purchase ease -> Satisfaction	0.616*	0.617	0.052	11.844	0.000
Purchase ease -> Trust	0.713*	0.713	0.038	18.944	0.000
Satisfaction -> Inertia	0.518*	0.513	0.061	8.462	0.000
Satisfaction -> Loyalty	0.345*	0.346	0.074	4.693	0.000
Satisfaction -> Recommendations	0.260*	0.260	0.051	5.135	0.000
Satisfaction -> Trust	0.420*	0.418	0.071	5.906	0.000
Trust -> Recommendations	0.620*	0.619	0.042	14.709	0.000

*Note: *p < 0.05*

The finite mixture partial least squares (FIMIX-PLS) segmentation revealed that there is no unobserved heterogeneity in the structural model (probabilities of the membership in the second cluster are too small; thus, the whole cluster gets too small). The Total Effects represent the importance of each variable on the customer *satisfaction* as well as *loyalty*. Accordingly, the assumption could be made that the importance of each variable remains the same regarding both Lithuanian and foreign retail websites. The index values represent the performance of each of the variable from the customers' perspective. The computation of index values is carried out by means of rescaling the latent variables' scores to a range of 0

and 100 (Höck *et al.*, 2010). The Importance-Performance matrixes for the variables *satisfaction* and *loyalty* are composed and provided in Figure no. 1 to identify the main variables for the improvement with management activities. As it could be seen, *purchase ease* and *assortment* are the variables that influence customer *satisfaction* and latter three variables are the most important for the composite customer *loyalty*. On the other hand, *interactivity* has no effect on *satisfaction* and no statistically significant effect on *loyalty*, though the performance level of the variable *interactivity* is relatively high in comparison with the remaining variables. Hence, the investments should be relocated from the variable *interactivity* to the variable *assortment*, because latter variable has the lowest performance of the three most important variables for the composite customer *loyalty*.

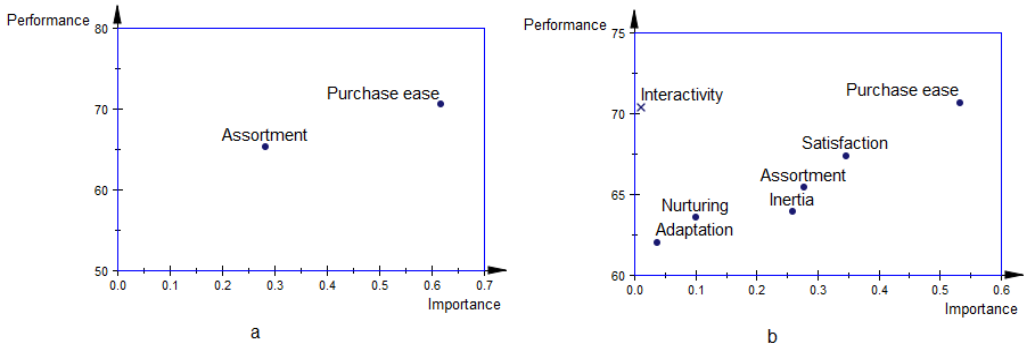

Figure no. 1 – Importance-Performance matrix of the variable
a) satisfaction, b) composite loyalty

Consequently, the analysis of the research results led to the creation of the general model of website quality-based e-commerce customer satisfaction index concerning Lithuanian customers' perspective and to the preparation of the managerial implications for the companies of e-business.

5. DISCUSSION

This research is in alignment with the studies arguing that *trust* does not influence customers' *composite loyalty*, only *attitudinal loyalty – intentions to recommend* (L. C. Hsu and Wang, 2008; Kassim and Abdullah, 2010; Eid, 2011). Moreover, latter statement partly supports the theory that consumers evaluate their experience, form *trust* directly (assuming positively evaluated experience) and create indirectly formed *trust* through the *recommendations* for other potential customers who have no experiences (Abdul-Rahman and Hailes, 2000; Almenarez *et al.*, 2004), which may encourage first time purchase from the specific website. Even though, investigating latter theory was not the object of this research; thus, it was not empirically confirmed, but the supported hypothesis stating that *trust* influences *attitudinal loyalty* and rejected hypothesis stating that *trust* influences *composite loyalty* give the background for this theory.

Furthermore, the results of this research provide support for the studies revealing that customers' *trust* and *inertia* are the consequences of customer *satisfaction*, and not vice versa (Almenarez *et al.*, 2004; Kim *et al.*, 2011; M. H. Hsu *et al.*, 2015).

On the other hand, the analysis of the research results revealed that in the case of Lithuanian consumers, *network* (which represents customers' communication among themselves through the website) has a statistically significant direct as well as an indirect effect on none of the endogenous variables in the model (*adaptation*, *trust*, *inertia*, *loyalty*). The reason for this might be the prevalence of social networks, where consumers can communicate with their friends and acquaintances and ask their opinion (which usually is more trustworthy for them), than talk to unfamiliar and untrusted persons in the retail website.

Customers' *adaptation* to the specific retail website is influenced by *assortment*, *interactivity*, and *nurturing*. This founding implies that Lithuanian customers feel that value propositions in the website are adapted to them when the variety of products or services provided in the website is sufficiently large, the possibility of two-way communication through the website among company and customers exists, and relevant post purchase information for the customers is provided from the website.

Customer *satisfaction* is influenced by *purchase ease* and *assortment* as well. For the Lithuanian customers, *purchase ease* consists not only of the convenient purchase from the website, but also of the ongoing relationships with the customers and overall image that the company projects to customers through effective use of inputs such as text, style, graphics, colors, logos, slogans, and themes, which facilitate the purchase from the website. Moreover, *purchase ease* and *satisfaction* influence customers' *trust*, which has a direct positive effect on customers' *recommendations*.

Lithuanian customers' *inertia* is influenced by the *assortment* provided in the specific website, customers' *adaptation*, and *satisfaction* with the specific website.

Finally, composite Lithuanian customer *loyalty* to a specific retail website is directly affected by *purchase ease*, *assortment*, *nurturing*, *inertia*, and *satisfaction*.

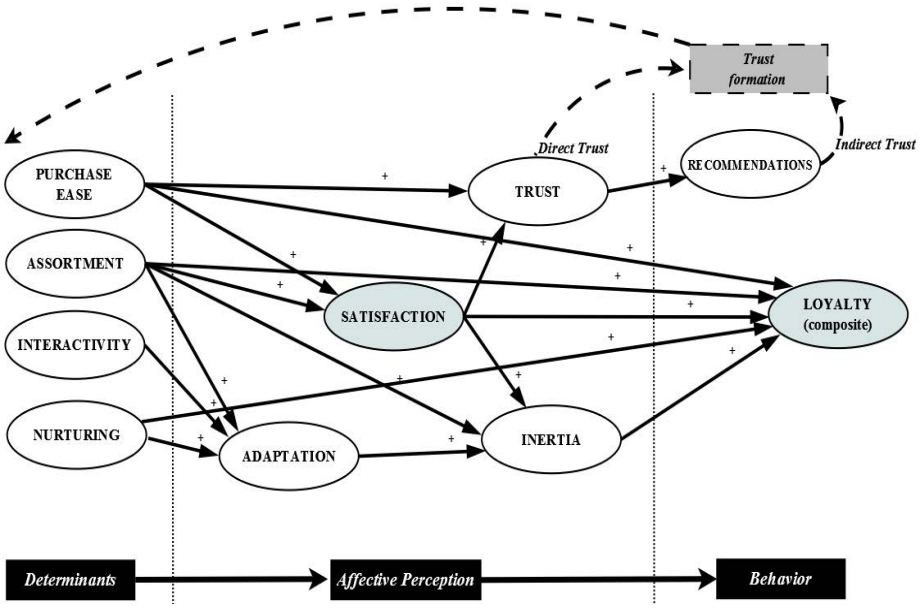

Figure no. 2 – The model of website quality-based e-commerce customer satisfaction index

All these variables (representing the determinants of customer satisfaction, affective perception, and behavior of the customers) and significant positive relations between these variables (including empirically unconfirmed theory regarding trust formation, marked in dotted arrows) compose the general website quality-based e-commerce customer satisfaction index model concerning Lithuanian customers' perspective (see Figure no. 2).

Consequently, it could be stated, that if seeking Lithuanian customer satisfaction and loyalty to the specific (Lithuanian or foreign) retail website, the two most important factors to enhance it are: *purchase ease* and *assortment*. Enhancing these determinants would require targeting the investments into the variety of products or services provided in the website, creating the convenient purchase from the website, managing ongoing relationships with the customers and improving the overall image that the company projects to customers through the website. The investments into the *assortment* can be taken over from the investments into the *interactivity* of the website. In this case, the possibility of balancing the investments while enhancing *satisfaction* and *loyalty* would appear.

Subsequently, the elaborated general model of website quality-based e-commerce customer satisfaction index concerning Lithuanian customers' perspective indicates the factors for the companies, which are worth investments in order to gain Lithuanian customer satisfaction and loyalty. As a result, not profitable investments might be avoided and the competitiveness of e-business in Lithuania would possibly increase.

6. CONCLUSIONS

Various different e-commerce customer satisfaction indexes are developed all over the world due to dissimilarities among consumers in different countries. The analysis of the scientific literature leads to the conclusion that most of the determinants of e-commerce satisfaction defined in different indexes correspond to each other and can be connected. Moreover, many of the e-commerce satisfaction indexes may be considered as website quality-based e-commerce customer satisfaction indexes, where website quality is implied in a broad sense including technical as well as service quality.

Lithuanian customers' online buying patterns reveal that it is important to enhance website quality factors that have influence on customer satisfaction with e-commerce as well as loyalty not only for the Lithuanian companies, but also for the foreign companies, which market consists of Lithuanian customers as well.

Purchase ease (composed of transaction ease, engagement, and commitment) and assortment are the determinants of Lithuanian customer satisfaction with e-commerce. Assortment together with interactivity and nurturing are the determinants of Lithuanian customers' adaptation to the specific retail website. Lithuanian customers' inertia is influenced by the assortment provided in the specific website, customers' adaptation, and satisfaction with the specific website. Moreover, purchase ease and satisfaction influence customers' trust, which has a direct positive effect on customers' recommendations. Composite Lithuanian customer loyalty to a specific retail website is directly affected by purchase ease, assortment, nurturing, inertia, and satisfaction.

Lithuanian e-commerce customer satisfaction barely achieves the average level; Lithuanian customer loyalty to the specific retail websites is lower than the level of satisfaction. These findings imply that there is a high necessity of the relocation of the investments from the e-businesses into the more profitable website quality factors. When seeking Lithuanian customer satisfaction and loyalty to a specific (Lithuanian or foreign)

retail website, the two most important factors to enhance it are: purchase ease and assortment. The investments into the assortment can be taken over from the investments into the interactivity of the website. In this case, the possibility of balancing the investments while enhancing satisfaction and loyalty would appear.

The elaborated general model of website quality-based e-commerce customer satisfaction index concerning Lithuanian customers' perspective indicates the factors for the companies, which are worth investments in order to gain Lithuanian customer satisfaction and loyalty. As a result, not profitable investments might be avoided, which could contribute to the growing competitiveness of e-business in Lithuania.

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