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Measuring quality perception in electronic commerce

A possible segmentation in the Hungarian market

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Abstract

Purpose – The perceived electronic-service quality (e-SQ) has become a relevant research area, not only in developed but also in smaller, less-developed countries. The purpose of this paper is to provide a description of an analysis into the relationship of the dimensions of perceived e-SQ and satisfaction as well as WOM intention in case of an online bookstore in Hungary where technical development and internet penetration is emerging; however, it is developing from an economic perspective. Beyond this a potential segmentation is introduced in the Hungarian market.

Design/methodology/approach – The direct effect of perceived e-SQ's dimensions on satisfaction and on traditional WOM were analysed using the PLS-SEM method, which was followed by the segmentation approach. The paper also demonstrates differences of the identified consumer segments, using multivariate analysis of variance.

Findings – According to the research only the dimension of efficiency and responsiveness have a significant positive effect on satisfaction, and beside these the quality perception of fulfilment has a significant influence on WOM intention. Using the relevant latent variable scores segmentation was conducted and four clusters were identified.

Originality/value – Due to peculiarities of e-services, quality measurement needs a constant revision and adoption. Extent amount of research has been dedicated to analyse the relationship of quality and satisfaction, but the direct effect of relevant quality dimensions on word-of-mouth intention is a new research field. Segmenting customers based on latent variable scores of the proposed model has not been conducted before in case of an online bookstore in Hungary. According to the results the evaluation of the technology-based components has the greatest effect on satisfaction and WOM intention. However, web-shops managers should focus not only on online characteristics but also on offline, human-based interactions and the service quality of their delivery partners.

Keywords E-commerce, Segmentation, E-service quality perception

Paper type Research paper

1. Introduction

Over the last ten years the business-to-consumer online market has grown at a fast pace, not only in developed but also in smaller, less-developed countries, such as Hungary. In 2014, the combined revenue of Hungarian web-shops was HUF273 billion (EUR872 million), which represents a more than 26 per cent increase over 2013 revenues (Enet, 2014). The number of online consumers is also growing: 72 per cent of regular internet users bought something online in 2014. The most popular goods

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purchased online are: books and magazines (44 per cent of online-buyers); clothes, sporting goods (40 per cent); and travel and holiday accommodation (36 per cent) (Eurostat, 2013). These facts contribute to the reason why e-commerce has become a relevant and important business research field in Hungary.

E-commerce offers several advantages relative to the brick-and-mortar environment. Such advantages include personalisation, an increasing range of products and information, and interactivity. However, certain risks have also appeared along with the benefits. Opportunities for fraud and abuse are higher in an impersonal and automated environment. Consequently, safe purchasing platforms and service quality-level play a more important role in convincing potential buyers than in offline environment. Therefore it is essential for companies to have a well-founded strategy resulting in highly appreciated electronic-service quality (e-SQ).

The main aim of the paper is to analyse the relationship between the dimensions of perceived e-SQ, satisfaction and word-of-mouth intention in a Hungarian online bookshop. Beside that – using the results of a PLS-SEM model – we propose segmentation based on quality perceptions. The dimensions of perceived quality are commonly measured using multi-item scales, however, in the proposed segmentation not separate items or the sum or average scores are used, but latent variable scores. Based on the results of such segmentation processes managers could build up a more reliable differentiation and communication strategy which helps to improve the level of satisfaction and word-of-mouth intention of consumers. In our research the E-S-Qual and its second scale, E-RecS-Qual was used with limitations to the Hungarian adoption.

The first section of the study provides an overview of related literature. In this section the main questions addressed are the following: what are the differences between traditional-service quality and e-SQ; how can e-SQ be measured; and what are the main consequences of perceptions of quality. The second section is about research design and methodology. The third part includes main findings and in the last section conclusions and managerial implications are highlighted.

2. Underlying theoretical frameworks

Online purchasing results in a different customer experience than offline purchasing: buyers are searching and communicating in a virtual world and human-machine interactions are replacing interpersonal interactions (Bressolles *et al.*, 2007). The number of self-service interactions is higher (Meuter *et al.*, 2000). The internet as a marketing and sales channel has many advantages (interactivity, personalisation, the community, enormous product, information supply, etc.) that necessitate the introduction of new research concepts as well (Wolfinbarger and Gilly, 2003). In this impersonal and automated environment the risk felt by a consumer is also higher, so privacy plays a more important role (Bressolles *et al.*, 2007).

To better understand the concept of e-SQ perception, Parasuraman *et al.* (2005) suggest that the differences between traditional services quality and e-SQ should be analysed.

2.1 Quality perception in e-commerce

In the early stage of the internet's expansion retailers believed that low prices and web presence can guarantee success (Minocha *et al.*, 2003; Kim and Benbasat, 2006). However, with the accumulation of consumer and corporate experience in online shopping, and as competition got stronger and online purchases became a routine

(Yoo and Donthu, 2001) companies had to realise that they had been mistaken. If consumers do not find the required information on website, if e-mails are not answered in time or if product is not delivered at the requested time, consumers do not hesitate to give a much lower rating in the quality assessment (Zeithaml *et al.*, 2002) and switching to another e-tailer has never been easier. Recognition of this fact gave rise to changes in strategic thinking and quality became a crucial factor in online channel as well. Yet the relevant literature was lacking until the mid-2000s (Lennon and Harris, 2002; Parasuraman *et al.*, 2005).

e-SQ is a complex concept that includes aspects of the buying process that precede and follow the actual purchase. It covers not only the information-seeking processes and the use of a website, but also purchase, fulfilment, goods delivery, and occasional return and compensation. A broadly accepted definition of perceived e-SQ is: "The extent to which a Web site facilitates efficient and effective shopping, purchasing, and delivery" (Parasuraman *et al.*, 2005, p. 5).

Perceived quality could be described – in online environment as well – as the difference between consumer perceptions and the company's performance (Parasuraman *et al.*, 2005). During the evaluation process consumers' expectations play a relevant role, which is influenced by earlier experiences, situational effects, company communication and word-of-mouth (Hill, 1986; Hofmeister-Tóth *et al.*, 2003; Kenesei and Kolos, 2007). Perceptions of quality have a significant impact on satisfaction, and its consequences. According to the disconfirmation paradigm, if perceived quality is lower than the expected, consumers may complain or even leave the company (Folkes, 1984; Szymanski and Henard, 2001). If this relationship is reversed – i.e. perceived quality is equal to or higher than expected – then consumers tend to be satisfied, which can lead to positive word-of-mouth, or repurchasing intentions (Oliver and Rust, 1997; Szymanski and Henard, 2001; Chang *et al.*, 2009), and long-term loyalty (Cronin and Taylor, 1992).

The first summary of the differences between traditional-service quality and e-SQ is connected to Gefen's (2002) early research. His overview shows that, instead of the five dimensions of traditional-service quality (reliability, assurance, tangibles, empathy and responsiveness (Zeithaml *et al.*, 1996), e-SQ can be described using only three dimensions: tangibles, empathy and a combined dimension of reliability, assurance and responsiveness. Based on a summary of research focussed on e-SQ, Bressolles *et al.* (2007) identified six dimensions: the quality and the quantity of information; the ease of use of the website; the design or the graphic style of the website; reliability and respect for commitments; security and privacy; and interactivity and personalisation (Table I).

Conceptualisation of the quality provided by websites and web-shops started in early 2000s. Since then series of concepts have shed the light and new approaches were developed. The concepts were often limited in scope as they focussed exclusively on interactions at the site or on post-purchase interactions. As argued above, the e-SQ delivered by webstores entails evaluation of the entire purchase process. For the same reason, these approaches came under harsh criticism in the mid-2000s (Wolfinbarger and Gilly, 2003; Parasuraman *et al.*, 2005; Bauer *et al.*, 2006). The scales created in this period were also widely criticised for judging all kinds of websites (from entertainment websites to e-shops) by the same standards, pointing out that the purpose of a site may have a significant influence on relevant quality dimensions (Wolfinbarger and Gilly, 2003). In addition to that, it is also recommended to examine the process of e-commerce separately in the case of

Traditional-service quality	Electronic-service quality
Similarities	
Both are perceived concepts that are defined by expected and perceived quality	
The consequences are similar, but the effects may be different	
Differences	
Interpersonal relationship	Human-machine interaction
There is a shop (material environment) and people	In shopping the consumer meets only with technology
	Self-service
	There is no interpersonal interaction→higher risk
Key dimensions (SERVQUAL, Zeithaml et al., 1996)	*Key dimensions (according to the resume Bressolles et al., 2007)*
Reliability	Reliability
Assurance	Assurance, privacy
Tangible	Design
Empathy	Interactivity and personalisation
Responsiveness	Ease of use
	The quality and quantity of information

Source: Summary of literature

Table I. Traditional and electronic-service quality

websites offering products and those selling services (Srinivasan *et al.*, 2002; Francis, 2007; Sejin and Stoel, 2012).

To measure e-SQ several scales have already been developed and introduced in the literature (Loiacono *et al.*, 2007; Barnes and Vidgen, 2001; Yoo and Donthu, 2001; Francis and White, 2002; Wolfinbarger and Gilly, 2003; Parasuraman *et al.*, 2005; Francis, 2009), but according to the critics most of the concepts do not have content validity because they do not fit the definition of e-SQ – they do not cover all stages of the buying process (information-seeking, transaction, delivery and consumer service) (Wolfinbarger and Gilly, 2003; Parasuraman *et al.*, 2005). Based on our literature summary (Table II), we can state that WebQual TM (Loiacono *et al.*, 2007), SITEQUAL (Yoo and Donthu, 2001) and WebQual 4.0 (Barnes and Vidgen, 2001) do not have content validity because the dimensions of these scales do not deal with post-purchasing interactions such as delivery and consumer service. They concentrate only on quality of the site and transaction (Kemény *et al.*, 2013).

The other fact that makes the construction of web-shops quality more complex is that some of its dimensions belong to the online environment, such as information-seeking and transactions, but others, in case of physical goods, belong to the offline environment. Concerning the nature of the relevant dimensions it also could be concluded that some dimensions of e-SQ are technology-based (e.g. system availability), while others are human-based (e.g. consumer service, the reliability of the information), and sometimes the delivery service is provided by an external company.

In this study we adopted the widely used E-S-Qual scale, and the E-RecS-Qual scale, which was established in 2005 by Parasuraman *et al.* (with 4 + 3 dimension with 22 + 11 items). The main scale has a second scale because the results of the research showed that e-service has some dimensions connected to compensation and responsiveness, but these items are not relevant to all customers. This scale is relevant only to customers who had a problem with the site or purchasing process.

Table II.
Summary of e-SQ concepts connected to E-S-Qual and E-RecS-Qual

Scale	Author(s)	Year	No. of dim. and items[a]	Dependent variable	Valuation: how does it cover the definition of e-SQ? IS	TR	DE	CS	SE
WebQual TM	Loiacono *et al.*	2000, 2002, 2007	12/36	1. Usability 2. Reusing intention	Y	Y	N	N	Y
SITEQUAL	Yoo and Donthu	2001	4/9	1. Usability 2. Reusing intention 3. Website value 4. Attitudes towards the site 5. Revisiting intention 6. Repurchasing intention	Y	Y	N	N	Y
PIRQUAL	Francis and White	2002	6/?[b]	1. Behavioural intention	Y	Y	Y	Y	Y
WebQual 4.0	Barnes *et al.*	2002	4/23	Index	Y	Y	N	N	Y
ETAILQ	Wolfinbarger and Gilly	2003	4/14	1. Quality 2. Satisfaction 3. Loyalty 4. Attitudes towards the site	Y	Y	Y	Y	Y
E-S-Qual and E-RecS-Qual	Parasuraman *et al.*	2005	7/33	1. Quality 2. Perceived value 3. Loyalty intention	Y	Y	Y	Y	Y
e-TRANSQUAL	Bauer *et al.*	2006	5/25	1. Quality 2. Perceived value 3. Satisfaction 4. Relationship duration 5. Repurchasing intention	Y	Y	Y	Y	Y
RECIPE	Francis	2009	4/19 4/18 4/19 4/20	1. Loyalty	Y	Y	Y	Y	Y
E-S-Qual and E-RecS-Qual Bank	Akinci *et al.*	2010	7/14	1. Perceived value 2. Loyalty	Y	Y	Y	Y	Y
Scale of Kao and Lin banking	Kao and Lin	2016	7/18	1. Trust 2. Satisfaction	Y	Y	Y	N	Y

Notes: IS, information-seeking; TR, transaction; DE, delivery; CS, contact, consumer service; SE, security; Y, yes, the scale measures this dimension; N, no, the scale does not measure this dimension. [a]Number of the scale's dimensions and the used items; [b]No information is available about the number of items

Source: Review of literature

The earlier scale included 11 dimensions (reliability, responsiveness, access, flexibility, ease of navigation, efficiency, assurance/trust, security/privacy, price knowledge, site aesthetics and customisation/personalisation) that were reduced to 4 + 3. The four dimensions of E-S-Qual (Parasuraman *et al.*, 2005) are the followings:

(1) Efficiency: how easy and fast is the access and usage of the site? – internal, technology-based characteristic.

(2) System availability: the correct technical functioning of the website – internal, technology-based characteristic.

(3) Fulfilment: are the promises fulfilled? – external, human-based characteristic.

(4) Privacy: does the site protect customer information? – internal, technology-based characteristic.

The second scale, E-RecS-Qual's dimensions are:

(1) Responsiveness: does the site handle problems in a correct way? – internal, human-based characteristic.

(2) Compensation: how does the site/vendor compensate if a customer has a problem? – internal, human-based characteristic.

(3) Contact: does the site have online or phone representatives? – internal, human-based characteristic.

The second scale (E-RecS-Qual) includes the internal, human-based components of the site such as consumer service and complaint handling, which are especially important to web-shops because there is no personal interaction with the seller and the buyer who cannot touch the purchased physical goods.

2.2 The antecedents of perceived quality

The relationship between perceived quality and satisfaction (De Ruyter *et al.*, 1997) as well as the role of emotions in consumer satisfaction decisions are well-researched topics (Oliver, 1993). Hunt (1977) treats attitudes and satisfaction separately, claiming that attitudes have their origins in emotions such as enjoyment, while satisfaction evolves from such emotions. By contrast, (Oliver, 1980; Oliver and Linda, 1981) conceives satisfaction as a fleeting experiential feeling while he considers attitude more permanent. According to the definition of Ajzen and Fishbein (1972), attitude indicates a person's location on a bipolar dimension of preference with respect to some object.

Veres (2009) suggests that consumer judgements about service quality should form the basis of the measurement of satisfaction. Others assert that complete satisfaction is the direct product of perceived service quality (Parasuraman *et al.*, 1988; Cronin and Taylor, 1994; Chang *et al.*, 2009; Ribbink *et al.*, 2004). Wolfinbarger and Gilly (2003) carried out a study in this topic in an online context, which revealed that e-SQ dimensions show a positive correlation with satisfaction. Their hypothesis was confirmed by Bressolles *et al.* (2007). In their study, Yang and Tsai (2007) demonstrated that, among the most widely used instruments, the dimensions of E-S-Qual and E-RecS-Qual, whether in combination or separately, positively affect consumer satisfaction. Godwin *et al.* (2010) also found that, among other factors, perceived quality plays a part in satisfaction decisions. We consider that these findings provide sufficient evidence for us to agree that perceived quality is positively correlated with consumer satisfaction.

Based on the model of Parasuraman *et al.* (2005) and on our previous literature review our hypotheses can be formulated as follows:

H1 e-SQ dimensions have a positive effect on satisfaction.

H1.1 The dimension of fulfilment has a positive effect on satisfaction.

H1.2 The dimension of system availability has a positive effect on satisfaction.

H1.3 The dimension of efficiency has a positive effect on satisfaction.

H1.4 The dimension of security has a positive effect on satisfaction.

H1.5 The dimension of compensation has a positive effect on satisfaction.

H1.6 The dimension of contact has a positive effect on satisfaction.

H1.7 The dimension of responsiveness has a positive effect on satisfaction.

E-satisfaction that occurs in online environments can be interpreted on the model of previous satisfaction definitions because consumers' evaluation of the given web-shop has regard also to the prior online purchase experience (Anderson and Srinivasan, 2003). In the case of e-commerce, we can distinguish between transaction-specific satisfaction pertaining to a particular encounter with a web-shop (e.g. booking a room), and cumulative satisfaction, which stems from repeat purchases. In the literature on information systems, which are an integral part of e-commerce, satisfaction is the sum of opinions about a specific system's attributes, with special attention to efficiency in which design and implementation play a leading part. Satisfaction is therefore defined by the dimensions of information content, personalised services, user interface and system value (Lu *et al.*, 2012).

The degree and level of satisfaction has far-reaching consequences. In the event of dissonance, i.e. dissatisfaction, customers consider whether they should abandon the business; and complaining is generally induced by serious dissatisfaction (Folkes, 1984; Richins, 1983; Ursic, 1985; Szymanski and Henard, 2001). Dissatisfaction may result in negative WOM (Folkes, 1984; Richins, 1983), a form of complaining addressed to prospective customers instead of the company. The more complaints and negative WOM a business attracts, the lower the chances of repatronage and repurchasing are. In addition, dissatisfied customers more readily search for further information and easier give in to the offers of competitors.

Most of the formerly mentioned e-SQ studies analyse the effect of perceived quality on satisfaction, repurchasing, revisiting intention or loyalty, but none of them deal with word-of-mouth, although this is a relevant and interesting research topic (Chang *et al.*, 2009), so we can explore the direct and indirect relationship to it:

H2. e-SQ dimensions have a positive effect on word-of-mouth intention.

H2.1 The dimension of fulfilment has a significant positive effect on word-of-mouth intention.

H2.2 The dimension of system availability has a positive effect on word-of-mouth intention.

H2.3 The dimension of efficiency has a positive effect on satisfaction.

H2.4 The dimension of security has a positive effect on word-of-mouth intention.

H2.5 The dimension of compensation has a positive effect on word-of-mouth intention.

H2.6 The dimension of contact has a positive effect on word-of-mouth intention.

H2.7 The dimension of responsiveness has a positive effect on word-of-mouth intention.

H3. Perceived e-service satisfaction has a positive effect on word-of-mouth intention.

In this study we investigate only one aspect of word-of-mouth (van Dolen *et al.*, 2007; Ltifi and Gharbi, 2012), which may be divided into traditional WOM and electronic WOM. Traditional WOM is defined as a negative or positive informal communication about a business or its products and services (Tax *et al.*, 1993), and e-WOM refers to "any positive or negative statements made by potential, actual or former customers about a product or a company […] via Internet" (Hennig-Thurau *et al.*, 2004, p. 39). During our research we will concentrate only on the traditional word-of-mouth intention.

3. Empirical research

Our research consisted of two stages. In the first stage the direct effect of perceived e-SQ's dimensions on satisfaction and on traditional word-of-mouth were analysed using the PLS-SEM method. The second phase provided a segmentation of the sample based on those perceptions of quality dimensions, which were relevant to the satisfaction and word-of-mouth relationship. In this part we also described different consumer segments by using multivariate analysis of variance.

A positive relationship between perceived quality and satisfaction and between perceived quality and word-of-mouth intention were corroborated by countless studies in an offline context, and research evidence has been provided for the existence of a similar relationship in the case of e-SQ as well (Wolfinbarger and Gilly, 2002, 2003; Bauer *et al.*, 2006; Bressolles and Nantel, 2004; Parasuraman *et al.*, 2005; Qin, 2007; Chang *et al.*, 2009; Godwin *et al.*, 2010; Carlson and O'Cass, 2011; Kim, 2012; Sejin and Stoel, 2012). However, the direct relationship between e-SQ dimensions (based on E-S-Qual and E-RecS-Qual scales) and word-of-mouth intention has not been analysed yet.

3.1 Research design

A research was designed to measure perceived e-SQ in Hungary using the E-S-Qual and E-RecS-Qual scale. This scale was adopted since it is a well-accepted scale in marketing and its roots come from traditional-service marketing (Parasuraman *et al.*, 2005). Word-of-mouth intention was also measured using a multi-item scale from Zeithalm *et al.* (1996), and satisfaction was measured with one item described in Parasuraman *et al.* (2005). Table AI includes the evaluation of the applied constructs. The translation of the scale followed a two-stage process in order to guarantee validity: first the English scale was translated to Hungarian, and after that the Hungarian items were translated to English and compared to the initial items.

Data collection took place among the users of one of the most popular Hungarian online bookshop, because the highest proportion of Hungarian e-shoppers buy books on the internet (NRC Piackutató Kft, 2009). An online survey was used via the newsletter of the company. Our aim was to achieve 300 respondents in one week who have made a purchase on this web-shop in the last three months. The final sample size decreased to 277 respondents because we decided to eliminate missing values.

The majority of the respondents were female (84 per cent), what is due to the product category (70 per cent of the registered buyers of the web-shop are female). In the research of Parasuraman *et al.* (2005) similar over presence of female customers could be found (in case of Amazon 74 per cent and in case of Walmart 78 per cent) so we can state it is acceptable. In total, 60 per cent of the respondents were younger than 40 years. Most respondents visit the analysed web-shop five to eight times per month (37 per cent). Half of the respondents (53 per cent) made their surveyed purchase in the previous eight weeks. This result is acceptable because 46 per cent of the online-buyers in Hungary make an online purchase in less than two month frequency (GKI, 2015). Table III shows a detailed description of the sample.

3.2 Research methods

Of covariance and variance-based modelling, we finally decided to use the latter for the purpose of our analysis because in this method normal distribution of the tested variables is not a requirement, and based on the Kolmogorov-Smirnov test performed, non-normal distribution could be anticipated in our research. Moreover, increased complexity of the model results in poorer performance of several indicators in the case of CB-SEM, which also argues in favour of using PLS-SEM. The use of this method is also recommended for relatively low sample numbers (Henseler, 2010), or when the construct scores are required for the analysis (Mandják *et al.*, 2012). The data were analysed using Adanco and SPSS 20.

Before analysing the expected relationships, the reliability and validity of the scales – such as the internal consistency reliability, convergence validity and discriminant validity – should be tested (Table IV). Dijkstra-Henseler's ρ can be used as

$n = 277$ people	Freq.	%	$n = 277$ people	Freq.	%
Gender[a]			*For how long have you been using the web-store?*		
Male	45	16	For less than 3 months	17	6
Female	232	84	For 3-6 months	17	6
			For 6-10 months	41	15
			For more than 1 year	202	73
Age			*How often do you visit this web-store?*		
< 20	21	8	Less the 5 times per month	56	20
20-29	78	28	5-8 times per month	103	37
30-39	95	34	9-12 times per month	52	19
40-49	41	15	More than 12 times per month	66	24
> 49	42	15			
Net monthly income			*When was your last purchase?*		
< HUF50,000[b]	65	26	Less than a week age	40	14
HUF50,000-99,999	87	35	1-2 weeks ago	41	15
HUF100,000-149,999	48	19	3-4 weeks ago	22	8
HUF150,000-199,999	35	14	5-8 weeks ago	43	16
HUF200,000-499,999	16	6	More than 8 weeks ago	131	47
> HUF499,999	1	0.4			
n.d.	2,500	9			
			The last average purchase size	HUF5,004[b]	

Table III.
Profiles of the sample

Notes: [a]According to a survey by Gemius, 60 per cent of website users are women; [b]HUF230 ~ USD1 (January 2014)

Table IV.
The reliability and validity of the scales

Construct	Dijkstra-Henseler's rho (ρ_A)	AVE	HTMT							
			1	2	3	4	5	6	7	8
1. System availability	0.84	0.64								
2. Efficiency	0.91	0.60	0.79							
3. Fulfilment	0.88	0.58	0.49	0.63						
4. Security	0.89	0.81	0.51	0.56	0.67					
5. Contact	0.84	0.75	0.54	0.68	0.66	0.72				
6. Responsiveness	0.93	0.78	0.46	0.62	0.57	0.68	*0.92*			
7. Compensation	0.88	0.67	0.33	0.44	0.49	0.55	0.67	0.78		
8. SAT	1.00	1.00	0.62	0.74	0.47	0.46	0.55	0.56	0.37	
9. WOM	0.92	0.86	0.58	0.73	0.54	0.47	0.55	0.59	0.41	0.67
Expected values	$\rho_A > 0.8$	AVE > 0.5				HTMT < 0.9				

measures of internal consistency reliability. Convergence validity of the latent variables can be measured by average variance extracted which shows "whether there is a positive correlation between the scale and other items of the same construct" (Malhotra and Simon, 2009, p. 320). Fornell and Larcker (1981) propose 0.5 as the threshold for acceptable convergence validity. Discriminant validity reveals if a measurement item of a given construct is correlated with items belonging to a different construct. For this purpose, we used heterotrait-monotrait ratio with a threshold of 0.90. Based on this criterion there was a problem with the constructs of contact and responsiveness. However, in the literature of perceived quality the used contracts were really similar and our result was really close to the threshold, we would continue our analyses. Further results show that the adopted scales have the expected reliability and validity and are suitable for use in our analyses. Following the advice of Henseler *et al.* (2014) we used the standardised root mean square residual (SRMR) for model validation. The SRMR value of our model is 0.079, which is acceptable.

The explained variances of the endogenous variables are substantial ($R^2_{SAT} = 0.544$, $R^2_{WOM} = 0.549$).

The path coefficient of the variables shows that efficiency, system availability and responsiveness have a relevant positive effect on satisfaction, ($\beta_{28} = 0.495$, $\beta_{18} = 0.158$ and $\beta_{78} = 0.254$). The effect of efficiency, fulfilment, responsiveness, contact and satisfaction on word-of-mouth intention is also higher than ± 1 path coefficient ($\beta_{289} = 0.296$, $\beta_{39} = 0.153$, $\beta_{59} = -0.124$, $\beta_{79} = 0.265$ and $\beta_{78} = 0.279$) (Figure 1). The Table AI includes the loadings.

In order to observe the significance of the assumed relationships, the following hypotheses should be analysed using the bootstrapping method (sample size 4,999) (Table V):

H0. $\beta = 0$, the path coefficient does not significantly differ from 0.

H1. $\beta \neq 0$.

Our results show that the variance of online consumers satisfaction is explained 54.4 per cent by the positive effects of efficiency (path of 0.495), and responsiveness (path of 0.254). The variance of word-of-mouth intention is explained 54.9 per cent by

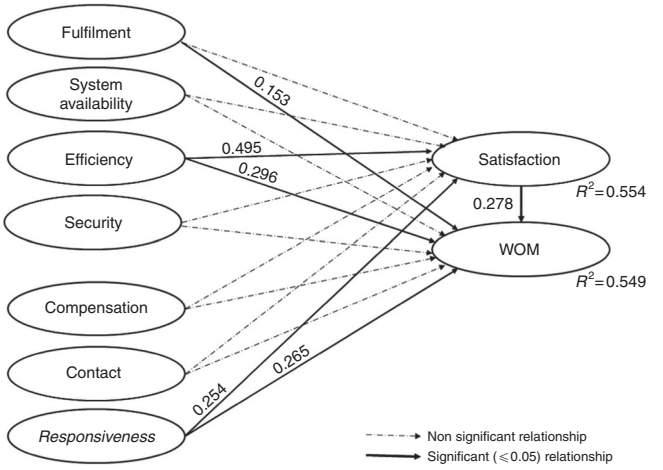

Figure 1.
Results of structural equation modelling with PLS

Hypothesis	Original coefficient	Standard bootstrap results Mean value	*p*-value (2-sid.)	Percentile bootstrap quantiles 2.5%	97.5%
H1.1 Fulfilment → SAT	0.010	0.019	0.908	−0.155	0.172
H1.2 System availability → SAT	0.158	0.141	0.093	−0.051	0.308
H1.3 *Efficiency → SAT*	0.495	0.510	0.000	0.315	0.711
H1.4 Security → SAT	0.021	0.025	0.753	−0.106	0.156
H1.5 Compensation → SAT	−0.055	−0.057	0.253	−0.148	0.037
H1.6 Contact → SAT	−0.053	−0.049	0.502	−0.208	0.108
H1.7 *Responsiveness → SAT*	0.254	0.248	0.008	0.061	0.437
H2.1 *Fulfilment → WOM*	0.153	0.155	0.019	0.030	0.288
H2.2 System availability → WOM	0.059	0.070	0.509	−0.094	0.252
H2.3 *Efficiency → WOM*	0.296	0.275	0.021	0.011	0.509
H2.4 Security → WOM	−0.030	−0.030	0.678	−0.173	0.118
H2.5 Compensation → WOM	−0.029	−0.024	0.564	−0.119	0.080
H2.6 Contact → WOM	−0.124	−0.125	0.174	−0.301	0.057
H2.7 *Responsiveness → WOM*	0.265	0.258	0.012	0.058	0.471
H3 *SAT → WOM*	0.279	0.288	0.003	0.125	0.494

Note: Hypotheses with italic letter cannot be rejected

Table V.
The results of hypotheses' analysis

the positive effects of efficiency (weight of 0.296), fulfilment (path of 0.153) responsiveness (path of 0.265) and satisfaction (weight of 0.278).

Based on the Cohen's f^2 indicator the effect size of the significant variables could be measured (Table VI). The variable of efficiency has a moderate effect on satisfaction, and the effect of responsiveness is really weak. The effect of fulfilment, efficiency and responsiveness is weak on satisfaction as well as on word-of-mouth intention. The effect of satisfaction is also weak on the word-of-mouth intention.

In order to identify the different types of consumers' perceptions, hierarchical cluster analyses with Ward method was used, based on the latent variable scores. In the

	β	Indirect effects	Total effect	Cohen's f^2	Effect size
Fulfilment → SAT	0.010		0.010	0.000	Zero
Fulfilment → WOM	0.153	0.003	0.156	0.026	Weak
System availability → SAT	0.158		0.158	0.029	Weak
System availability → WOM	0.059	0.044	0.103	0.004	Zero
Efficiency → SAT	0.495		0.495	0.208	Moderate
Efficiency → WOM	0.296	0.138	0.434	0.062	Weak
Security → SAT	0.021		0.021	0.000	Zero
Security → WOM	−0.030	0.006	−0.024	0.001	Zero
Compensation → SAT	−0.055		−0.055	0.003	Zero
Compensation → WOM	−0.029	−0.015	−0.044	0.001	Zero
Contact → SAT	−0.053		−0.053	0.002	Zero
Contact → WOM	−0.124	−0.015	−0.139	0.010	Zero
Responsiveness → SAT	0.254		0.254	0.033	Weak
Responsiveness → WOM	0.265	0.071	0.335	0.036	Weak
SAT → WOM	0.279		0.279	0.079	Weak

Notes: $f^2 < 0.02$ – zero effect; $0.02 < f^2 < 0.15$ – weak; $0.15 < f^2 < 0.35$ – moderate; $f^2 > 0.35$ – strong

Table VI.
The effects between the variables

analyses only those exogenous latent variables which have a significant effect on satisfaction and word-of-mouth intention (efficiency, fulfilment and responsiveness) were used. With this segmentation our aims were to find out which segments are relevant in terms of satisfaction and WOM intention, and to analyse the relationship between the relevant segments.

In order to analyse the segments we decided to use a four-cluster solution. To analyse the differences in the clusters, variance analyses was used.

4. Evaluation and results

Based on the significant antecedences of satisfaction and word-of-mouth intention, four segments were established. Table VII contains the characteristics of the four clusters. The 0 value shows the average quality perception with the analysed construct, values above 0 indicate a higher perceived quality and values below 0 mean a weaker perception of quality.

Based on the used latent variable scores, only one of the segments evaluated all of the relevant dimensions of the e-SQ lower than the average score. They were labelled as "unhappy"-s. Two of the segments have 61 members. One of them is named "technology underrated" because in its members' eyes the relevant technology-based dimension – efficiency (−0.019) – as well as the other technology relevant aspect – fulfilment (−0.309) – differs significantly from the other segments: better than the rating of the "unhappy"-s (sig = 0.000), but lower than the average of the other segments. In the other group with 61 members the quality perception of efficiency (0.153) and fulfilment (0.437) is above, but the rating of the human-based dimension – responsiveness (−0.818) – is below the average score. Thus they could be called the "website's soft skills underrated" segment. Most of the respondents belong to the group where the average scores are well above zero and above the average ratings of the others. This segment is called the "happy" segment and it has 109 members.

	Technology underrated segment	Happy segment	Website's soft skills underrated	Unhappy segment	Total
n (people)	61	109	61	46	277
Variables that were used in cluster analysis					
Efficiency					
Mean	−0.119	0.663	0.153	−1.616	0.000
SD	0.640	0.291	0.567	1.091	1.002
Fulfilment					
Mean	−0.309	0.645	0.437	−1.698	0.000
SD	0.412	0.000	0.269	1.220	1.002
Responsiveness					
Mean	0.322	0.775	−0.818	−1.180	0.000
SD	0.558	0.103	0.737	1.031	1.002
Variables that were not *used in cluster analysis*					
SAT					
Mean	0.016	0.528	−0.007	−1.263	0.000
SD	0.764	0.366	0.638	1.484	1.002
WOM					
Mean	0.193	0.433	−0.002	−1.280	0.000
SD	0.600	0.434	0.813	1.472	1.002

Table VII. Characteristics of the segments

Based on the analysis of the overall levels of satisfaction, the "website's soft skills underrated:" (−0.007) and the "Technology underrated" (0.016) segments do not differ significantly: they have a similar closed to the average satisfaction level. Only the "happy" segment has a high positive overall satisfaction level (0.528). An interesting result that the word-of-mouth intention scores are above the average in two cases: the "happy" segment has the highest intention (0.433), but the intention of the "technology underrated" segment is also above the average (0.194), but their intention do not differ significantly from the results of the "website's soft skills underrated" segment (sig = 0.184).

When examining the perception of the other quality dimensions it can be established that the perception of the "happy" segment differs significantly from the others: all of their evaluations are above zero. The technology-based quality dimensions' perception of the "soft skills underrated" group is around zero. Soft skills perception is lower (above −0.8), and this perception significantly differ from the "technology underrated segments" perception. The unhappy segment offers the lowest evaluation (Figure 2).

5. Research contribution

5.1 Scientific contributions

In our paper the most relevant aspects of e-SQ were summarised based on the literature, and we examined which dimensions have a relevant direct effect on satisfaction and traditional word-of-mouth intention in a Hungarian online bookstore. As stated before, this approach is not present in the literature, WOM intention is usually linked to overall satisfaction. It is also a uniqueness that not long-term predictions, but a short-term behavioural consequence is linked to e-SQ dimensions and satisfaction. Furthermore it is not widespread to segment potential buyers based on latent variable scores.

As our conclusion we may state, that some of the analysed e-SQ scales do not have content validity because they do not perfectly fit to the definition of e-SQ. According to this definition, e-SQ is an umbrella construct which includes not only the perceptions of the web-store characteristics but also post interactions such as delivery and consumer service. That means that e-SQ has two relevant aspects: a technology-based component – the characteristics of the web-store, the usability which could be developed using different IT tools – and a human-based component. On the

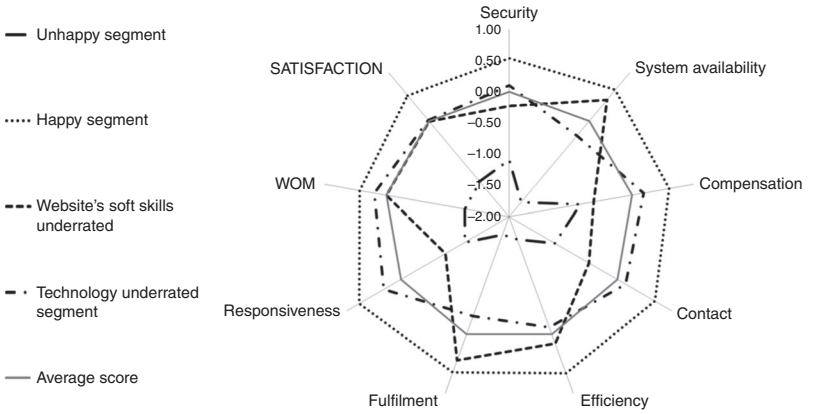

Figure 2.
Comparison of segments

one hand this includes the reliability of the information on the site and the general reliability of the web-shop – these dimensions belong to the online environment – and on the other hand consumer service, complaints and returns, which belong to the offline environment. This indicates that e-SQ is a complex construct, and its measurement is complicated due to the fact that most web-shops do not have their own delivery service, they outsource it to other companies. It is thus important to distinguish between internal and external dimensions.

Most of the e-SQ scales also include the dimensions of privacy and security, which is mainly a technology-based component – for example, the security of payment, personal information – but it could also have a human-based side – e.g. customer care and complain management.

Considering the characteristics of the existing e-SQ scales, we decided to use E-S-Qual, and a secondary scale, E-RecS-Qual, in order to measure e-SQ perceptions of consumers and its relationship to satisfaction and word-of-mouth intention. This scales measure the e-SQ through seven dimensions, such as: efficiency, system availability, privacy – these are the technology-based dimensions – and fulfilment, responsiveness, compensation and contact – which are the human-based characteristics.

According to our research, in case of an online bookstore, only the dimension of efficiency, system availability and responsiveness have a significant positive effect on satisfaction, and the perception of the quality of fulfilment, efficiency and responsiveness have a significant influence on word-of-mouth intention.

Using the latent variable scores of these relevant e-SQ dimensions a segmentation took place in which four segments were identified. The largest segment is the happy segment with 172 members. They evaluated all quality dimensions as being above average, and they had the highest levels of satisfaction and word-of-mouth intention. The web site's soft skills underrated groups' perception of the human-based interactions of the web-store and the security dimensions is lower. The technology underrated segments members evaluated all dimensions above average, but IT-based components – such as efficiency and system availability – much lower. The unhappy segment rated the web-store's quality the weakest.

There is no significant difference between the technology underrated and the web site's soft skills underrated groups' satisfaction and WOM intention level.

5.2 Managerial contributions

In our paper we have presented findings about perceived quality dimensions, which could influence customer satisfaction and the word-of-mouth intention in e-commerce. In an online environment competition is really intensive and the switching costs are relatively small. This is why it is especially important to analyse the antecedents of loyalty; based on the literature satisfaction is one of the most important among them. Most of the studies treat word-of-mouth as a component of loyalty. Loyalty indicates a long-term relationship, but we have conducted only an ad hoc research which focussed merely on the most recent purchase; namely, we measured only word-of-mouth intention.

Our research shows that in e-commerce satisfaction and word-of-mouth intention are influenced by certain technology-based as well as certain human-based components of e-SQ, but technology-based components are more important. Furthermore in word-of-mouth intention fulfilment plays an important part, although this is usually an outsourced function of the company, such as in the case of the bookstore company analysed. These results also indicate that web-shops managers should focus not only

on online characteristics, but also on offline human-based interactions and on the quality of their business partners (e.g. delivery services).

Beside these results we also presented a potential segmentation, which uses the scores of complex, multi-item constructs. With this segmentation managers can establish segment-specific differentiation strategies. In the case of the analysed online bookstore, if the shop wanted to concentrate on the web site's "soft skills underrated" group, the first step should be to improve the responsiveness of the company. But if the "technology underrated" segments is more important to the company, then the technology-based components – system availability and efficiency – of the website as well as the delivery method should be improved. These dimensions of quality perception can serve as differentiation as well as communication criteria. The difference between the "soft skills underrated" and the "technology underrated" segments is due to the two major aspects of an online store: the technological and the human aspects. Both of them are important, but as our results indicate, differentiation can lead to the satisfaction of the proposed different target groups.

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Appendix 1

		Mean	SD
E-S-QUAL			
Efficiency			
EFF_1	This site makes it easy to find what I need	4.47	0.77
EFF_2	It makes it easy to get anywhere on the site	4.44	0.77
EFF_3	It enables me to complete a transaction quickly	4.64	0.68
EFF_4	Information at this site is well organised	4.51	0.70
EFF_5	It loads its pages fast	4.38	0.81
EFF_6	This site is simple to use	4.64	0.68
EFF_7	This site enables me to get on to it quickly	4.83	0.45
EFF_8	This site is well organised	4.52	0.69
System availability			
SYSA_1	This site is always available for business	4.75	0.53
SYSA_2	This site launches and runs right away	4.58	0.67
SYSA_3	This site does not crash	4.66	0.70
SYSA_4	Pages at this site do not freeze after I enter my order information	4.71	0.63
Fulfillment			
FULF_1	It delivers orders when promised	4.62	0.76
FULF_2	This site makes items available for delivery within a suitable time frame	4.61	0.68
FULF_3	It quickly delivers what I order	4.55	0.76
FULF_4	It sends out the items ordered	4.73	0.63
FULF_5	It has in stock the items the company claims to have	4.67	0.66
FULF_6	It is truthful about its offerings	4.80	0.48
FULF_7	It makes accurate promises about delivery of products	4.68	0.67
Security			
SEC_1	It protects information about my Web-shopping behaviour	4.64	0.69
SEC_2	It does not share my personal information with other sites	4.62	0.71
SEC_3	This site protects information about my credit card	4.56	0.74
E-RecS-QUAL			
Responsiveness			
RESP_1	It provides me with convenient options for returning items	4.40	0.84
RESP_2	This site handles product returns well	4.31	0.90
RESP_3	This site offers a meaningful guarantee	4.47	0.80
RESP_4	It tells me what to do if my transaction is not processed	4.47	0.83
RESP_5	It takes care of problems promptly	4.35	0.87
Compensation			
COMP_1	This site compensates me for problems it creates	4.21	0.94
COMP_2	It compensates me when what I ordered doesn't arrive on time	3.89	1.26
COMP_3	It picks up items I want to return from my home or business	3.78	1.27
Contact			
CONT_1	This site provides a telephone number to reach the company	4.16	1.05
CONT_2	It offers the ability to speak to a live person if there is a problem	4.40	0.82
CONT_3	This site has customer service representatives\available online	4.52	0.76
Satisfaction			
SAT		9.08	1.30
Word-of-mouth			
WOM_1		4.65	0.70
WOM_2		4.73	0.60
WOM_3		4.72	0.61
			$n = 277$

Table AI.
The evaluation of e-SQ, satisfaction and WOM (5/10-point scale)

Appendix 2

Indicator	Compensation	Contact	Efficiency	Fulfilment	Responsiveness	SAT	Security	System availability	WOM
COMP_1	0.877								
COMP_2	0.831								
COMP_3	0.749								
CONT_1		0.766							
CONT_2		0.914							
CONT_3		0.902							
EFF_1			0.785						
EFF_2			0.902						
EFF_3			0.672						
EFF_4			0.810						
EFF_5			0.651						
EFF_6			0.845						
EFF_7			0.678						
EFF_8			0.820						
FULF_1				0.786					
FULF_2				0.828					
FULF_3				0.805					
FULF_4				0.760					
FULF_5				0.744					
FULF_6				0.564					
FULF_7				0.821					
RESP_1					0.897				
RESP_2					0.874				
RESP_3					0.878				
RESP_4					0.885				
RESP_5					0.869				
SAT						1.00			
SEC_1							0.888		
SEC_2							0.913		
SEC_3							0.892		
SYSA_1								0.809	
SYSA_2								0.833	
SYSA_3								0.867	
SYSA_4								0.690	
WOM_1									0.911
WOM_2									0.946
WOM_3									0.929

Table AII.
Outer loadings

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