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MODELLING OF COMMERCIAL WEBSITES. A NEW PERSPECTIVE ON USABILITY AND CUSTOMER RELATION

Introduction

Internet development and its market expansion result in the necessity to expand the research on the factors that impact customers behaviour to incorporate shopping for products and services online. From the economic point of view, the skills of winning customers and, first of all, keeping them is a critical aspect of the activity of modern websites offering online services. The process of loyalty building is the creation and cultivation of positive relationships with service consumers. Such relations should be based on client perceived high quality of services and on trust to the service provider [SrAP02; WLJB10].

Previous studies [e.g. DrJe05; HJJM09] have shown that factors affecting users' trust in web services may be assigned to two fundamental groups: construction features of service websites and users' characteristics. The first group includes technical quality, ergonomics and the information content of the website. The second one comprises social factors such as trust, a tendency to take risks, approach to the safety issue and user experience associated with previously visited websites.

However, in view of dynamic development of online services and the employment of modern technologies, the existing approach so far, appealing to quality and information attributes of service websites and generalized characteristics of users turns out to be insufficient [Siko08]. Therefore, the authors of the present study made an attempt to apply a Visual – Interaction – Process – Relation (VIPR) layer model (described in further sections) for commercial websites.

Models of building relationships in web services

According to literature data, there are many models trying to reflect the impact of various characteristics, concerning both web services and users, on building relationships between service providers and customers. These models are focused on certain aspects of relationship building, such as:

- building loyalty [HwKi07; GaBa08; Palv09],
- usability and technical quality of the website [SrAP02],
- perception of transaction risk [DrJe05; KuKn05; LNMC08],
- the impact of customer experience on the evolution of the retailer-customer relations [HJJM10; ZFWR11],
- satisfaction as a source of customer loyalty [LiWa06; PhVo10].

Visual – Interaction – Process – Relation layer model

As already mentioned, dynamic development of online services has caused that the existing approach to the attributes of web services and characteristics of customers turned out to be insufficient to describe the complexity of building relationships between service providers and customers. Hence, a necessity emerged to seek new methodologies in this field. A VIPR layer model of the quality of online services [SiWa09] is a proposal extending the perspective of building relationships between service providers and customers beyond the groups of factors named above.

The VIPR model describes technical attributes of online services supporting the completion of a service and affecting consumer behaviour. The attributes have been assigned to four layers:

- "V – **V**isual user interface layer, facilitating perceptual/manual operations,
- I – **I**nteraction layer, facilitating user-system dialogue progress,
- P – business **P**rocess layer, facilitating subsequent steps in selecting, purchase and payment,
- R – economic value/**R**elation layer, affecting willingness of the consumer to come back, buy again and to recommend this service/website to others" [SiWa09].

The latest studies carried out by a service decomposition method [Siko12] have demonstrated that elements of online services should be examined in eight categories: *Visual clarity*, *Interactivity*, *Ease of use*, *User guidance*, *Information content*, *Personalization*, *Recommendations* and *Customer care*. It is worthy of notice that these categories resemble those proposed in [SrAP02], although their

connection to the VIPR layers is a novel approach. The VIPR model extends the perspective beyond constructions and technological features of service websites to include also process and relational factors.

The aim of the present study was to apply the VIPR model to commercial web services and examine relationships between individual layers of the model and categories relative to building long-term relations with customers.

Methods

Opinions of customers of commercial websites was measured by means of the authors' 27-item Web Services Credibility Scale (in the appendix in the Polish language version). Eight factors were distinguished according to the VIPR model: *Visual clarity*, *Ease of use*, *Interactivity*, *User guidance*, *Recommendations*, *Customer care*, *Information content*, *Personalization*. The respondents were asked to express their opinion on the relevance of individual criteria as regards the credibility of the online provider. The perceived credibility was assumed to be an indicator of trust level and of building long-term relationships. A 5-point answer scale was used, where 1 denoted "definitely reduces the credibility" and 5 "definitely improves the credibility".

207 students of the Faculty of Management or Computer Science, 106 men and 101 women, took part in an anonymous, volunteer questionnaire survey. All respondents were experienced users of commercial web services. Students below 25 years of age were the most numerous group (87%). The selection of the group was intentional since, according to current surveys (e.g. NetT12), persons in this age group account for more than a half the population of Polish Internet users.

The results were analyzed using a STATISTICA 10.0 computer program. Descriptive statistics of individual factors and *r*-Pearson's correlation coefficients were calculated. The Bonferroni correction applied to control type 1 error was calculated by dividing the expected alpha significance level ($p = 0.05$) by the number of tests conducted. The reliability of factors having at least 2 items was evaluated using Cronbach's alpha coefficients. For exploratory analysis, data clustering was employed to show their structure. Euclidean distance was chosen to calculate the distance between the objects and the single linkage rule was applied for agglomeration of clusters [KiMi09].

Results

Descriptive statistics are given in Table 1.

Table 1

Web Services Credibility Scale – descriptive statistics of the factors

Factors	M	SD	Range	Skewness	Kurtosis
F1: Visual clarity	3.85	0.59	1–5	-0.2	-0.07
F2: Ease of use	3.87	0.56	1–5	-0.3	0.33
F3: Interactivity	4.11	0.53	1–5	-0.1	-0.35
F4: User guidance	4.07	0.63	1–5	-1	2.59
F5: Recommendations	4.25	0.64	1–5	-0.9	0.89
F6: Customer care	3.79	0.82	1–5	-0.3	0.11
F7: Information content	4.14	0.45	1–5	-1.2	4.05
F8: Personalization	4.2	0.79	1–5	-1.3	2.23

Mean values reflect the force of influence of individual factors on customer perceived credibility of web services. High values of skewness and kurtosis for *Information content* and *Personalization* may be a sign of their great significance for credibility. Standard deviations of *Recommendations* and *Personalization* are higher than those of the remaining factors. Such a spread of results may indicate that not all users expected this type of elements in the web service.

Next, *r*-Pearson's correlation coefficients were obtained with the Bonferroni correction (Table 2). The values of Cronbach's alpha reliability coefficients of individual factors are placed on the diagonal of the table.

Table 2

Correlations between the study factors

Factors	F1	F2	F3	F4	F5	F6	F7	F8
F1: Visual clarity	0.76							
F2: Ease of use	0.8	0.72						
F3: Interactivity	0.41	0.43	0.03					
F4: User guidance	0.43	0.49	0.24	0.62				
F5: Recommendations	0.23	0.37	0.18*	0.44	0.8			
F6: Customer care	0.57	0.56	0.23	0.41	0.29	-		
F7: Information content	0.49	0.41	0.33	0.33	0.3	0.32	0.62	
F8: Personalization	0.34	0.44	0.34	0.42	0.44	0.35	0.31	0.76
Note: * $p < .01$, the remaining correlations: $p < .001$ (the Bonferroni correction 0.05/28 = 0.0018). Cronbach's alpha reliability coefficients are placed on the diagonal								

The values of correlation coefficients indicate strong interactions between individual factors. Moreover, positive values of the coefficients are the evidence that the factors considered strengthen one another. Cronbach's alpha coefficients suggest good reliability of the factors, except *Interactivity* (consisting of two items).

Cluster analysis was used for a better specification of the structure of relationships between individual factors (Figure 1).

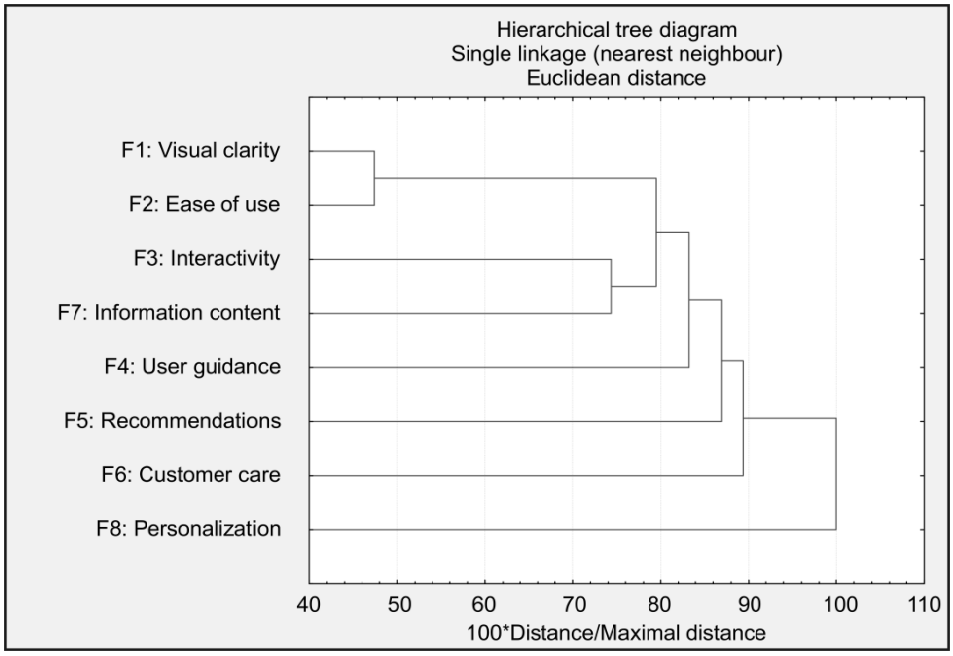

Fig. 1. Cluster analysis: Hierarchical tree diagram

Visual clarity, *Ease of use*, *Interactivity* and *Information content* made up one group, whereas each next factor formed a separate element.

Discussion

The results obtained indicate that customers of commercial websites notice the differences in the significance of individual attributes for building strong relationships with service providers. Factors which build up the usability, i.e. both *Visual clarity* and *Ease of use*, were the least important. This group included also *Customer care* (represented by one item) connected with general impressions evoking positive emotions in customers. It may be presumed that this is not a perfect example for the care about the client, reflecting perceived website aesthetics rather.

Considering the importance for customers, *User guidance* and *Interactivity* were ranked higher than the factors named above. *Information content* was even more important for consumer trust in web services. Although *Personalization* and *Recommendations* were ranked the highest by respondents, these factors were not so important for all users (a wide range of answers). These are probably quite new needs of users which have emerged along with the growth of competition on the online services market. A great developmental potential should therefore be seen for companies in these aspects.

The analysis of the mean values of individual factors has shown that the elements distinguished are arranged in 4 levels which may be presented in the form of a pyramid (Figure 2). These levels are equivalent to layers in the VIPR model.

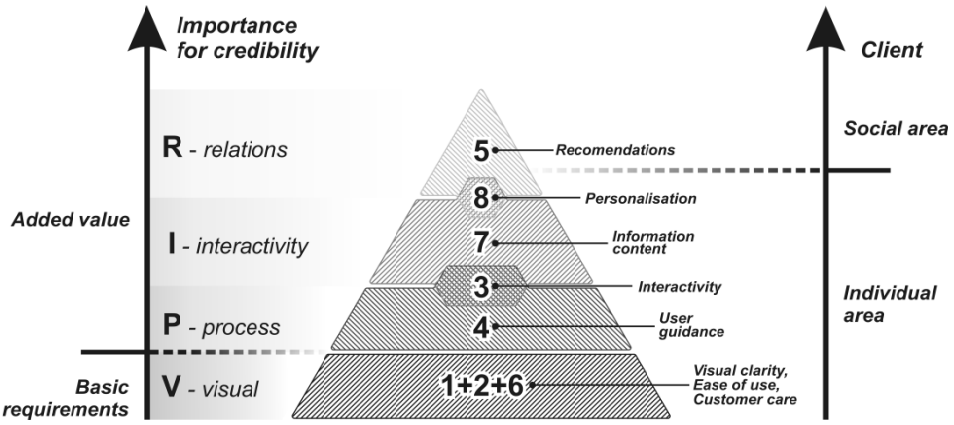

Fig. 2. Model of factors' importance for perceived e-retailer credibility

The base of the pyramid is formed by factors building the functional quality (*Visual clarity* and *Ease of use*), and by *Customer care*. These elements primarily affect general impressions of the user on the first visit to the website. If these impressions are not positive enough, the user may give up further exploration of the site. Therefore, the creation of a high-quality website within constituent categories of the layer is a fundamental requirement the website should meet to encourage the customer to use the service.

The second level of requirements is occupied by elements affecting the fluidity of the process: *User guidance* and *Interactivity*, that latter being assigned also to the third level. The website should guide the user to finalize the transaction easily and as quickly as possible. In addition, this process should be accelerated by interactive elements.

The third level comprises *Interactivity*, *Information content* and *Personalization*. *Information content* is a key element of this level, enabling comparison of the offer of a given website with offers of competing web services. Therefore, the diversity of information may be a strong point in gaining advantage in the competition. The connection of this level with layer I (*Interactivity*) of the VIPR model is not accidental. *Interactivity* and *Personalization* are by nature related with the interactivity of the website. However, the bulk of information available requires not to stun the user with its mass but to provide only such part of it which refers to the service demanded. Interactive solutions, adjusted to the current task, should therefore be applied.

The highest level is intended to build relationships with the customer by adjusting the offer and the website to personal needs of the client (the so-called "tailoring") and by providing opinions and recommendations concerning the service website.

While the base of the pyramid is formed by fundamental constructional requirements for the website, the higher levels constitute an added value intended to build advantage in the competition by strengthening trust and deepening the relationships.

It is worth noting that almost all categories refer to the interaction between individual users and the service website. Only *Recommendations* situated at the top of the pyramid are related with the social area. Humans, being social animals, seek opinions and information on objects and phenomena they are not sufficiently experienced with [Aron72]. Social networking websites are the most common source of such information. Being aware of this fact, service providers, apart from own commercial website, create and keep profiles on such social websites, thus additionally strengthening the relationships with customers.

It is recommended to service providers to make their best to mould positive opinions about themselves and the services offered. This concerns both opinions and recommendations directly reaching the customer and those expressed by other users or institutions.

Conclusion

The significance of commercial websites attributes for building customer trust was diversified. The attributes were arranged in layers, beginning from the basic usability of the service website to the highest layer involving relationships with customers. Here, similarity to Maslow's hierarchy of needs [Masl54] comes to mind. It can be presumed by analogy that the usability satisfies basic needs of

customers, related with perceived website quality, whereas the higher levels constitute the added value, being the answer to higher order needs.

It has been demonstrated that when entering the interaction with the service website, the user acts as an individual being, expecting satisfaction of own needs. Such behaviour is observed in the lower layers of the pyramid. When the user wants to make sure of taking the right choice, he acts as a social being, asking other users or institutions about their opinion. This behaviour is connected with the relationship layer which is the most important for the perceived provider credibility and for building relationships with the customer.

In summary, on the one hand the study presented has confirmed suitability of the VIPR model in modelling of commercial websites. On the other, it has revealed the sequence of layers of this model. Moreover, the layers turned out not to be mutually independent. They overlap and smoothly penetrate each other.

The indication of two dimensions: basic – added values and individual – social area has shed a new light on human-computer interaction. This is the strong point of the present survey. The first dimension shows the significance of the VIPR model for building the credibility of the service provider, from the basic to added values. The second one places the significance of these layers in the area ranging from individual relationships with the customer to the social aspect, when the customer adds opinions of other users to his/her relationships with the service provider. This sheds a new light on the human-computer interaction, particularly from the economic point of view.

It is worth emphasizing that the results were based on the measurements of individual opinions of users who were engaged in the relationships building process. It would have been difficult to obtain such results by using an expert approach only. The research, however, has two major limitations. First of all, it has been conducted on a random sample consisting of students only. Secondly, the research has focused on online shopping in general without considering specific character of certain goods.

Further studies focused on building customer – service provider relationships should be carried out. The attempt to apply the VIPR model to commercial web services turned out to be satisfying and delineating new research trends.

Appendix

Web Services Credibility Scale

Item No	Item
F1: Visual clarity	
17	The sites do not open properly in some Internet browsers (e.g. Opera)
22	The sites are legible and clear
23	The web site structure is clear
30	Graphic design is polished and easy on the eyes
F2: Ease of use	
18	The store site has a local search engine
21	The site menu is clear and allows access to basic functions of the site
25	It is easy to find the required information and goods on the site
28	The web site is user friendly and useful
F3: Interactivity	
9	The web store provides information on the goods shipping options
11	The wait time for the ordered products is long
F4: User guidance	
19	The web store protects the transmitted data against capture
20	The web store provides information on how the customers' personal data are stored and used
26	The website provides a help system explaining the ordering process
F5: Recommendations	
13	The website provides a user forum enabling the exchange of opinions between the store customers
14	The information about a product includes customers' opinions about such a product
15	The web store has recommendations from known institutions and the media
16	The web store presents the opinions of experts and test results
F6: Customer care	
29	Homepage encourages to enter the website
F7: Informational content	
2	No web store registration data
3	The price information is unclear or placed in an inconspicuous place
4	The offer is wide and up to date
5	Product information is extensive and complete
6	Product information includes high quality images
7	The information on the website contains errors
8	The information on the website is incomplete
F8: Customisation	
10	The web store accepts numerous forms of payment (credit card, cash, bank transfer, etc.)
12	The customer can choose the shipping method (e.g. mail, courier, etc.)

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MODELOWANIE KOMERCYJNYCH SERWISÓW INTERNETOWYCH – NOWE PERSPEKTYWY W ZAKRESIE UŻYTECZNOŚCI I RELACJI Z KLIENTAMI

Streszczenie

Z ekonomicznego punktu widzenia krytycznym aspektem działalności serwisów usług online jest umiejętność utrzymania klientów. Celem artykułu było zastosowanie modelu warstwowego VIPR (Visual – Interaction – Process – Relation) w odniesieniu do usług handlowych online.

Wskaźnikiem zaufania i nawiązywania trwałych relacji były oceny doświadczonych użytkowników serwisów handlowych online (n = 207) uzyskane za pomocą Skali Wiarygodności Internetowych Serwisów Handlowych, która mierzy 8 czynników, takich jak klarowność wizualna, łatwość użycia, interaktywność, prowadzenie użytkownika, rekomendacje, dbałość o klienta, zawartość informacyjna i personalizacja.

Czynniki: klarowność wizualna, łatwość użycia, interaktywność oraz zawartość informacyjna tworzyły jedną grupę. Każdy następny czynnik stanowił odrębny element. Dla klientów najmniej ważne dla wzbudzania zaufania były klarowność wizualna i łatwość użycia (wartości podstawowe, obszar indywidualny). Najwyżej oceniano personalizację oraz rekomendacje (wartości dodane, obszar społeczny). Zwłaszcza rekomendacje reprezentują nowe potrzeby użytkowników, które pojawiły się wraz z rozwojem konkurencji na rynku usług online.

Pozytywnie zweryfikowano model VIPR. Wskazanie dwóch wymiarów: wartości podstawowych – dodanych oraz obszaru indywidualnego – społecznego daje nowe spojrzenie na interakcję człowiek – komputer.