Confrontational pattern design method – new method of website design

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Abstract

The main aim of this article is to analyze the applicability resulting from the practice, a new method of designing information systems - operationally named confrontational pattern design method. At the beginning of the work the specificity and assumptions a new methodology is presented and its compatibility with modern design methods. This is followed by studies, which verify of the application of the method in the case of pre-analysis of the project's new website online comparison websites. Results of research and an analysis of the method usefulness for the practice have been analyzed in detail.

Keywords: *Project management, information systems design, comparison websites*
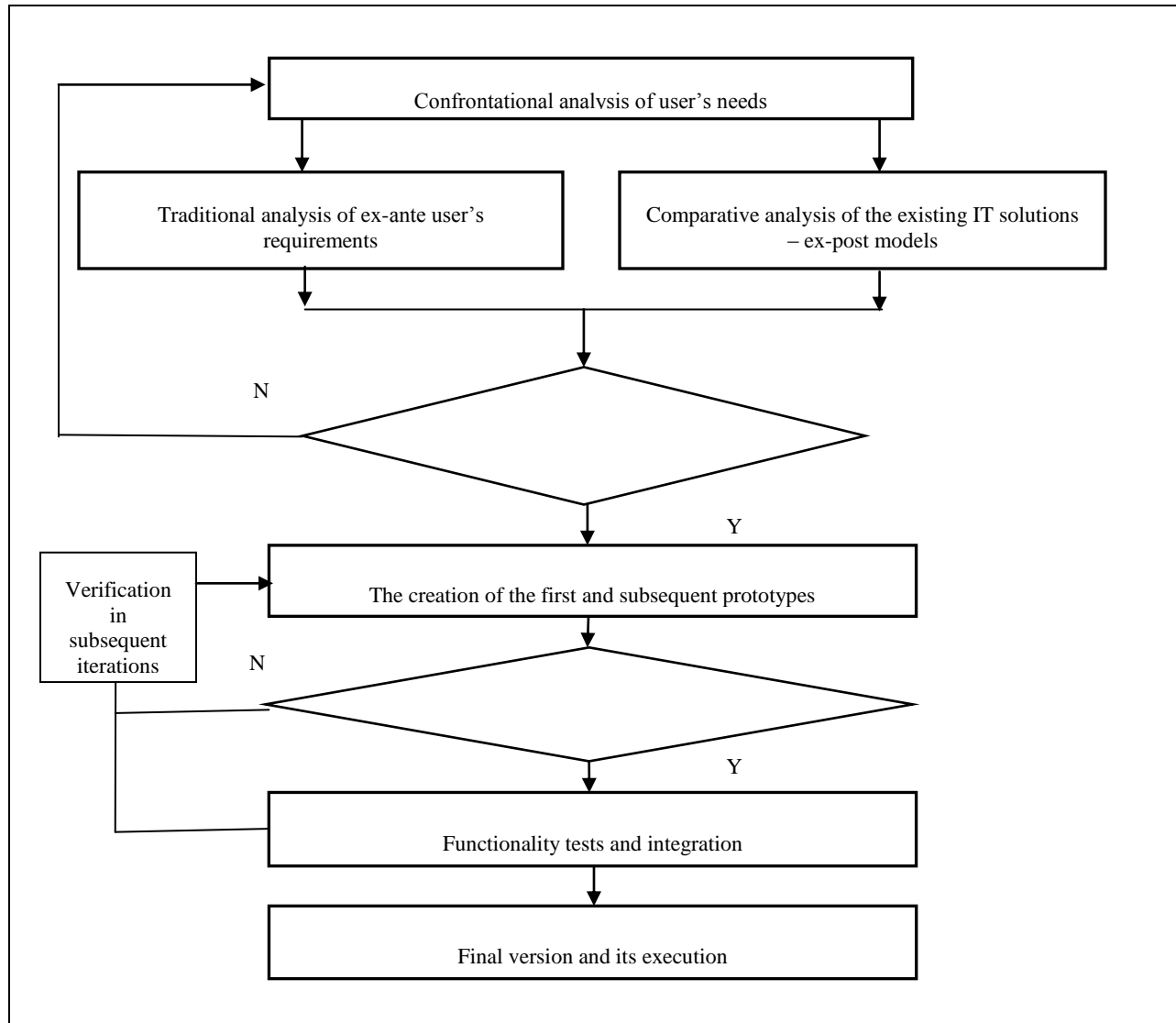
Introduction

The following article presents a new design methodology resulting from some years of experience in designing of websites. It refers both to the activities of project teams and, on the other hand, to the modern methods - service design solutions (Meroni & Sangiorgi, 2011). Their basic recommendations are (Chmielarz, 2013; Flasiński, 2006; Orłowski, Kowalczuk, & Szczerbicki, 2009; Sikorski, 2013; Trocki, 2012):

- Focusing on the user's needs,

- Full cooperation of the parties during the project,

- Presentation of the full realization of the service on an ongoing basis,

- Formalization and specific "materialization" of all service elements in a manner which is understandable for the user,

- Comprehensive coverage of the service process by a single contractor.

However, they have one fundamental disadvantage. They do not build theoretical knowledge in the form of models, procedures, and practices. Thus, they are not rooted in an economic or a wider praxeological context. They are not used to optimize the investment in information systems (especially services), or create new projects of information technology (IT) services (based on the added value of the global and multicultural customer) and realize projects which minimize exclusion from the realm of operating systems. This is particularly important for the electronic commerce tools. The integration of these solutions with basic assumptions of modern management methods and some of the best proven traditional solutions can bring, as it seems, very good results with regard to creating design patterns. This conclusion is supported by a number of experiments conducted by the author and his collaborators during the research into the assessment of e-business and the possibility to use the findings in system designing (Chmielarz, Szumski, & Zborowski, 2011). In the study, the team of researchers used an iterative approach to

identify ex ante needs of the user and confront them with the ex post experiences resulting from a deep analysis of the existing IT solutions of confrontational pattern design. The basic assumptions and recommendations of *Confrontational Pattern Design* (CPD) refer to the concept of *Service Design*, on the one hand, and *Agile Design* methods on the other. They are as follows:

- In many cases user's requirements, even in the case of an informed client, are dominated by existing habits connected with the IT systems used in the organization: in the clients' opinion the questions concerning additional functionalities introduce elements of ambiguity, or even contradictory,

- Project schedule becomes the result of negotiations between the user, expecting to reduce the time of the realization of the project, or even be provided with the finished product immediately, and the possibilities of the contractor and his desire to offer a product which is of higher quality than the existing solutions,

- Iteration between the initial recognition of the user's needs (even if they tend to be reduced to the experience of the previous installation), and best practices derived from the analysis of the existing solutions on the market; each successive iteration is a compromise bringing us closer to the final solution,

- There are methods of identifying best practices, consistent with the scientific basis of the evaluation of IT systems (and common sense); we should aim at constant improvement or creation of an IT system which allows for automatic selection of the method best suited to a particular decision-making situation,

- The user shows a specific tendency to overcomplicate systems, thus, we should aim at their greatest simplicity at the level of design, content, service, and methods of solving basic design problems,

- Parallel analysis of the user's requirements – on the one hand, the application of traditional analytical methodologies (questionnaires, interviews, conversations…), on the other, consideration of the user's evaluation of the existing systems in order to extract certain components which can meet his needs in the best possible way,

- Coordination of the language describing design requirements with the assessment criteria of existing solutions,

- Ongoing integration of selected components in accordance with previous arrangements in the present version of the project,

- Solving, by way of negotiation, confrontational requirements resulting from the projection of the user's requirements, performance, and usage analyses as well as expert requirements resulting from the best practices of completed projects in the same area.

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Figure 1: Basic phases of the life cycle of the project in CPD model

The life cycle of the project according to CPD model (ref.: Fig. 1), consists of four basic phases:

- Confrontational analysis of the user's needs – parallel examination of the needs of the final user and of the existing IT solutions in the field. Identification of the user's needs and identification of the best solutions resulting from the present software. Based on the list of the best solutions, we create a project based on the optimal design patterns used in the existing portals. The comparison of the user's needs with the constructed model. In the case of differences – negotiations with users, which aim at bringing their position closer to the position resulting from the analysis of best practices,

- On this basis we create a prototype of an IT system – subsequently, it is presented to the client; in the case it does not meet the user's expectations – introduction of

changes, creation of another prototype – presentation of the prototype to the user; in the case of fulfilling requirements - testing stage,

− Functionality tests – subsequent versions presented to the client are tested before next modifications, which client may suggest at this stage. In case of doubts, we return to the creation of the next prototype and working on the final version of the project,

− The last iteration leads to the creation of the last, complete version of the project, which is then executed.

The methodology of the CPD concerns mainly small and medium-sized e-commerce projects. It assumes full access to the existing software, from the user's perspective, and such a situation is taking place in the Internet. Apart from the classical analysis of the user's requirements, the practical approach consists in the examination of the existing solutions enabling: specification and accurate research into the area in which the software works; creating a ranking of IT solutions existing on the market; identification of the features which make particular solutions better than others.

In the course of the project such a procedure: minimizes the need for in-depth analysis of the user's needs; reduces the possibility of errors (we learn from others' mistakes); offers an opportunity of introducing solutions valued by the customers of the existing software, and is used to train the user with regard to negotiations with analysts and IT system designers, increasing the effectiveness of their cooperation.

However, there are concerns regarding: the creation of a coherent methodology which needs to be applied in the examination of the needs of a user of existing IT solutions; interpretations of findings of practical analyses; the necessity of taking into account the high dynamics of technological innovation in this field, and the necessity of developing the mechanism of negotiations of the proposed solutions with the end user.

Simultaneously, the proposed solution is compliant with the assumptions of agile methodologies:

− Project stakeholders, on the one hand, present their requirements with regard to the project solutions; on the other, they provide opinions on the possible application or their improvement thanks to the adoption of the best design patters from the best IT projects exist in the field. Mutual, iterative communication is conducive to the creation of the approach, which meets the needs in this area,

− Such a solution represents far-reaching adaptability – expressed through change management. It allows the user to suggest greater expertise than the one resulting from his efforts and skills,

− This procedure assumes full compliance with the reality – after all, you use the available patterns built on existing solutions, modified only by additional user requirements,

− Presenting the users with the best market practices and allowing for their modification leads to greater flexibility in planning,

– Empiricism is the basis for the creation of the best design patterns,

– The use of two parallel sources of research into the user's needs decentralizes the approach and the style of project management, which may result in saving time, more than in the case of an autocratic approach,

– In the majority of cases, we apply simple methods in the analyses of the existing solutions, which subsequently leads to greater simplicity of the applied solutions,

– We observe constant communication with the user at the stage of the analysis and project design (the need for iterative confrontation of the identified user's requirements with the results of the analyses of existing systems),

– Parallel work on the analysis and design process enforces operating in small teams.

Assumptions of the Research

The issue of creating a project of a comparison site may be used as an example of the application of this method. The findings of a research company Tradedoubler (2013) show that Polish clients use comparison sites more and more frequently, anticipating constant growth of e-commerce (Poland and Czech Republic noted over 30% increase in internet sales in 2012, while the average in Europe is 22% (Eurostat, 2013)). In 2013, research has been conducted in eight European countries. In the study, it turned out that 85% of the surveyed Poles declared using this class of software. For the sake of comparison: in Italy, the results were in the range of 83%, in Sweden the ratio reached 68% and in Great Britain 66% of respondents declared using this kind of service. The determinants of the success seem to be: the novelty effect, limited financial resources, which consumers may spend on shopping, promotional activity of comparison sites, the growing awareness of the opportunities posed by internet shopping, and the price, which is a key criterion in the case of buying branded goods. The destimulators are mainly phenomena such as: not all shops in Poland, especially new ones, present their offers on comparison sites; offers are not continuously updated; errors concerning the presented product price and there is no active verification of the prices provided by the shops [5].

The internet comparison website is the software belonging to the class of *intelligent agents,* used to support the decisions made during the process of selecting a supplier of goods in electronic commerce. Their main function is to compare selected features of products sold in many shops on one website. They work in the interest of B2C *(business-to-customer)* in the field of e-commerce, where products, promotions, availability, delivery time, etc., and their prices are available to everyone and they are the same for each customer. The information about the product features and their prices are supplied to the comparison website directly by the e-shops' owners. At present comparison websites are improved, modern versions of previously created software which may provide information not only with regard to the best price of the product, but also – in the case of traditional sales, they may indicate the nearest shop where the goods may be found. The software provides information about the prices of goods from the real world (not participating in the production chain), realizing its business strategy entirely in the virtual space. The most sophisticated comparison sites have mechanisms allowing for building business knowledge with inference based on the information about a client, product range, the value of purchases in the time unit, etc. More and more frequently they play an additional social role –

apart from information about the lowest prices, they also present product reviews, information about the shop where the item has been bought and terms of purchase and delivery, etc., coming from other buyers. The application of the newest technologies makes it possible for the software to operate not only on websites but also as mobile applications. At present many customers start the purchasing process by checking all the characteristics of the product in the Internet (e.g. the producer's websites), and subsequently, they look for more detailed description in e-shops, and, finally, they wish to know the prices of goods offered in particular shops – they may be found in comparison websites. In the case of material products, the so-called showroom, where you can check the product in a way which is not attainable on the Internet: taste, exact size, fragrance, texture, etc. is an additional chain link. The most popular software of this class on the market are: Ceneo.pl, Skąpiec.pl, Nokaut.pl and Okazje.info.pl. The client verifies the price, the brand of a product, the reputation of a shop, client's opinions, and subsequently, based on the available data, he or she chooses the most attractive offer. At present, comparison sites are widely known and most commonly used – therefore, they prove to be very useful in conducting the mass research into the needs of the so-called average user of the Internet.

The assumptions of the study were as follows:

- The objective of the study is to design an online comparison service so that it meets the users' needs in a way which is optimal in terms of the qualitative characteristics: functional, technological, etc.,

- We should analyze users' requirements concerning the basic usability parameters of the portal. The study's objective is to indicate the parameters which are most important from the point of view of the websites' clients (considering the class of electronic agents),

- Based on the above findings, we create a list of the most important evaluation criteria of the existing comparison websites,

- The list of criteria is used for individual evaluation of comparison websites known to users (one user can evaluate more than one website),

- The group of respondents is not chosen at random, it belongs to the class of convenience samples as the respondents are students of the selected universities in Warsaw (Faculty of Management of the University of Warsaw and Faculty of Information Technology of the Academy of Finance and Business Vistula); they represent all types of studies (B.A., B.Sc., M.A., PhD studies),

- The evaluation will be standardized according to the ten-point scale used to examine other types of IT systems. The following scale of ratings has been adopted:

- The results of the analysis of user requirements will be confronted with the evaluation of the characteristics of the existing comparison websites in order to identify the best possible implementation of those characteristics which are most important from the user's point of view,

- The analysis will be performed first by a scoring method, and, subsequently, by means of AHP/ANP (T. Saaty) method, the preference scale will be automatically calculated for particular criteria,

- Multiplying the preference scale by the table of results of the scoring analysis will allow for the realignment of the findings with the application of relations among particular criteria,

- The realignment will result in finding the design patterns of comparison websites which are considered best from the point of view of management, and which may be used in the creation of the design of the website of this class.

Initially, among the randomly selected five students of the Faculty of Management of the University of Warsaw and Academy of Finance and Business Vistula, declaring the use of comparison websites for making purchases, the authors carried out a pilot study concerning the factors which are most important when using software of this class. After the users' suggestions and as a result of standardization (unification of the terminology and concepts of particular categories proposed by them), the following groups of characteristic features have been identified: design (visualization), information presented on the site and the ease of navigation, text search, data operations: selection (filtering), and sorting the results according to selected criteria and additional functionalities used for increasing user-friendliness.

The final evaluation of the website depends on the set of criteria used in the comparison process (therefore, their selection is frequently considered vital for the research). The set of various characteristics of comparison websites has been proposed by the author of the research, and the importance of its elements has been verified by the users during the interviews and the observation of their behaviors in the course of their work with a selected comparison website. After the activation of the comparison website the first impression, usually visual one, depends on the graphic design of the homepage. The next important element is the possibility of entering the data concerning the attributes of a particular product or service. After the identification of a particular product, the mechanisms of its dynamic search: extended and expanded mechanisms of sorting and selecting a list of products are important. Also, the price of the product and the costs of its delivery are the information which is of particular importance for the client. Taking this into account, we pay attention to the possibility of sorting not only according to the selected price range of the product, but also according to the additional costs connected with transport. Therefore, in some comparison sites we may find an option of sorting by a shop name (the cost of delivery frequently depends on the distance from the shop). Moreover, in the case of majority of comparison websites, we also note additional functionalities – destined mainly for experienced clients. They are an advantage which attracts new customers to particular websites and they help to maintain the loyalty of regular users. Of course, all typologies of characteristics are generally arbitrary and frequently interrelated. Nevertheless, they are recognizable by the users in such a form.

Conclusions from the observation of students' behavior supplied the initially established sets of features with the detailed criteria and subcriteria, which were thoroughly discussed with the respondents before placing them on the list used in the evaluation. The final list of criteria included:

- Visualisation, information available on the website, and the ease of navigation: brand awareness (the ease of memorizing data and reasons why we like the website); main page (readability and clarity of the main page, the ease of navigation and finding particular functions); the consistency of graphic elements, clearly marked colours, matching colours of elements, background colouring, icons symbolizing categories of products, colours and clarity of the text, carefully selected pictures of good quality, etc.); photo gallery (large, readable and clear images, which do not obscure navigation and present the actual features of the product etc.); completeness of information (characteristic features, minimum/maximum price, product image); clarity (appropriate font size, distinct colouring, the appropriate distribution of elements on the website); avoiding distracting elements (too much advertising, excessive number of photographs, etc.); opinions about shops (logo, delivery time, minimum price, clients' opinions); product reviews (if they are available, in what form, whether they meet clients' requirements); comparison engines (operating according to features specified by a client – e.g. price, number, delivery time); the ease of using categories (availability: lists, subcategories, characteristic features, etc.); the form of presentation of the product list (lists, different views, presentation according to the product features, icons, photos); rankings of products/shops (position in the ranking of shops/product categories), and suggesting products (prompting – the latest model, at a similar price, other customers also bought…, etc.);

- Functionality of the text search (dynamic search of the selected product, without the necessity of looking through many categories): the accuracy of search results (the name of the product, the name of the product+ producer, etc. combinations); prompting (lists displayed during the search, text field with autocomplete: prompting the name in the early selection stage, etc.), and spellchecker (automatic correction of spelling);

- Filtering and sorting results (simple and easy selection of products): filtering functionality (a large number of criteria, speed, limitations on operations which may be performed by a client; the possibility of creating complex selection rules, etc.); sorting functionality in the product list (criteria of ordering and its combinations), and sorting functionality in the list of shops (map, city, list according to prices);

- Additional functionalities (functions improving usability) for the user (individually for websites): ordering at the level of a comparison site; memorizing a list of products; creating sets of products; loyalty program; the possibility of using mobile applications; price alert; tracking the changes concerning your favourite products (prices, characteristics).

In November 2013, the authors conducted surveys in the selected universities. Over 110 people filled the survey; however, only 86 respondents completed them correctly. But still it should be treated as a pilot study. Among the survey participants: women constituted 2/3, 1/3 of the respondents were men. Most people, 80%, were in the age group of 18-25 – typical for students of full-time studies and 15% from the age group of 26-35 - characteristic of students of part-time studies. The participation of people over 35 years of age was small – 5%. Fifty eight % of the

respondents were representatives of the cities with over 500,000 inhabitants, 22% of towns with 10-100,000 inhabitants, only 6% were from rural areas. Over 60% declared having secondary education, 28% were students of BA studies and 7% of MA studies. Three-quarters of the group declared the status of a student, 15% are employed in the private sector, 6% in the public sector and 4% are self-employed. Over a third of the sample belongs to the income group with over PLN 4,000 per month, 28% 2,000-2,500, 23% to PLN 1,500, and 12% of the remaining groups.

Analysis results

The first part of the survey available on the Internet and distributed in its traditional form was used to verify the importance and relevance of the list of criteria established in the interviews and direct discussions (information analysis) with clients of comparison websites (students) in a pilot survey. For all respondents, all the criteria connected with visualization, information contained on the website and the ease of navigation turned out to be the most important factors (34.2%). The second place was taken by the functionalities of the text search (33.8%); the last position (32%) was taken by the functionality of filtering and sorting results and additional functions improving usability. The differences in those groups were not very significant (up to 2 percentage points). For particular selected criteria, the differentiation did not appear to exceed (to a great extent) the observed results. The difference between the highest and the lowest scores amounted to 2.1%.

Relatively highest scores were assigned to the accuracy of search results – 5.68% and the completeness of information – 5.58%; the lowest were given to: suggesting products – 3.58% and additional functionalities - 3.83%. In total, this indicates the proper use of this tool (compatible with the objectives behind its creation) and its use in an elementary, rather than extended, range. In the case of website comparison websites, the evaluation of visualization criteria turned out to be very high – the graphic designs of home page obtained the score of 5.56%.

In the evaluation of the usability of criteria, 40% of the responses were very high scores and about 31% of responses claimed that the criteria selected for the study were good: this means that almost ¾ of criteria specified in the pilot survey are regarded as accurate. On average, only 3% of the respondents considered the criteria as poorly matched to the assessment of comparison websites. Small differences in the average scores do not induce the author to reject any of the criteria. A similar situation occurs when we refer to the average values of the obtained scores to the maximum possible score in the evaluation of comparison websites (ref: Fig. 2). In this way we obtained a list of functionalities of a comparison website which, from the users' point of view, best suits their expectations with regard to this type of service. Its importance has been verified by means of a survey conducted among the clients of selected comparison websites. All listed elements obtained more than 50% of the maximum possible value, so they may be applied in the ex post analysis of the existing comparison websites.

In the second part of the study, the author conducted an examination of the comparison websites according to the previously adopted criteria. The examination analysed the four selected comparison websites which are the most popular among clients and the fifth one, which was selected individually by respondents.
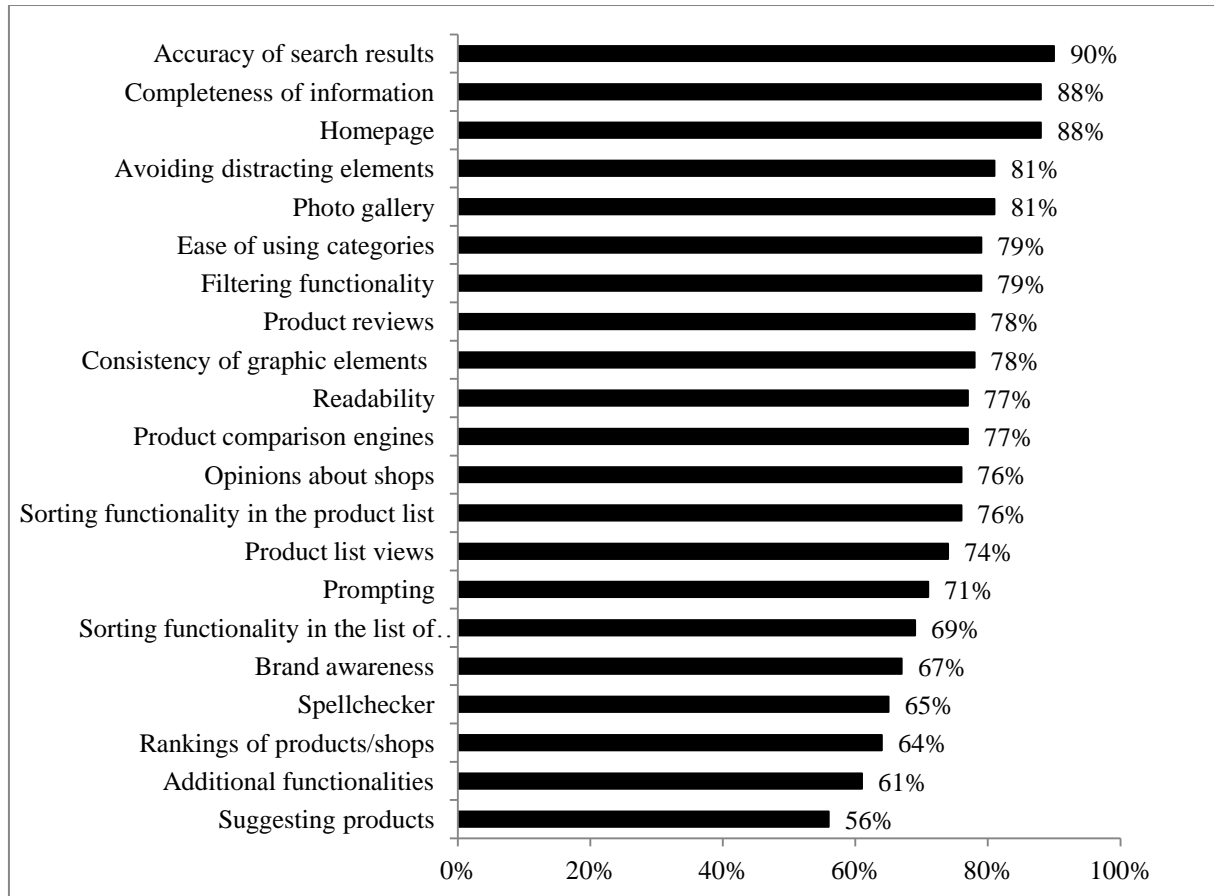
Figure 2: The degree of the suitability of particular criteria for the assessment of the quality of comparison website

The surveys conducted with the participation of comparison websites' users confirmed that at present attractive design and the ease of navigation are a standard requirement in a website. If a website is characterized by attractive design and distinctive look, brand awareness, and intuitive use, a client will continue using the website he is familiar with; he will not look for alternative solutions and he will be promoting it among his friends. Therefore, a good impression made when the user is loading and navigating a website for the first time is of particular significance. Consequently, one of the most important factors is the first visual impressions of the homepage. Its readability, clarity, and ease of interaction will encourage the client to use a particular website in the future. As far as visualization is concerned, the websites of all analysed comparison websites are presented without any major problems. Nokaut.pl has the most characteristic graphic design: it is a combination of transparency and distinctive coloring (large, clear photos of a family) and icons representing product categories. The website of ceneo.pl is more toned down (lack of large graphic elements), which combined with the large spacing between elements results in greater readability. Okazje.info.pl, where the categories and selected products are presented in a clear manner, makes a similar impression on its user. Skapiec.pl displays a centrally located *box* with categories/icons placed in particular compartments, which makes it

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easy to find the right product. During the examination the users did not note any advertising banners on websites, which significantly improves the usability of the service.

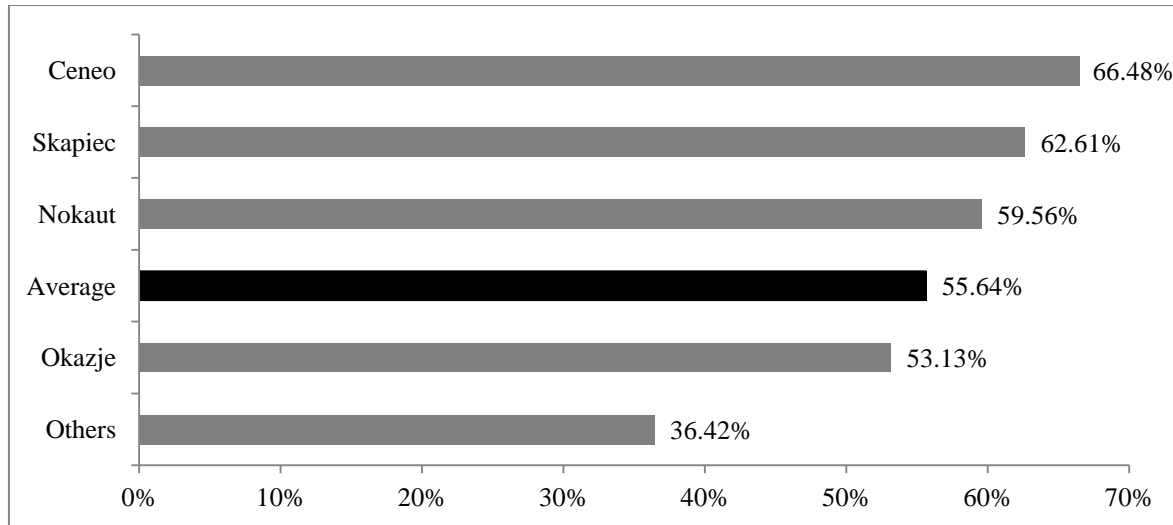| Description/Website /Evaluation	Ceneo	Nokaut	Skapiec	Okazje	Other	Total	Average
Brand awareness	7.89	7.40	7.34	4.78	1.67	29.08	5.82
Homepage	7.42	6.32	7.03	7.12	5.00	32.89	6.58
Consistency of graphic elements	6.96	6.72	7.07	6.76	3.33	30.85	6.17
Photo gallery	6.75	6.20	6.48	6.35	4.00	29.78	5.96
Completeness of information	6.77	6.70	6.39	5.65	4.67	30.17	6.03
Clarity and readability	7.25	6.56	6.76	5.71	3.83	30.11	6.02
Avoiding distractions	6.14	5.71	5.75	4.41	3.67	25.68	5.14
Opinions about shops	7.11	6.38	6.46	5.06	2.67	27.67	5.53
Product reviews	7.04	6.38	6.52	4.71	3.83	28.47	5.69
Product comparison engines	7.06	5.95	6.48	4.94	4.00	28.43	5.69
The ease of using categories	7.15	6.26	6.96	5.41	5.00	30.78	6.16
Product lists views	7.24	6.59	6.70	6.00	4.50	31.04	6.21
Rankings of products/shops	6.98	5.87	6.33	5.35	3.33	27.87	5.57
Suggesting products	6.17	5.83	6.04	5.00	5.00	28.03	5.61
Accuracy of search results	7.59	6.87	7.14	5.71	1.83	29.14	5.83
Prompting	6.44	5.70	6.14	5.00	4.00	27.28	5.46
Spellchecker	6.06	5.60	5.96	5.38	3.33	26.32	5.26
Filtering functionality	7.35	5.91	6.46	5.00	2.00	26.73	5.35
Sorting functionality in the product list	7.19	6.78	6.63	5.13	4.17	29.89	5.98
Sorting functionality in the list of shops	6.78	5.96	6.48	5.24	3.50	27.95	5.59
Subtotal	139.34	125.67	131.14	108.69	73.33	578.18	115.64
Ordering from the level of comparison engine	6.81	5.08	4.85	4.45	3.17	24.36	4.87
Memorizing a product list	6.03	5.17	5.69	4.73	2.67	24.29	4.86
Creating sets	5.38	4.50	5.23	4.73	2.67	22.50	4.50
Loyalty scheme	4.91	4.73	5.55	4.40	3.83	23.42	4.68
The option of mobile applications	6.14	5.00	5.58	5.45	4.00	26.18	5.24
Price alert	5.23	5.75	5.17	6.00	4.17	26.31	5.26
Tracking changes in favourite products	5.65	4.91	5.83	5.00	4.50	25.90	5.18
Additional functionalities	40.16	35.14	37.90	34.76	25.00	172.96	34.59
Average total	6.79	6.11	6.41	5.35	3.64	28.30	5.66
Total	179.50	160.81	169.04	143.45	98.33	751.14	150.23
% maximum score	66.48%	59.56%	62.61%	53.13%	36.42%	27.82	55.64%

Table1: Weighted average of scores obtained from the evaluations of selected comparison websites

Due to the character of the website, in all analysed programs the text search functionality has been clearly marked. In all cases, it was positioned on the same line as the logo of the website. Additionally, in the case of okazje.info.pl when the page is scrolled down the text search is always in the same place on the top of the page, which provides constant access to this functionality. Also, we could observe that navigation by categories is usually very easy. In the case of ceneo.pl, after the user hovers the cursor over the main categories, a list of subcategories appear and a selection of the most popular items is placed next to the list. Similar solutions can be found in okazje.info.pl, but in this case the number of main categories is smaller, which facilitates navigation (it is compensated with additional links to recommended categories). The solution which improves navigation in the website is, according to clients, placing the category field horizontally, which allows for displaying all of them without the need to scroll the page.

The lists of all the presented products in all analysed websites include the following data concerning: the name of the product, minimum price (websites okazje.info.pl and nokaut.pl additionally present the maximum price), photo of a product and the description of its basic characteristics. Ceneo.pl distinguishes itself with large photos of products, larger than in the case of other websites. Okazje.info.pl offers only one way of presenting a product list. In the case of ceneo.pl and skapiec.pl the list of products may be displayed in two ways, and in the case of nokaut.pl the list is available in three different views. In the list view, where the greatest amount of information is being displayed, ceneo.pl and nokaut.pl display only three features of a product, okazje.info.pl present four features of the product and skapiec.pl shows five features, which, after clicking the right button, increase to more than a dozen. Unfortunately, small font in combination with a large number of parameters in this case reduces the readability of data. Therefore, when we consider the readability factor, it appears that the most attractive websites are ceneo.pl and nokaut.pl; skapiec.pl turns out to be the worst when this criterion is taken into account.

Product reviews are a very important element, helping customers to choose the right product. The websites ceneo.pl, skąpiec.pl and okazje.info.pl present both a link to product review and the general assessment of the product by other buyers. In nokaut.pl, the product list presents only information concerning the position in the ranking of popularity in a specific product category (overall assessment and links to reviews are presented only on the product data sheet).

After navigating to the characteristics of a product (included in the so-called product data sheet) in all comparison websites, we first note the list of shops offering a particular product. Apart from the basic information about the shop, all the analysed websites present information about the evaluation of the shops and opinions about them. The most readable list is presented by ceneo.pl, next by nokaut.pl, where the information about the delivery time is clearly visible. In skąpiec.pl, there are no logotypes of the shops, and in the case of okazje.info.pl the links to shops are not presented in a very readable way. The greatest amount of information and the clearest presentation of the product are provided by skąpiec.pl and ceneo.pl. Nokaut.pl provides a description with low readability.

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Figure 3: Ranking of selected comparison websites

A client using the comparison website should have a possibility to compare the products according to the parameters selected by them. The most intuitive comparison website is nokaut.pl. Adding products to compare does not cause any difficulty. In the case of ceneo.pl, adding products to the comparison engine for the first time is not so obvious. In skąpiec.pl, we may compare products from the same category (being at the same time in the same category may pose a certain problem). Okazje.info.pl does not have the functionality of comparing products with each other. The average results of the survey are shown in table 1.

The study shows a ranking of selected comparison websites. It is presented in Figure 3. The first three websites: Ceneo, Skąpiec, and Nokaut have obtained a total score above the average; okazje.pl and individually chosen websites (different from the most popular ones (cenuj.pl, webkupiec.pl etc.)), are positioned below the average.

Application of the research results in the design method

Generally, there emerges one regularity, which may be applied when establishing analytical characteristics for the project – it indicates which of the existing websites of this class can be used as a basic pattern to be imitated when creating a new website. Generally, we may conclude that ceneo.pl will serve this purpose in the best way. However, the detailed analysis of the results is not so clear or univocal. In terms of the consistency of graphics, loyalty scheme and tracking the changes in the favorite products, the leading position is taken by skapiec.pl, in case of price alerts – okazje.pl. Skąpiec.pl, which takes a second position in the ranking, does not offer price alerts, which are of considerable importance to clients. Okazje.pl, which takes the lowest place in the ranking, occupies the second position when we take into account the evaluation of the homepage and creating sets and a third place with regard to the photo gallery it presents on its website.

We can also consider individual sites taking into account the features which are evaluated as the best and the worst. In most popular websites, there occurs a puzzling consistency of the best and

the worst scores. In other services, some of the characteristics are beyond the scope of the list. Hence, we may assume that, basically, the most important elements of the comparison websites are: brand awareness, home page, consistency of graphic elements, and the accuracy of search results. However, whenever a particular website feature receives the lowest scores, it points to the fact that potential customers attach great importance to this particular element. Therefore, avoiding distractions, lack of spellchecker (or inappropriate corrections), and lack or limited number of additional functionalities should be added to the list. Also, we must appreciate the three remaining, important elements: completeness of information, the ease of using categories and filtering functionality.

We may also analyze the results of the examination considering the number of scores in particular categories. Ceneo.pl was a leader in the ranking because it obtained the greatest number of very good scores. Also, the greatest number of good scores was assigned to skapiec.pl, which came second in the ranking. The comparison website: okazje.pl obtained the largest number of satisfactory or poor grades, other comparison websites – unsatisfactory. Nokaut.pl does not distinguish itself in any category.

Apart from the possibility of limiting the number of basic features important for the creation of a prototype – which results from the studies of the existing websites in this category, the presented study shows a high discrepancy between the initial, average results of the clients' opinions concerning comparison websites and their characteristic features and average scores obtained from the ranking of the most popular websites existing on the Internet. The reason of such variances was probably – as usual – growing experience of final users (customers) on contact with reality (existing websites) and connecting with it their requirements. Based on the initial evaluations, the first three positions are taken by: accuracy of search results, completeness of information, and the design of the homepage. When we take into account the evaluations of website analyses, the most important factors are: homepage, views of the product list, consistency of graphic elements. The same situation occurs in the case of other features of comparison websites. However, if we consider not the values of the total of evaluations, but average values from initial analysis and the ranking of websites, then the importance of the features resulting from evaluations from initial analyses, more or less coincides with the importance of the features shown by the ranking of websites. What is the reason of such great variances between the opinions concerning the usefulness and importance of particular criterion for the evaluation of the comparison website, and low scores of these features in the analysis of particular comparison websites? It seems that the situation is caused by the users' awareness of high requirements which it should meet and, on the other hand, dissatisfaction with the implementation shown on the websites of existing comparison engines. It is also a clear indication of the system designer – we should not use the ready-made patterns in the cases where we observe the high discrepancy between the user's expectations and the importance of the feature and its fulfillment. We should focus on these elements so that they are presented in the form which would meet the users' expectations.

Summary

On the basis of the above findings, we may create a detailed basic design pattern – a prototype which is a compilation of the best features of comparison websites, identified on the basis of the websites' evaluation provided by their users. The prototype should be confronted with the clients'

expectations emerging from their individual preferences. The findings also allow for specific flexibility in shaping subsequent prototypes: out of the 29 features eventually identified as important in the first phase of the conventional study into the users' needs, only 13 of them (which constitutes 44.83%) seem to be the most important criteria from the point of view of the existing patterns (ref: Table 2).

Criterion	Preliminary analysis - position	The ranking of websites – position	Average of the total	Absolute difference value
Accuracy of search results	1	9	5.00	8
Completeness of information	2	5	3.50	3
Home page	3	1	2.00	2
Avoiding distractions	4	21	12.50	17
Photo gallery	5	8	6.50	3
The ease of using categories	6	4	5.00	2
Filtering functionality	7	19	13.00	12
Clarity/readability	8	6	7.00	2
Consistency of graphic elements	9	3	6.00	6
Opinions about products	10	11	10.50	1
Comparison engines	11	12	11.50	1
Opinions about shops	12	17	14.50	5
Sorting functionality in the product list	13	7	10.00	6
Product list views	14	2	8.00	12
Prompting	15	18	16.50	3
Sorting functionality in the list of shops	16	15	15.50	1
Spellchecker	17	20	18.50	3
Brand awareness	18	10	14.00	8
Rankings of products/shops	19	16	17.50	3
Additional functionalities	20	13	16.50	7
Suggesting products	21	14	17.50	7

Table 2: The ranking of particular criteria sets of comparison websites in the initial, average users' evaluation and the average score resulting from the conducted study concerning the selected comparison websites.

We may see that more than 55% of the features may be shaped at the user's discretion, without referring to any patterns. This is the area where we may carefully match the user's requirements to the possibility of creating the website and modifications resulting from the latest trends in this field. Particular attention should be paid to the criteria where the discrepancy with regard to the expectations and implementation is the greatest.

In subsequent iterations, by means of this very "confrontation" with the possibility of maneuvering gained by obtaining a specific pattern, we improve the final prototype and we can

move on to the next phase of the project. i.e. functionality tests and integration of the project and, eventually, the installation, testing and launch of the final version.

References

Chmielarz, W., Szumski, O., & Zborowski, M. (2011). *Kompleksowe metody ewaluacji witryn internetowych*, Warszawa, Wydawnictwo Wydziału Zarządzania UW, Warszawa.

Chmielarz, W. (2013). *Zarządzanie projektami@rozwój*

Eurostat. (2013). http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/E-commerce_statistics.

Flasiński, M. (2006). *Zarządzanie projektami informatycznymi,* Wydawnictwo Naukowe PWN, Warszawa.

2013. http://wiadomosci.mediarun.pl/artykul/internet-internet,czy-dzieki-porownywarkom -cen-faktycznie-kupujemy-najtaniej,44430,2,1,1.html.

Meroni, A., &Sangiorgi, D.(2011). *Design for Services*, Lancaster University, Farnham, Gower.

Orłowski, C.,Kowalczuk, Z., & Szczerbicki, E. (2009). Zastosowanie technologii informatycznych w zarządzaniu wiedzą, PWNT, Gdańsk.

Tradedoubler. 2013. http://www.tradedoubler.com/pl-pl/informacje-i-zasoby/.

Trocki, M. (2012). Nowoczesne zarządzanie projektami, PWE, Warszawa.