Articles

Optimization of Online Visual Merchandising Elements (OVME) on the Basis of Consumer Preferences

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Summary:

The article reports the results of a research project on the newly emerging academic field of merchandising. The aim of the recent study is to offer an optimal combination of OVME in online fashion stores in accordance with users' preferences. One of the main conclusions drawn from an analysis of pre-selected fashion items in the online environment, as well as the layout of online shops, was that the main attributes to be considered in online store space design result from content analysis (and are overviewed in detail in a previous publication of Katrandjiev, Hr. and Velinov, I.). The authors share their findings and offer a further direction of research.

Key words: Customer behavior, OVME[1], Retail, Merchandising, Conjoint analysis

JEL classification: M 31, M39, L 67, L86

1. Research Importance and Research Goals

Fashion products consumption through online purchases literature overview has only recently begun to turn into user-centric, implementing innovative methods to accelerate sales (Williams et al., 2005). In the fashion field, various studies deal with consumer issues. However, the accent is on fashion trends, as well as the related problems of the manufacturing process and the design of the product. The process of buying is poorly reviewed and developing OVME good enough for the success of this process may be partly due to the late development of the merchandise science in Bulgaria.

The study aims to offer an optimal combination of OVME, based on Bulgarian user preferences. The growing number of online users of fashion items is in respect of the rapid development of marketing and merchandising. According to the Forrester Research Report, retailers must strive to increase their websites accessibility. They can benefit from buyers, focusing on additional and accurate product

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[1] Online visual merchandising elements

information, image enhancement, flexibile payment methods and goods reclaim, reduced transportation costs, etc. (Rosencrance, L, 2009). Business and researchers have long considered the visual stimulation and communication as important aspects of retail (McGoldrick, P, 1999 and 2002). It is important how the product or brand are graphically represented. Aspects of offline shopping space that might be adopted by online stores are said to be **design** (Li, D., T. Daugherty, and F. Biocca, 2001; Bellizzi, J. A., et al., 1983; Berman, B. & J.R. Evans, 1995; Bhattacherjee, A., 2004), fixing (Donnellan, J., 1996), **goods** (Davies, B. & P. Ward, 2002), **demonstration** (Buchanan, C., et al., 1999; Burke, R. R., 2000; Chaging, L. D., et al., 1994), **color** (Koelemeijer, K. & H. Oppewal, 1999) and **packing** (Bruce, M. & R. Cooper, 1997). These and some additional elements are the core of the online shop design (Potts, K., 2007).

1.1. Selection of an application procedure of conjoint analysis

Conjoint analysis is one of the many tools of marketing research. It proves to work better in predicting consumer behavior. Used in a set of research methods (content analysis and cluster analysis), it helps to reach the optimal merchandising strategy (Jelev, S., 2008; Brice, R., 1997).

Conjoint analysis is an extremely powerful way to capture what really drives consumers to buy one product rather than another (Raghavarao, D., B. J. Wiley & P. Chitturi, 2011), (Richard, M. O., 2004). The main advantage is to design dynamic market models for a bigger market share.

2. Previous Research

The online purchase of fashion goods is among the top market shares – around 40 % of the purchases for 2011 *г*. Interest in the Internet has increased, with over 20 million users, and they amount up to 130 000 new users every month (Dieckmann, M., 1995; Anderson, M. C., 2005), ensuring a large market potential (Fox, E. A., 1995; Hahn, H. and R. Stout, 1993; Powell, J., 1994). E-commerce sales mark a growth of 20% per year, creating a 143 billion dollar profit in 2009 (Internet Retailer).

The increased demand for "green" clothing (Williams et al., 2005) has a significant effect on the global fashion apparel industry. Users seem more likely to make a compromise between different attributes of clothing, such as comfort and quality (i.e. functional attributes) and fashion and style (i.e. hedonistic attributes) (Sondhi & Singhvi, 2006). Previous studies on style, color, quality (O'Cass, 2000; Sondhi & Singhvi, 2006; Cervellon, M.-C. et al., 2010), brand (Carrigan & Attalla, 2001), resistance, country of origin (Martinez & Kim, 2012), safety maintenance (Eckman et al., 1990; Davis, 1987; et al., 1986) are most often considered. Little is known about exactly which BME stimulate purchases. This study examines the relative value of OVME, based on consumers' behavior. The growing demand for "green" clothing is influenced by the production of eco clothes, as most brands that offer "green" product lines and use reusable materials, find it a way to attract eco buyers (Sampson, L.K., 2009).

A study of online apparel shopping in the U.S. shows that detailed product information results in greater sales volume

(Park, J. H. and L. Stoel, 2002; Jang, E. and L. D. Burns, 2004).

Search facility optimization is important - slow loading will mean poor Google rating (Nelsen, Y., 2001).

Customers' navigation defines web design and layout (Vrechopoulos, A. P. et al., 2004). Navigation in a broad sense (not taking into account one site but in the context of the entire online environment) boosts sales (Gomory, S., et al., 1999; Lee, J. et al., 2001). Some researchers (Sit, J., B. Merrilees, and D. Birch, 2003) state that the better the perception of the usefulness of the information on the site is, the greater the customer satisfaction is. The air of an online store (stimulus) (Eroglu, S. A., 2001 and 2003) touches cognition (the organism), which affects buyers' behavior (reaction).

Another researcher (Kim, S. Y. and Y. J. Lim, 2001) points out a number of characteristics that have a positive effect on customer satisfaction, such as comfort in buying, product representation, etc.

Eroglu was the first to point to the importance of design (Eroglu, S. A., 2001 and 2003), and to offer a frame to measure the impact of "atmospheric" elements on purchase intentions. "Atmospheric" elements can be grouped in two main sub-categories - LTRE[2] and HTRE[3]. They are further developed and analyzed by (Velinov, I. 2013).

The impact of "atmospheric" elements (Mehrabian, A, JA Russell, 1974) that create S-O-R model, was also examined, studying the effects of the physical environment on human behavior through: pleasure, arousal and dominance. The store space is consciously designed to provoke specific emotional effects in the buyer (Kotler, Ph., 1973; Donovan, R. J, JR Rossiter, 1982). Although the study of "atmospheric" elements has recently been made, an empirical evidence of their impact on online users' behavior is cited.

The influence of color as an element on the response of the buyer is very strong (Wu, J.-H. & Y. Yuan, 2003; Xu, Y. & V. A. Paulins, 2005; Zhou, L., L.Dai, D. Zhang, 2007). Each color, tint or shade, leads to a rapid response and purchase (Gorn, GJ et al., 2004).

Research dedicated to the online registration mainly covers all issues, related to the protection of consumers' privacy. The collection of personal data is the focus of several studies (Tsai, J., 2011; Xu, Y. & V. A. Paulins, 2005; Zhou, L., L.Dai, D. Zhang, 2007; Forbes). Risks that arise during online shopping target mostly the exchange of personal data and credit card information. Despite the risks, consumers shop online. The increased capital from the total sales on the Internet reveals this fact (Kannan, PK et al., 1998; Salam, AF et al., 1998). (Hu, X. et al., 2001) studied a group of online service providers, building optimal pricing strategy. (Ba, S., and P. Pavlou, 2002) use data from e-Bay, to show that feedback systems develop confidence in the online seller, generating price premium to the seller.

In particular, the three-dimensional image of the product could create positive attitudes and purchase intentions (Halepete, J. and J. Park, 2006).

VM consists of visual resistant marketing functionalities: dummies, props, graphics, labeling and more

[2] Low Task Relevant Environment
[3] High Task Relevant Environment

(Diamond, J. and E. Diamond, 2007). Not all products from the catalog are available online (Szymanski, DM & Hise, RT, 2000). Merchandising is identified in the literature by assortment, quality, price and style (fashion) (Gautschi, DA, 1981; Bell, S., 1999; Ahn, KH, 1989; Finn, A. & J. Louviere, 1995; Wong, KM et al., 2001; Weisbrod, G. et al., 1984). Merchandise methods bring effectiveness in boosting sales (Gomory, S., et al., 1999). Product location (recently on a full page or two) is significant (Allen, C., 1999). A three-dimensional product image is positively associated (Halepete, J. and J. Park, 2006, Allen, C., 1999, 10 best Practices for Online Merchandising).

Trying on clothes is a problem in online shopping (Reda, S., 2002). Competitive prices and other merchandising attributes (Park, JH and L. Stoel, 2002) can stimulate sales. Awareness is critical for the Bulgarian consumer. Since touching and feeling are decisive for the purchase; online consumers must be compensated with a realistic online demo (Then, NK and MR Delong, 1999; Halepete, J. and J. Park, 2006).

According to (McCormick, H. and Ch. Livett, 2012), users rely on four factors: customization, detailed description, safety information and virtual dummy demonstration.

3. Research Methodology

3.1 Sampling method and sample size

The analysis is based on online visual merchandising elements (OVME), evaluating websites of several online stores (full description in a preceding article - Katrandjiev, Hr. and Velinov, I.). Five databases were screened from students attending „Marketing Research" classes and duplications have been removed.

Unique fashion online stores encounter 5,753 shops. Randomly picked were 200 online fashion stores to define the fundamental OVME (Bhatnagar, 2000). The study was taken by 153 individuals - Bulgarian students at New Bulgarian University and the University of National and World Economy. The conjoint analysis method was adopted to help mark OVME, according to preferences in Bulgaria. The analyses and conclusions are based on this sample.

4. Research Method

The reduced number of OVME gives accuracy of data. The purpose is to show the exact VME (Table 1) users prefer. These seven basic attributes with their subdivisions will be insufficient to conduct conjoint analysis. Consequently, all the attributes and couples must be used, as a rule, resulting from the

Table 1. Reduced number merchandising elements in conjoint procedure

Search engine		Style presentation			Background color					Types product view		Method of displaying		
Yes	No	Horizontal	Vertical	Mixed performance	White	Black	Red	Blue	Yellow	2D	3D	Dummy	Model	Without Dummy / Model

Source: Author's table

orthogonal design of a conjoint analysis. In our case it is impossible because the use of all visual attributes in orthogonal design will generate an incredibly large number of show cards that could not be comprehended by respondents and precisely analyzed.

The description of the attributes and their levels (at the beginning of orthogonal design) is done within an SPSS module. All possible combinations of relevant profiles are: 2.3.5.2.3 = 180. This is the derivative of the number of levels of all attributes. The evaluation of this large combination is practically impossible. The amount of profiles can significantly be reduced with the means of the fractional factorial design (Kalinov, Kr., 2010). It evaluates effectively the main effects in a limited number of experimental stimuli. Using the SPSS module, we reduced the 180 possible profiles to 25 samples.

4.1. Determining the input data

The next step in the conjoint analysis is to determine the input data. In our case they represent consumer preferences (the extent to which each stimulus option is preferred) or shopping intentions. Respondents were addressed with a questionnaire. Preference estimates or shopping intentions could be divided into two types: metric and non-metric (Kalinov, Kr., 2010).

This paper cites metric input data in levels of preference to any of the stimulus options. A named polar scale with unnamed intermediate options is adopted. A scale from 0 (least preferred) to 100 (most preferred) appears in each show card (Fig. 1).

Researchers prefer to deal with metric for convenience. Respondents prefer easy evaluation. Researchers feature fast data analysis. Pre-scale is designed, to address the description of the variables. Card numbers in the sector Variable View / Label: card 1, card 2, card 3, etc. to card 25 are kept. In Variable View / Name is accepted for better synchronization and accuracy. Questions in the survey are encoded by q_1 to q_9.

The questionnaire combines all 25 show cards and a relevant demographic block. The risk of data distortion can be reduced by appropriately structuring the questionnaire and reviewing the answers (Tull, D. and L. Richards, 1980). The review sifted the best interviewers and they might be invited for future research. When it is carried out continuously, the risk of distortion greatly reduces.

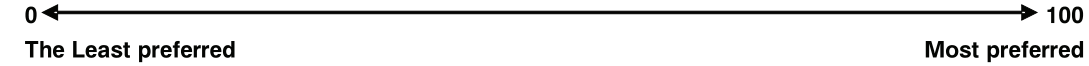
In this study 10% of the interviews were reviewed and a deliberate distortion of data has not been established. The following hypothesis was formulated:

H: It is possible to develop a methodology for selecting the optimal combination of OVME to better meet Bulgarian online users' needs.

Perceived anonymity represents the extent to which respondents believe that their identity and responses will be kept confidential by third parties. The principle of anonymity is pointed out to the respondents at the beginning of each study. However, the level of perceived anonymity varies within different methods of data collection.

5. Analysis of Online Stores

In this section, the results are discussed. The main purpose is to derive the most important attributes, forming the optimal combination of OVME. Some indicators would be interpreted to an extent where the conjoint analysis model corresponds to the collected group data.



The Least preferred **Most preferred**

Fig. 1. Named polar scale

Source:The figure is designed by the author.

The SPSS conjoint procedure initially generates regression analysis, where the dependent variable is the empiric rating estimates of respondents, and the independent one – the level of product attributes. Regressive odds (values), linking attribute levels with score variability of product estimates, are calculated and appear together with the standard errors (validation). The corresponding magnitude of each attribute is derived, as well as the general indicators of similarity (proof of consistency).

Table 2 introduces the orthogonal design in 25 sample show cards. Summarized information is represented in the questionnaire.

Table 2. Show cards in tabular form

№ on the map	Search engine	Style presentation	Background color	Type product view	Product detailed description	Purchase method	Method of demonstrating product
1	No	Horizontal	Red	3D	No	Yes	Dummy
2	Yes	Vertical	White	3D	No	No	Without Dummy and Model
3	Yes	Mixed performance	Red	2D	Yes	Yes	Model
4	No	Vertical	Red	2D	Yes	Yes	Without Dummy and Model
5	No	Horizontal	Yellow	3D		Yes	Model
6	Yes	Horizontal	Blue	2D	Yes	No	Dummy
7	Yes	Mixed performance	Yellow	3D	No	Yes	Without Dummy and Model
8	Yes	Horizontal	Black	2D	No	No	Without Dummy and Model
9	No	Horizontal	Blue	2D	No	No	Without Dummy and Model
10	Yes	Vertical	Yellow	2D	Yes	No	Dummy
11	Yes	Mixed performance	White	2D	Yes	No	Dummy
12	Yes	Vertical	Red	2D	Yes	Yes	Dummy
13	No	Mixed performance	Blue	2D	No	Yes	Model
14	Yes	Vertical	Blue	3D	No	Yes	Dummy
15	Yes	Mixed performance	Black	3D	Yes	Yes	Model
16	Yes	Horizontal	Yellow	2D	Yes	No	Dummy
17	Yes	Horizontal	White	2D	Yes	No	Model
18	Yes	Vertical	Black	3D	Yes	No	Model
19	No	Vertical	White	2D	No	No	Model
20	Yes	Vertical	Blue	3D	No	Yes	Model
21	Yes	Horizontal	Black	2D	No	Yes	Model
22	Yes	Horizontal	Red	3D	No	Yes	Model
23	No	Vertical	Black	2D	Yes	Yes	Dummy
24	No	Vertical	Yellow	2D	Yes	Yes	Model
25	No	Horizontal	White	3D	Yes	Yes	Dummy

Source: The table consists of the author's calculations

Show cards contain a detailed descriptive rhetoric of the concept, the same subtitles for different attributes in order to guarantee coherence between the descriptions. For accuracy

each concept typifies the other. It is difficult to ensure that the pictures (drawings, cartoons and photographs) contain only information about the analyzed situation. Attributes that are valued could be used in the evaluation of certain other attributes, which are difficult to describe. Show cards contain subtitles used for different attributes on each card, ensuring coherence between the descriptions.

SPSS conjoint analysis describes the model which will be revised (parameterized). Each factor (attribute 1, attribute 2, attribute 3 attribute 4 and attribute 5) appears in the list where the selected particular model, the number of factor levels and labels are marked (Table 3).

Table 3. Conjoint-analysis Factors Summary

Object parameterization		
	N of Levels	Relation to Ranks or Scores
Attribute1	2	Discrete
Attribute 2	3	Discrete
Attribute 3	5	Discrete
Attribute 4	**2**	**Discrete**
Attribute 5	3	Discrete

Source: Author's calculations using orthogonal design in SPSS

The current file contains a detailed study description (i.e. no missing values in show cards). Values on age representation from the demographic block are omitted. SPSS conjoint analysis does not account for missing values in one or more variables (hence the third type of calculation for sample by age is not done).

The consistency checking of input data does not analyze the effect of the elements on the respondents. For each group (group conjoint analysis) or each respondent (individual conjoint analysis) SPSS display results in three tables. The subject Name label identifies the group or respondents whose results are presented (Table 4 shows the results of the whole sample „Overall Statistics" - at „utility" level).

5.1. Analysis of the results in assessing the utility (Utilities)

Utility (utilities) estimates show how each factor-level is related to preferences (units are ranks or ratings in accordance with the scales used; evaluations are used in the example rating). Positive values indicate that the respective attribute level is positively related to preference, and negative values indicate that factor level is not preferred. For the purpose of a fair and accurate description, the following names of the studied optimal OVME are introduced:

- attribute 1 - *search engine*;
- attribute 2 – *style presentation*;
- attribute 3 – *background color*;
- attribute 4 - *types of product view*;
- attribute 5 – *method of demonstrating product* (Table 4).

The description applies also to Table 4 u Table 5.

If we consider the first factor attribute 1, indicating a search in online store, it is clear that the group respondents prefer it: „Yes" (utility = 1.990) to "No" (utility = -1.990). Estimates are normalized such that their sum is equal to 0. If the number of product cards was sufficient to any assessment of the utility, a standard error value is returned. Thus we assess whether utility levels are significantly different. The difference between the estimates of the utility of the two alternatives [1.990 - (-1.990) = 3.980] is a much higher number than twice the standard error (2 x 0.641 = 1.282), which means a significant difference between the two estimates of utility. If this difference was less than twice the standard error, the difference in the estimates of utility could be explained by scattering (e.g. in the overall estimation the values do not differ between the rate of the factor levels).

Table 4. SPSS conjoint-analysis Utility

Utilities			
		Utility Estimate	Std. Error
Attribute 1	**Yes**	**1.99**	**.641**
	No	-1.99	.641
Attribute 2	Horizontal	-1.788	.876
	Vertical	-1.952	.876
	Mixed performance	**3.739**	**1.047**
Attribute 3	**White**	**3.745**	**1.256**
	Black	**2.031**	**1.256**
	Red	-2.493	1.256
	Blue	**1.086**	**1.256**
	Yellow	-4.368	1.256
Attribute 4	2D	-5.429	.641
	3D	**5,429**	**.641**
Attribute 7	**Model**	**5.682**	**.876**
	Dummy	**1.774**	**.876**
	Without dummy and model	-7.456	1.047
(Constant)		51.434	.718

Source: The table consists of the author's calculations using orthogonal design SPSS

In the parameterized conjoint-model (Table 4) the constant is also included. Ordinal data (rating values) may vary in accordance with show cards number, which makes it non-interpretive.

Focusing on utility and other factors, it is evident that consumers prefer *mixed presentation* of the webgeometry for online fashion stores (3.739). From color to background - attribute 3, Bulgarian online users prefer the *white color* (3.745), followed by *black* (2.031) and *blue* (1.086). Respondents opted for *3D demonstration* of the product with a very high score (5.429), for *model (*5.682), and as its best alternative - *dummy* (1.774).

5.2. Analysis of the results for the relative importance (Importance)

The values of relative importance in Table 5 reveal the extent to which a particular attribute affects the formation of preferences. The example shows that attribute 4 (*product presentation*), is the highest (5.429 (-5.429)). The value of the relative importance is 16.168. The attribute of the highest importance, is the background color. Although values are lower (3.745 for white, 2.031 for black and 1.086 for blue), the impact here is due to **the psychological effect of color** on the first visit (highest value of relative importance – **31.565**). The search option has the smallest relative importance (10.745) - the rank of the utility estimate is the smallest (1.990 - (-1.990)).

Table 5. Attributes *Relative Importance*

Importance Values	
Attribute 1	10.745
Attribute 2	16.764
Attribute 3	**31.565**
Attribute 4	16.168
Attribute 7	24.758

Source: Based on the author's calculations, using SPSS orthogonal design

5.3. Validity of conjoint analysis results

Measures of association in SPSS show the strength of the relationship between the grades and ratings of the individual cards and their predictions of the model estimates for utility. Higher values expose an association agreement between empirical rating and the estimated values of the model. If the values are low, it means that

the conjoint model is not proved by empirical data. At an individual level low convergence could be explained with a more complex psychological assessment of preferences by the respondent (interaction effects), which cannot be covered by the model. Another possible reason can be the confusion, or lack of concentration in the respondent. In group analysis (unless reasons specified) low values of association can be explained with combinations of different user evaluations. In this example the verification of the analysis of group level indicates that validation values are high (Table 6).

Two key indicators measure the strength of association in SPSS. The first is the standard correlation coefficient R of Karl Pearson (presumably a metric scaling level of the two variables) and the second is the coefficient of Kendall Tau, calculated on rating data. Both factors have a theoretical maximum value of 1 to indicate a perfect association between the estimated values of cards utility and the empirical rating of cards value. There is a high association between the average ratings cards and assessments of their utility predicted by the model. Correlation coefficients are accompanied by tests of statistical significance - Table 6.

Table 6. Correlations between observed and estimated preferences

Correlation / Validity		
	Value	sig.
Pearson's R	**.962**	.000
Kendall's tau	**.833**	.000

Source: The table consists of the author's calculations using orthogonal design SPSS

6. Summary and Guidelines for Future Research

6.1. Summary

The conclusion (Table 4) is that the desired sustainable OVME are - *search engine, mixed web graphic, white, black and blue background*, *3D format representation, along with a model and a dummy representation*. High values and a statistically significant degree of the standard errors for all attribute levels should be noted.

Table 5 shows that *background color* is the most important attribute (31.5), followed by *method of demonstrating product* (24.7) *style presentation* (16.7), *types of product view* (16.1) and *search engine* (10.7).

Conjoint-group level analysis shows that OVME, presented in Table 7 are important for both groups of respondents. As shown in the table, youths, aged 18 to 35 years, determine seven basic components:

- Search engine.
- Style presentation - mixed presentation of menus vertically and horizontally.
- White, black or blue are background colors.
- 3D format demonstration.
- Live model or dummy demonstration (Table 7)

Table 7. Optimal OVME terms

OVME	
groups	**elements**
Criteria for searching	*Search Engine*
Style presentation	*Mixed performance*
Background color	*White*
	Black
	Blue
Type of product view	*3D presentation format*
Method of demonstrating product	*Model Dummy*

Source: Table drawn up by authors

6.2. Guidelines for future research

Bulgarian online users OVME are selected, based on their desires and

past shopping experience. The research objective is achieved through a conjoint analysis - OVME optimized for a particular user group.

Although not all the visual elements of content analysis are used, all the elements entering the clustering of online shops conjoint analysis provide a good and objective assessment, based on the visual elements. Limit the use of the whole package of studies and summarized merchandising elements due to the physical and psychological inability to cope with all combinations. Problems associated with emotional and cognitive abnormalities that inevitably arise as a result of the underlying assumptions made by conjoint analysis limit their effectiveness.

However, the state of society in Bulgaria, the awareness of the respondents, their experience in handling Internet, advances in information technology are reasons why a large portion of the elderly population, including working age, refused to or cannot deal with online shopping. The limitations of this analysis make it necessary to continue and improve the methods for the study of BME so as to offer new, more sophisticated models of online stores tailored to the rapidly changing habits and demands of the consumers of fashion goods online.

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