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*Role of Social Values in Determining the Attitudes Towards
Consumers' Pathological Behavior on Market
– Model-Based Approach*

Rola wartości społecznych w kształtowaniu postaw wobec zachowań patologicznych
konsumentów – podejście modelowe

Key words: consumer's pathological behavior; social values; binary logistic regression model

Slowa kluczowe: zachowania patologiczne konsumenta; wartości społeczne; model regresji logistycznej

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Introduction

Consumer pathological behavior can be determined by variety of factors, including external factors, being independent of the consumer, and the subjective ones, being directly related to an individual person. Taking into consideration an individual market participant, it is also possible to point out values whose presence can either encourage or discourage development of pathological behavior and attitudes towards such behavior. Identification of social values determining pathological behavior makes it possible to pinpoint these values which strongly influence consumer pathological behavior and create their attitudes towards this phenomenon on the market.

The main goal of the paper is an attempt at determining relations existing between consumer's social values and consumer's attitudes towards pathologies. Presumably, already at the preliminary stage of verifying the significance of the relation, there exists some connection between values presented by consumers and their attitudes towards pathologies. The issue appears, however, to be more complex. Following the model-based approach, some analytical tools have been proposed to determine a construct which could enable to predict attitudes towards pathologies on the basis of attitudes presented by the consumer. The tools include the logistic regression and a concept of classification methods. In both cases it is possible to clearly determine social values which categorize consumers in terms of their attitude towards pathological behavior.

1. Consumer behavior pathologies – theoretical background

Pathology constitutes a very diverse concept, not straightforwardly defined in specialist literature. In the literature, pathological behaviors are most frequently defined as consumer misbehavior [Fullerton and Punj 2004; Vitell 2003]. Lovelock and Wirtz [2011], for example, used the notion of a "bold consumer", and described him or her as someone acting in a senseless or improper way, and creating problems for companies, their personnel and other customers.

Hoffman and Bateson [2010] refer to consumer behavior pathologies whilst discussing causes of failure in service provision and describe problematic consumers. According to the authors, this failure in proper service provision is down to problematic consumers and their behavior, such as alcoholism, verbal and physical abuse, breaching of the selling policy, quite consciously, defies the rules set by the service provider, customers' unwillingness to cooperate, etc. Fullerton and Punj [2004] developed a concept of "consumer abnormal behavior" and provided a more precise definition of "consumer misbehavior" described as "the one that violates generally accepted norms of conduct in the field of consumption, and consequently disturbs the consumption order". Reynolds and Harris [2009] define pathologies in consumer behavior as dysfunctional and refer to situations in which the consumer consciously violates generally accepted conduct norms in consumption. By using the term "dysfunctional behavior", the authors intended to emphasize intentions and infringement of norms.

The phenomenon of pathology in consumer behavior is also regarded as consumer retaliation, which is demonstrated by aggressive behavior, both in a verbal or physical form, and meant to hurt another person [Huefner and Hunt 2000]. In the case of consumers, retaliation is targeted at service providers and retail sellers. The phenomenon of retaliation is approached in various contexts, yet always regarded as commonplace [Kuester et al. 1999]. Many authors erroneously define it as a set of dysfunctional behaviors due to some mental disease, an opportunistic attitude or

a crave for intense experiences. However, revenge is not an act of some impulse, as the first step in the process of retaliation relates to consumer perception of service providers' actions as harmful and mischievous [Aquino et al. 2001].

With reference to the above-presented considerations, the study into pathologies of consumer behavior on the market should be based on the assumption that pathologies are consumers' actions which are not compliant with generally accepted norms of market conduct and which are taken only to maximize consumer's own benefits. Simultaneously, pathologies exert negative influence both on companies and other consumers, as well as the consumer himself/herself.

2. Methodology of research

While identifying the role of social value in development of attitudes towards consumer pathological behavior on the market, Schwartz's [2010] concept was taken in consideration as the most complex one. Schwartz, in his theory, defines the value as a concept or belief in some desired terminal states or modes of behavior which are independent of a definite situation, which facilitate the decision-making and are individually prioritized. Schwartz has distinguished ten basic categories of values including: tradition, conformity, universalism, benevolence, power, achievements, hedonism, stimulation, self-direction independence and security. The concept of values developed by Schwartz is not confined to the inventory of independent values, but points out to interactions between them. On the one hand, the values can be complementary, but, on the other hand, they can be contradictory and in opposition to one another.

According to this concept, the following hypotheses have been put forward:

- Universalism is set to be negatively correlated with attitudes towards consumer pathological behavior (H1);
- Benevolence will be negatively correlated with attitudes towards pathologies in consumer behavior, yet the interaction will be less intense with respect to universalism (H2);
- Conformity will be negatively correlated with the attitude towards pathologies in consumer behavior (H3);
- Tradition will be negatively correlated with attitudes towards consumer pathological behavior (H4);
- Security will be negatively correlated with attitudes towards pathologies in consumer behavior (H5);
- Power is neutral with respect to attitudes towards consumer behavior pathologies (H6);
- Achievements will be positively correlated with attitudes towards pathologies in consumer behavior (H7);

- Hedonism will be neutral in confrontation with consumer behavior pathologies (H8);
- Stimulation will be negatively correlated with attitudes towards pathologies in consumer behavior (H9);
- Self-direction will be neutral with respect to pathologies in consumer behavior (H10).

In the next part of this study, we introduce an analytical tool allowing for verification of all these hypotheses – logistic regression model.

The binary logistic (or logit) model is used to estimate the probability of a binary response based on one or more independent variables. Such model allows one to find out if the presence of a specific independent variable increases the probability of a given outcome by a specific percentage [Tutz 2012, pp. 29–48]. The logit model can be presented as:

$$g(\mu) = \beta_0 + \beta_1 X_1 + \cdots + \beta_k X_k + \varepsilon$$

where g is a link function defining the relation between average value of dependent variable $\mu = E(Y|X_1 = x_1, X_2 = x_2, \dots, X_k = x_k)$ and the linear combination of independent variables. The model assumes that the variable $Y \sim B(1, p)$, where $B(1, p)$ is a binomial distribution with the probability of success p . In the binary logistic model we have $\mu = p = P(Y = 1|X_1 = x_1, X_2 = x_2, \dots, X_k = x_k)$ and the link function (called logit) is of the form:

$$g(p) = \text{logit}(p) = \ln\left(\frac{p}{1-p}\right)$$

Thus the final expression for the binary logistic model is as follow:

$$p = P(Y = 1|X_1 = x_1, X_2 = x_2, \dots, X_k = x_k) = \frac{\exp(\beta_0 + \sum_{i=1}^k \beta_i x_i)}{1 + \exp(\beta_0 + \sum_{i=1}^k \beta_i x_i)}$$

The parameters β_0 and $\beta_i, i = 1, 2, \dots, k$ are estimated using the maximum likelihood method.

The advantage of the logit model is the possibility of interpretation the parameters $\exp \beta_i$. To do this we have to define the odds which is the ratio of the probability p and $q = 1 - p$. The odds might be expressed as a function of independent variables using formula:

$$\frac{p}{q} = \frac{p}{1-p} = \gamma(x_1, x_2, \dots, x_k) = \exp(\beta_0 + \sum_{i=1}^k \beta_i x_i)$$

If Y is a binary variable with outcomes $Y = \{1, 0\}$, therefore $\exp \beta_i$ says about changes of odds if the value of X_i changes by 1 (*ceteris paribus*). One may compare the value of $\exp \beta_i$ to 1. In other words (example for X_i):

- a) if $e^{\beta_1} > 1$ the factor described by X_1 has a stimulating effect on the $Y = 1$,
- b) if $e^{\beta_1} < 1$ the factor described by X_1 limits the probability of the $Y = 1$,
- c) if $e^{\beta_1} = 1$ there is no influence of X_1 on Y .

3. Empirical analysis

In this part of the paper, we focus on the practical application of logistic regression in the problem of modeling the probability of consumers' attitudes indicating the acceptance of pathological behavior. The data used in this research derived from the survey conducted in 2016 in Poland within NCN grant following the decision No. DEC-2013/11/B/HS4/01470 where some of the questions identify the respondent's attitude to the pathology in consumers' behavior. The data has been recoded to the form that allows for using the logistic regression model. The sample consisted of 1,200 respondents and the question identifying the attitude toward consumers' pathological behavior was: "What is your opinion about the pathology in consumers' behavior?

- a) Consumers' pathological behavior is acceptable for me.
- b) I think that it's not allowed to accept any consumers' pathological behavior.
- c) I could accept consumers' pathological behavior but only in a special situation".

In the option a) and c) the response "yes" (coded as 1) meant the acceptance of consumers' pathological behavior, whereas in the option b) the acceptance was confirmed by the response "no" (coded as 1). The response "I have no opinion" has been coded as a missing value. It is easy to see that these three options a), b) and c) indicate three different models (model 1, 2 and 3, respectively). Independent variables were represented by the indices defining social values.

The results of initial correlation analysis indicate multidirectional influence of social values to the respondents' attitudes toward consumers' pathological behavior, but the real relation is verified later in the study. As presented in the theoretical part of the paper logistic regression allows for modeling the probability that the random variable Y takes one of the two values: "1" or "0". The value "1" reflects the acceptance of consumers' pathological behavior. At the first stage we estimated the parameters of the univariate submodels for each of the models 1–3. In the univariate submodels each one of the analyzed independent variables was treated separately. The estimates of parameters (except intercepts) are shown in Table 1.

Table 1. The estimates of the univariate logistic regression models

Social values	Model 1			Model 2			Model 3		
	$\hat{\beta}_i$	p-value	$\exp \beta_i$	$\hat{\beta}_i$	p-value	$\exp \beta_i$	$\hat{\beta}_i$	p-value	$\exp \beta_i$
Hedonism	0.287*	0.000	1.332	0.043	0.384	1.044	0.268*	0.000	1.307
Achievements	0.025	0.609	1.026	-0.036	0.479	0.965	0.121*	0.012	1.129
Power	0.254*	0.000	1.289	-0.052	0.289	0.949	0.184*	0.000	1.202
Universalism	-0.123	0.064	0.884	-0.420*	0.000	0.657	0.03	0.635	1.03

Social values	Model 1			Model 2			Model 3		
	$\hat{\beta}_i$	p-value	$\exp \beta_i$	$\hat{\beta}_i$	p-value	$\exp \beta_i$	$\hat{\beta}_i$	p-value	$\exp \beta_i$
Benevolence	-0.208*	0.000	0.812	-0.380*	0.000	0.684	-0.004	0.943	0.996
Security	-0.147*	0.008	0.863	-0.293*	0.000	0.746	-0.005	0.927	0.995
Conformity	-0.078	0.16	0.925	-0.338*	0.000	0.713	-0.199*	0.000	0.819
Tradition	-0.010	0.848	0.990	-0.249*	0.000	0.780	-0.065	0.200	0.937
Stimulation	0.180*	0.001	1.198	-0.072	0.189	0.930	0.173*	0.001	1.188
Self-direction	-0.022	0.693	0.978	-0.115*	0.044	0.891	0.119*	0.031	1.127

Source: Authors' own calculations.

* statistical significance at 0.05

As presented in Table 1, all models differ due to the statistical significance of parameters. Given univariate submodels for model 1 we found positive statistical relation for the social values such as hedonism, power and stimulation which stimulate the probability of acceptance for the pathology in consumers' behavior. In contrast, the negative statistical significance was observed for benevolence and security – these values limit the probability of acceptance for the pathology in consumers' behavior. If we take a look at the univariate submodels for model 2, all of the significant factors had a negative influence on the variable Y which means that the higher values of the variables representing social values, the higher disapproval of consumers' pathological behavior. For the third model all statistically significant univariate models were related to the social values such hedonism, achievement, power, conformity, stimulation and self-direction, but only conformity affected negatively the probability of acceptance for the pathology in consumers' behavior. If we look at the odds ratios for all three models, the highest absolute values of deviations from the level 1 were observed for hedonism (positive, model 1), universalism (negative, model 2) and hedonism (positive, model 3). In model 1, if the consumer declares to be hedonist, the chance of acceptance for the pathology in consumers' behavior is 33.2% higher than if he does not declare to be hedonist. In model 2, if the consumer holds universal values, the chance of acceptance for the pathology in consumers' behavior is 34.3% lower than if he does not hold them. The result of model 3 is similar to the model one but the chance is about 30%.

In the next step we estimated the parameters of three separate multivariate models using variables determining social values. In addition we assessed if the variable "gender" is related to the acceptance of the pathology in consumers' behavior. The estimates were obtained using v-fold cross-validation and backward stepwise method. The results for all these models are presented in Table 2.

Table 2. The estimates of the multivariate logistic regression models

Social values Gender	Model 1			Model 2			Model 3		
	$\hat{\beta}_i$	p-value	$\exp \beta_i$	$\hat{\beta}_i$	p-value	$\exp \beta_i$	$\hat{\beta}_i$	p-value	$\exp \beta_i$
Intercept	-0.458	0.000	0.682	-0.472	0.000	0.624	0.274	0.000	1.316
Hedonism	0.271	0.000	1.312	n/a	n/a	n/a	0.268	0.000	1.307
Achievements	-0.301	0.000	0.740	n/a	n/a	n/a	n/a	n/a	n/a

Social values Gender	Model 1			Model 2			Model 3		
	$\hat{\beta}_i$	p-value	$\exp \beta_i$	$\hat{\beta}_i$	p-value	$\exp \beta_i$	$\hat{\beta}_i$	p-value	$\exp \beta_i$
Power	0.282	0.000	1.325	n/a	n/a	n/a	n/a	n/a	n/a
Universalism	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Benevolence	-0.208	0.001	0.812	-0.325	0.000	0.722	n/a	n/a	n/a
Security	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Conformity	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Tradition	n/a	n/a	n/a	-0.133	0.028	0.876	n/a	n/a	n/a
Stimulation	0.166	0.015	1.181	n/a	n/a	n/a	n/a	n/a	n/a
Self-direction	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Gender	-0.382	0.013	0.632	n/a	n/a	n/a	n/a	n/a	n/a

Source: Authors' own calculations.

As we can see, not all the social values were finally included in the models. These presented in Table 2 are statistically significant. Independent variables included in the first model represent: hedonism, achievements, power, benevolence and stimulation. The odds ratios indicate that for hedonism, power and stimulation if the consumer holds these values, the chance of acceptance for the pathology in consumers' behavior is 31.2%, 32.5% and 18.1% higher, respectively, than if he does not hold them. In turn, for achievements and benevolence the odds ratios are below one, so if the consumer declares to hold these values, the chance of acceptance for the pathology in consumers' behavior is 26.0% and 18.8% lower than if he does not hold them. In addition, the odds ratio for "gender" is below one as well. That means that being a man increases the chance of acceptance for the pathology in consumers' behavior (by 36.8%). Second model is composed by benevolence and tradition. Both these social values had negative impact on the acceptance of pathology in consumers' behavior. Odds ratios were below one which means that the chance of acceptance for the pathology is 27.8% and 12.4% lower if the consumer holds these values. The last model reduced to the univariate case, where independent variable was represented by hedonism. The odds ratio for hedonism is interpreted in the same way like it was in the model 1 (positive impact).

At the end of the study we examined the quality of these three models. We calculated two most popular measures of fit: pseudo- R^2 (Nagelkerke and Cox-Snell) and Hosmer-Lemeshow statistic. The values of pseudo- R^2 's have similar interpretation as a classical R^2 in linear regression models. Results say that the factors represented by the social values explained only small percentage of the volatility of dependent variable. The highest values were observed for model 1 (Nagelkerke: 13.0% and Cox-Snell: 9.1%). However, it should be noted that the dependent variable is binary, so the values of pseudo- R^2 might be lower than in the case of quantitative variable (where classical R^2 is calculated). The Hosmer-Lemeshow statistic tests whether the model statistically differs from the data. Such a result was obtained only for the model 2. The remaining models correctly describe the data.

Conclusions

The article presents a model approach to the problem of identifying attitudes towards consumers' pathological behavior observed on the market. We proposed the logistic regression model which is used to estimate the probability of a binary response based on one or more independent variables. The dependent variable identifying the acceptance of pathological behavior has been distributed into three separate models based on the questions derived from the survey. As a set of independent variables we used indices defining social values. In addition, we checked if the categorical variable "gender" has significant impact as well. Within the study raises a series of hypotheses verifying the relationship between social values and the attitude toward pathological behavior of consumers on the market. As we have already found at the first stage of the analysis, most of the hypotheses were positively verified (in terms of Pearson correlation coefficient). Both univariate and multivariate logistic regression models confirmed this initial results. In the end, we confirmed hypotheses about universalism (H1), benevolence (H2), conformity (H3), tradition (H4), security (H5) and achievements (H7). Those that could not be verified are related to power (H6), hedonism (H8) and stimulation (H9). The relation between self-direction and the attitude of respondent towards consumers' pathological behavior has been verified partially.

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Role of Social Values in Determining the Attitudes Toward Consumers' Pathological Behavior on Market – Model-Based Approach

Attitudes towards pathological behavior of consumers might be created by many factors. One of the most important factors are social values being conducive to create certain attitudes towards consumers' pathological behavior. The paper attempts to define the relationship between social values and consumers' attitude towards pathology in market behavior. Using a model approach we proposed analytical tools that might help to determine theoretical construct which could allow one to forecast probability of pathology acceptance in consumers' behavior based on the social values represented by the consumer. We used logistic regression model which allows one to define social values discriminating consumers in terms of their attitudes towards pathological behavior.

Rola wartości społecznych w kształtowaniu postaw wobec zachowań patologicznych konsumentów – podejście modelowe

Postawy wobec zachowań patologicznych konsumentów mogą być kształtowane przez wiele czynników. Do jednych z najważniejszych można zaliczyć wartości społeczne, których występowanie sprzyja (bądź nie) kreowaniu określonych postaw wobec takich zachowań. W pracy podjęto próbę określenia relacji między wartościami społecznymi konsumentów a ich postawami wobec patologii w zachowaniach rynkowych. Wykorzystując podejście modelowe, zaproponowano narzędzie analityczne, które umożliwia określenie konstruktu pozwalającego prognozować prawdopodobieństwo wystąpienia określonych postaw wobec patologii na podstawie wartości społecznych reprezentowanych przez konsumenta. Wykorzystano model regresji logistycznej, który umożliwia jednoznaczne określenie wartości społecznych dyskryminujących konsumentów w kontekście ich postaw wobec zachowań patologicznych.