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MARKETING IN SOCIAL INNOVATIONS TARGETED AT HEALTHCARE

Abstract. *The paper deals with the implementation of marketing in social innovations, types of marketing, and the effects they can bring in the sphere of social innovations. The principal aim of the paper is to explain the possibilities of marketing approach implementation in social innovations and point out some specific areas of marketing which can contribute to more efficient applicability of social innovations and reaching a desirable change with social added value. The authors focused on the sphere of health and the population attitudes to its protection, emphasizing breast carcinoma prevention. The research was implemented on a sample of Slovak women to identify the level of women's awareness of this issue, whether they are familiar with the methods of protecting their health and whether they use them. This study involved the methods of cluster analysis and binary logistic regression. The research uncovered the facts that are truly alarming from the perspective of societal benefit and women's health protection. The respondents' insufficient awareness and low activity in the field of their health protection result in the low level of prevention in this area on the side of women and on the side of medical doctors – specialists, particularly gynecologists. Such a situation includes the women's insufficient awareness of prevention, low motivation, insufficient accessibility and validity of the needed data and precision, and doctor specialists' lack of awareness of the possibilities and tools available to improve this area. That is exactly the space allowing for the use of marketing in a whole spectrum of its tools and processes and specific solutions capable of delivering the desired societal change and influencing women's behavior in the preferred direction. Besides, it is especially effective to implement social marketing and social marketing programs that would mediate necessary information to the receivers and stimulate their motivation towards the desired approach to their health protection. The use of neuromarketing would be beneficial. It would be reflected in the better accuracy of the survey and thus the higher quality of the answers obtained. Based on them, it is subsequently possible to create better-targeted campaigns and strategies of social marketing that would approach the target audience more effectively than in acquiring the information via traditional marketing research methods. The findings would benefit marketing agencies, medical doctors (gynecologists, mammologists), and non-profit organizations actively working in this field.*

Keywords: innovations, innovative solutions, neuromarketing, social benefits, socially desirable behavior, social marketing, social problems.

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Introduction. From ancient times people have been dealing with the search for solutions to numerous social questions troubling the society in a long-time perspective. There are the issues of poverty, environment, and health protection. Nowadays, the most frequently discussed issues include lifestyle diseases such as cardiovascular diseases, tumorous diseases, diabetes, obesity, air-passages diseases, mental and nervous system diseases, allergy, and HIV/AIDS. A group of particular significance is constituted by tumorous diseases, the occurrence of which is alarming lately. Breast carcinoma belongs the most frequent among these diseases. The causes of breast carcinoma origination have not been clearly explained yet. However, the risk factors are known. Bella (2005) ranked the risk factors of breast carcinoma origination into two groups: 1) uninfluenceable (predisposition) – age, tumorous disease in the family, benign tumor, menopause, and 2) influenceable – obesity, alcohol consumption, physical activity, hormonal treatment, socio-economic condition, geographical position.

There is a significant space for their elimination through adequate awareness, education, and motivation to their prevention in the sphere of influenceable risk factors. It is for this purpose that a new area of marketing came into being, called social marketing. Social marketing does not concentrate on classical marketing goals such as sales increase, product design improvement, reduction of costs. It focuses on foregrounding social problems and their elimination, implementing analogous tools, methods, and techniques of commercial marketing, thus influencing the attitudes, opinions, and thinking of individuals, lawgivers, and the whole social groups.

Traditional marketing methods still have their justification. Nevertheless, they can tell much less than other marketing approaches. Because of the sensitiveness of the topic and its highly ethical dimension, for researchers such as marketers, it is often very demanding to gain precise information of necessary quantity and quality. This shortcoming could be eliminated by substituting the traditional marketing research methods with the marketing discipline's research techniques labeled as neuromarketing. Neuromarketing is a new area of marketing exploring people's reactions to individual marketing stimuli via brain activity monitoring. It offers new ways of examination with the potential to obtain information hidden in the human mind, inaccessible until recently. Physiological and brain reactions may help identify the processes which form the base of behavior, such as excitement, reward, or attention. Lately, there has been a lot of effort made to understand human knowledge and behavior more deeply. That facilitated the origination of synergy between biological and social sciences. The common research efforts of both biological and social scientists assisted in supporting great progress in various social, behavioral, biological, and managerial sciences. Neuroeconomics and neurological sciences about decision-making mediated valuable theoretical knowledge on human decision-making that considers individual choices and a neural mechanism that lays the basis for these choices (Shiv and Yoon, 2012).

Compared to the available classical alternatives, both marketing approaches may bring better solutions to societal problems (i.e., more efficient, more effective, better sustainable, and more just). They can satisfy urgent social or societal needs (including health protection), simultaneously creating new societal relations and cooperation in social development. Thus, there is about social innovations, which at the same time are societal ones. They involve elements of a systemic change, have a societal impact, and carry high societal value.

Literature Review. The increased dynamics of societal processes demand innovative approaches and ways of handling the current social issues, which exceed the frameworks of usual patterns of thinking and acting. The focus of attention is shifting to the topic of social innovations. New organizations, tools, and strategies are being created. They form and spread awareness of the desired change, highlight the promoted ideas, and elicit the public's concern. The social dimension has acquired a new aspect deriving from the new dynamics of the surroundings and from the knowledge that social changes constitute an indivisible part of the societal development dynamics. If the social change is permanent, there is a need for an adaptation strategy in the form of social innovation. Social innovations represent innovative solutions

to social problems, offering new answers to topical questions, people's problems, or living conditions. The most effective socially innovative solutions incorporate perspectives from both the private and the public sectors (Diaz-Ruiz et al., 2018).

The definitions and issues of handling social innovations are being approached differently by authors, depending on the area they target and apply social innovations. One group of authors perceives social innovations as new initiatives to resolve the social needs of a society (Mumford, 2002; Phills et al., 2008; Pol and Ville, 2010). Forms of participation, relations, and praxis in the field of social innovations are being dealt with by Howaldt and Schwarz (2010) or Cajaiba-Santana (2014). An institutional and systematic approach to social innovations is being applied, for instance, by Westley and Antadze (2010) or van Wijk et al. (2019).

Lubelcova (2011) noted the key definition criteria include orientation at unsatisfied needs or people's social problems, innovative nature of approach which brings positive social change (behavior change, attitudes, social impacts), and creation of added social value (synergic social effect on the quality of social relations). Mulgan et al. (2007) defined social innovations as new ideas based on the innovative connections of until-recently separated elements operating in practice in the process of reaching social goals. That differentiates innovation from improvement (which brings only a partial contributive change) and from creativity or invention, which may be vitally important for innovation but do not incorporate application, launching in practice, which is a criterion of a new idea's usability. Thus, the term innovation does not mean only a new idea, a thought, but also its practical application. Authors Lessem and Schieffer (2008) contemplated the delimitation of social innovation and social research strategies that could stimulate social innovations. Hautamaki (2010) talked about sustainable innovation, which he specified as innovative activities based on ethically, socially, economically, and ecologically sustainable principles. This approach combines opportunities related to the sustainable development of practice with the new prospects of innovative activities and management. Institutionalized conditions are also being explored by other authors who view social innovations as changes in the institutional configuration of reproduction activities of the society (Hamalainen and Heiskala, 2007).

The main areas of social innovations are believed to incorporate especially:

- population's health;
- education and potential human development;
- social mobility and inclusion;
- services in unemployment;
- support of entrepreneurship;
- living environment and regional development;
- culture, creativity, development of communities;
- effective public administration;
- development of technologies;
- quality of life and financial literacy.

The fundamental areas of the current innovation deficit and, simultaneously, the greatest opportunities for new creative solutions are in the view of Mulgan et al. (2007) represented by:

- growing average life expectancy (a challenge for pension schemes and their reforms, new forms of both health and social care);
- increasing social diversity and differentiation (prevention of social segregation and social conflict);
- growth of social inequality both between and inside of societies (risks of social distance and social exclusion);
- increase of chronic diseases frequency (new models of medical support);
- behavioral problems of excess (obesity, diets, lack of movement, addictions);

- problems of transition into adulthood (the process of young people maturing and problems of their life prospects);
- happiness in life (the discrepancy between economic growth and falling level of social welfare and between consumerism and feeling of satisfaction).

As has already been mentioned, an idea's novelty is not the only criterion for defining social innovations, but there is also its application in practice. Implementing new approaches to solving social problems is a specifically demanding process that is exposed to a broader range of barriers compared to technical and technological innovations. Innovations serve as generators of the processes of a desired social change. Mulgan (2006) pointed out that implementing innovations. It is necessary to bear in mind the following potential barriers:

- the risk of decreasing effectiveness and efficiency;
- the risk of human interests;
- the risk of thinking;
- the risk of relations network.

The listed barriers to innovations, however, may operate as supporters and stimulators of change too. Particularly the awareness of the low effectiveness or efficiency of the habitual ways of dealing with social problems may generate the need for change. The growth of interests of the agents of change may facilitate the fall of trust in the customary forms of solutions and trigger the search for alternatives. Social innovation initiatives can be regarded as transformation in complex adaptive systems, shifting the institutional and structural dimension of the systems and generating resilience (Westley, 2008). These initiatives can take multiple forms: a product, process, services, policy, or market mechanism (Dawson and Daniel, 2010).

At present social innovations as new ideas and solutions can be found in various spheres, and the same applies to the variety of approaches to their implementation. Quite often, they could be in healthcare (van Niekerk et al., 2020, 2021; Srinivas et al., 2020; Mason et al., 2015; Cheema et al., 2019; Awor et al., 2020) or related to food safety (Huang and Tsai, 2021). The topic of social innovations within the issue of prevention is being dealt with by Castro–Arroyave et al. (2020), McCarthy et al. (2013), Grindell et al. (2019), Ghiga et al. (2020). Nevertheless, it is not easy to motivate and persuade target groups to act and solve social problems. To accomplish a vision of general societal importance requires a procedure of the process planning, constituted by the target groups research, determination of the strategy/strategies to achieve social goals, and finally, evaluation of the implemented processes. The efficiency of such a tool as marketing in promoting societally and socially desirable changes and behavior of target groups has already been understood and acknowledged. The marketing approach utilized in entrepreneurship is being used in carrying social innovations (Mura and Orlikova, 2016) through societally/socially desirable change of behavior in different areas of life and society for approximately 50 years now. Gradually, a new type of marketing originated labeled as social marketing which denotes organized efforts managed by a group that draws knowledge from the traditional marketing procedures to persuade target groups to adopt a particular behavior or to give one up. Achieving the wished-for change in thinking, attitudes, practice, or social behavior adds new tools and characteristics for social marketing to the standard ones. Besides, with the help of their combination, it handles a very complex desirable societal change with economic and/or political content, often in limited circumstances. Literary sources offer several definitions of social marketing and point out the opportunities of its utilization in different areas. In the beginning, it was its closeness to traditional marketing which was being emphasized. Andreasen (2006) claimed that in the 1970s, i.e., in its early years, social marketing was using the knowledge, concepts, and techniques of marketing to reach social and economic goals. It also dealt with the analyses of social consequences, marketing strategies, decisions, and activities.

The resemblance to traditional marketing is being discussed by other authors too. However, they emphasize its distinguishing features related to the focus, efforts, and effects of social marketing compared

to traditional marketing. Thus, Kotler and Roberto (1989) considered social marketing to be an organized effort led by one group which intends to convince others to adopt, change, or give up specific ideas, attitudes, practices, or behavior. Further on, they maintain that social marketing is a strategy designed to change behaviors. It combines the best traditional approaches elements to social change in integrated planning and carrying out activities. It employs the progress in communication technologies and marketing experience. Then, it uses marketing segmentation concepts, consumer research, product development and testing, controlled communication. Besides, it draws on the theory to provide for as big a target audience response as possible. The similarity between traditional and social marketing rests solely in tools and procedures, not in the purpose on which both marketing approaches concentrate. In reaction to this statement, in 2002, Andreasen formulated six points in which social marketing differs from classical marketing. In turn, it is appropriate to highlight the ideas as follows:

1. The ultimate purpose of social marketing is the change of people's behavior. It does not persuade them to buy a product or a service but to change behavior, while the target group often does not gain any clear profit from the change. Moreover, those who are targeted by the campaign are often not the ones who benefit from it.

2. To study the target audience in social marketing, the research, pre-tests, and monitoring are being done on a much broader scale than in traditional marketing.

3. To ensure maximum effectiveness of a marketing campaign, the audience is being «carefully segmented». Instead of unclear «segments», the terminology of stakeholders is preferred here. It is a group of persons, institutions, and organizations concerned with socially desirable behavior (e.g., doctors, family, healthy food producers, medicaments, and the state).

4. The main element of an efficient social marketing strategy is creating an attractive and motivating exchange for the target audience.

5. Social marketing is not concentrated on the activities from the viewpoint of benefits for sellers but the tasks directed at society.

6. The procedures aimed at achieving the desired behavior are examined in detail, unlike in commercial marketing, where producers engage in research only to increase their market share or monitor their competitors' activities.

In 2013 the International Social Marketing Association (ISMA) specified and expanded social marketing definition by the dimensions of effectiveness, efficiency, equitability, and sustainability (ISMA, 2014).

According to Lee and Kotler, social marketing is about:

- a) influencing behavior change;
- b) utilizing a systematic planning process that applies marketing principles and techniques;
- c) focusing on priority audience segments;
- d) delivering positive benefits for individuals and society (Lee and Kotler, 2020).

Social marketing is much more complex than the traditional one. Unlike traditional marketing, its social counterpart is to change deeply rooted opinions and attitudes, often with very limited resources. Moreover, to achieve its goals, it needs a much longer time than traditional marketing. Changing habits usually takes several years. Thus, adapting to the characteristics of the target groups is usually complicated. Another factor determining the complexity of social marketing is the correctness or incorrectness of the decision concerning the choice of strategy. It means that the decision, e.g., on selecting education, does not have to be sufficient to change a particular behavior.

Social marketing is a distinct marketing discipline that has been labeled as such since the early 1970s. The first social campaigns were taking place without prior creation of a social marketing program. Social marketing campaigns are still being employed while the content of social changes and their intensity is changing. Early efforts to adopt social marketing approaches were focused on family planning, tobacco,

HIV/AIDS. Noe, they include additional efforts to public health, prevent injuries, protect the environment, contribute to communities. In turn, more recently, they have enhanced financial well-being (Lee and Kotler, 2020). Social marketing is a relatively frequently implemented tool and approach in health, its protection, and other related topics. As has already been mentioned, the first campaigns focused on the struggle against smoking or HIV/AIDS. At present, they are being used in principle in any context relating to health where the most resonant issues lately involve healthy diet (Fergus et al., 2021; Mostafavi et al., 2021), mental health (Potts and Henderson, 2021), seniors' health (Yasumoto and Gondo, 2021), or the issue of prescription drugs (Machowska et al., 2021). Equally so, the current pandemic of COVID-19 required the implementation of innovative marketing techniques and social marketing techniques (Svec and Mura, 2020; Evans and French, 2021).

The sensitivity of social themes as well as the nature of social marketing itself, especially the need for available valid data for precise segmentation of social marketing programs target groups, calls for innovative solutions and procedures capable of bringing the desired change of behavior and added value in the shape of favorable social adaptation to the results of the innovative social approach. One of such solutions is the use of neuromarketing metrics. The potential of a w information on consumer behavior acquired by neuromarketing methods represents an interesting contribution to the marketing practice in social marketing. Neuromarketing is a young and attractive discipline interconnecting the knowledge of neuroscience with marketing research. Owing to the exploration of the consumer's brain and mind, it can uncover his/her needs, opinions, preferences, which elements s/he likes and, on the contrary, which elements s/he does not like and which elicit in him the feelings of fear and distrust. (Morin, 2011) Neuromarketing offers new approaches. Notably, if they get incorporated into other methodologies, they may lead to very interesting effects and may broaden the results of marketing strategies in social campaigns in various segments. Organizations could be encouraged to develop the sphere of social marketing using neuro-imaging techniques to develop successful social campaigns, select distribution channels, and price or communication decisions closely related to this kind of work.

Neuromarketing research is not widely spread in the investigated region because of the involved high expenses for its application, the insufficient awareness of creators of marketing campaigns, and individuals themselves. Neuromarketing was described as a field of research (Murphy et al., 2008), an area of study (Lee et al., 2007; Eser et al., 2011), a branch of applied neuroscience like, e.g., neuro-economics, neuro- psychology, neuro-business, consumer neuro-science (Perrachione and Perrachione, 2008), a part of marketing (Fisher et al., 2010), mutual interconnection of the systems of perception (Butler, 2008), scientific approach (Senior and Lee, 2008), sub-branch of neuro-economics (Hubert and Kenning, 2008). As for neuro-marketing, some authors viewed it in the first place as a means of gaining scientific knowledge (Lee et al., 2007; Murphy et al., 2008; Fisher et al., 2010; Butler, 2008), while others rather consider it to be a potential tool of commercial marketing (Perrachione and Perrachione, 2008; Hubert and Kenning, 2008; Fugate, 2007). Neuromarketing occupies a significant position in marketing studies and social campaigns. Eser et al. (2011) suggested that neuromarketing uses the latest resources when scanning a consumer's brain to understand the process of purchasing. Schneider and Woolgar (2012) claim that neuromarketing is the latest medium employed by marketing scientists to understand the consumer's behavior in buying itself and during the campaigns' influence. Understanding consumer behavior is the most frequently mentioned purpose occurring in the studied literature.

Neuromarketing is constituted by a group of techniques trying to identify the parts of the brain which are being activated during marketing stimulus and the cognitive processes occurring in those areas and various other related biological markers. Other possible applications of neuromarketing include developing more efficient social campaigns, such as the promotion of using safety belts in cars or giving up smoking (Orzan et al., 2012). Lee et al. (2007) stated that it is very difficult for individuals to express their feelings and other subjective factors. Furthermore, individuals usually cannot explain the origin or the reason of a

particular behavior (Hubert and Kenning, 2008) because emotions are relatively complex. They often do not fully realize the reasons for their actions themselves. An individual does not even have to be aware of having experienced a certain emotion (Murphy et al., 2008). The inability of self-assessment is not the only problem the research in social marketing is faced with. Individuals sometimes are not willing to participate in research which often poses a fundamental problem. There is also a tendency of individuals to transfer incorrect information in case of a highly sensitive topic or feel the need for acceptance from society (Hubert and Kenning, 2008). The obtained answers are not genuine. The respondent consciously filters them before they are recorded (Hubert and Kenning, 2008). Neuromarketing embodies an opportunity to overcome these obstacles since the research participants have no control over the collected information (Butler, 2008; Hubert and Kenning, 2008; Fugate, 2007). In a sense, they become mere instruments that mediate gaining the information for further process. Depending on the sensitiveness of the topic, neuromarketing tools allow obtaining more precise and better-targeted information than could be gained through classical marketing research. Therefore, the approach could be directed to better suit the target group in social marketing campaigns.

The human brain contains more than 100 billion neurons forming various connections. These connections encode everything we do and everything we know. The brain operates as a dual-core processor where the left hemisphere is a center for routine activities, including speaking. In turn, the right hemisphere specializes in new situations and creative solutions. Within the context of neurology, the brain has been examined for a long time. Numerous studies proved that modern EEG devices could predict consumers' behavior with a probability of over 87%. EEG identified specific brain areas (Cp3, Cpz, Fp1) (Lewis, 2005). In turn, consumers' behavior can be predicted based on them. In theory, developing such products or marketing campaigns could be possible to meet customers' expectations.

Neuromarketing methods enable researchers to collect signals and interpret psychological processes in the brain. At the same time, people carry out specific tasks or experience marketing stimuli to illuminate the connection between human behavior and the nervous system. Furthermore, it is possible to employ automatic technologies to predict customer's preferences, provided that the technology is appropriate for marketing purposes in creating social campaigns. It is realized that intimacy and trust may pose severe obstacles in topics as breast cancer in women. However, social campaigns could be appropriately set, thus improving behavior towards a socially desirable change. Especially trust and precision of information can be achieved by appropriate neuromarketing research. The following part will describe basic neuromarketing methods that could be appropriately utilized in setting campaigns in social marketing. They are presented in order from the least invasive the patterns of towards respondents – monitoring biometric reactions, including eye-tracking, electroencephalograph (EEG), and brain activity imaging with the help of functional magnetic resonance (fMRI). The information obtained from the biometric responses may be more reliable in social marketing than questionnaires liable to higher error rates. Authors classified the instruments types applied in neuromarketing research into instruments recording metabolical activity, those recording electric activity in the brain, and finally, instruments that do not record electric activity in the brain. Eye-tracking is the least invasive method that could be applied in social marketing research. The device used to track the direction of respondents' looks could measure the changes in pupil size. Modern eye-tracking devices use specialized sensors to identify the direction of looking based on the patterns of infra-red light reflected by the cornea during common moves of the eyes (Podlesek et al., 2021). Those sensors can be placed on a tabletop or in a pair of specialized spectacles, which enable mobile eye-tracking outside of the laboratory (Farris et al., 2016). The basic precondition of eye-tracking is that an individual visually and mentally processes all impulses directed by his/her eyes. Eye-tracking appears to be a suitable tool for the evaluation of visual attention. The device is easily transportable and yields information in real-time (Jung et al., 2021). Employing eye-tracking, researchers can find out which properties of marketing materials and information on campaigns are the most significant and in such a

way draw the attention of target groups. They may help understand how consumers process information and on what conditions all available information can be utilized. This method might be applied directly in outpatient clinic units, in direct contact with the patient, with an opportunity to see his/her reactions to visual impulses.

Electroencephalography, known as EEG, is a more invasive method than eye-tracking. Nevertheless, from the viewpoint of the quantity of available valid data, it is more valuable for the implementation in social marketing. EEG measures the cortical activation of consumers via detection of the cortical electric activity with the help of an electroencephalogram with electrodes placed along the surface of an individual's head skin (Aldayel et al., 2020). EEG can only detect surface cortical activity, but the EEG signal possesses a high time definition in milliseconds, making it possible to accurately detect changes in brain activity due to fast stimuli changes (Holler, 2021). EEG has been implemented in the studies concentrated on marketing stimuli to measure various aspects of consumers' answers, such as their engagement in a given topic or the work-out of advertising campaigns. The left part of the frontal cerebral cortex is one of the components of the circuit involved in experiencing positive emotions, which leads to the tendency to approach the stimuli perceived as preferable. The corresponding area on the right side is a significant component of the circuit engaged in processing negative emotions. In contrast to eye-tracking, this method extends the working field by the area of emotional evaluation. The first method of eye-tracking could visually determine the sphere of interest. However, it could not accurately specify if it elicits a respondent's positive or negative reaction. In this respect, the EEG method is beneficial since it can identify whether the stimulus is positive or negative, which may be further utilized in the correct evaluation of social campaigns.

From the viewpoint of gaining a large amount of data, the most advantageous method that can be selected to apply neuromarketing in social marketing is fMRI – functional magnetic resonance imaging. The fMRI device measures the magnetic properties of hemoglobin (the component of red blood cells, which transports oxygen throughout the body). The device measures the amount of oxygenated blood in the whole brain. It can accurately mark the area of 1 millimeter since a brain analyzing a task uses more oxygen and glucose (Kiran and Prabhakar, 2020). If a particular brain area is working during fMRI measuring, it will be illuminated in the image created by the device. This device is being employed in diagnosing tumors, brain stroke, and the defects of neural connections and other diseases. That is why its secondary implementation for social marketing purposes in the search for reasons why respondents refuse to come to preventive health checks may become a true solution to the problem. An advantage of the fMRI device is recording reactions immediately in real-time. It evaluates if the emotion is positive or negative. Besides, it can even measure the intensity of that emotion (Sankar, 2021). However, the price of such a device may constitute the biggest problem in social marketing research. There is no better way of obtaining trustworthy information in the necessary amount and, especially, quality.

Because the object of neuromarketing's exploration is an individual him/herself, doing this kind of research is inevitable to consider the individual's rights and privacy. Social marketing allows reaching the borderline of what the respondent wants to tell. In classical inquiry, the respondent may refrain from verbalizing certain motives, and in the final account, it may distort the research as a whole. Under the influence of neuromarketing methods autonomy, the respondent loses control over what she/he wants to say. Thank these devices, researchers gain maximum overview concerning the respondent and, through that, also clear data without distortion. Neuromarketing methods can eliminate all of these lapses of will or non-cooperation of respondents and offer researchers data without distortion.

The use of scientific technologies to support the social marketing activities, of course, is not a problem in its essence but the use of the technology which examines the internal work of the human brain, mainly if it goes beyond the scope of what could be uncovered by the traditional research of behavior, evokes considerable worries (ethical problems and dilemmas). These problems fall into two main categories as follows:

- protection of various sides which may be hurt or abused by neuromarketing;
- protection of consumers' autonomy (Murphy et al., 2008).

In the subconsciousness of some people, neuromarketing evokes disturbing questions concerning the measure to which advertising agencies, marketing researchers, and their corporate clients should have an opportunity to interfere with the privacy of consumers, patients, respondents. The assumed power will give them a chance to manipulate their decision-making on their health condition (Lewis, 2005).

To maintain the balance between potential discoveries and moral persuasions, it is inevitable to establish a neuro-ethical approach that would incorporate micro- and non-invasive equipment. Among the fundamental directions and standards that will necessarily have to be observed while conducting certain research, there is voluntary consent of the research participants, an opportunity for research participants to quit/cancel participation before or during the research, observance of human rights of the research subjects. Consumers/the target public are concerned with three main spheres of interest concerning the use of their data by companies:

- transparency;
- safety;
- responsibility.

Consumers and individuals at the same time need a particular depth of understanding of the data collection process and certain perceived control over manipulation with their data to be able to deal with the issues of privacy protection effectively. That is why the argument is still growing, claiming that a new scientific boundary in neuromarketing must be protecting human dignity and integrity, guarding the privacy and autonomy of consumers, and protecting the vulnerable groups of population such as children or seniors. To soothing the worries, neuromarketing can follow the projects that may bring benefits to consumers. For example, continuous monitoring in real-time, mediated by portable nano-devices, might offer better understanding and treatments to some compulsive behaviors, such as addiction to shopping, smoking, alcohol, gambling. Such solutions can identify the reasons for low participation in preventive health checks and will help to propose the right method to improve this trend. The experiments with neuromarketing must respect the universal ethical rules set by the Declaration of Helsinki (WMA), which would guarantee any need for well-being or any advantage of the knowledge that can derive from them.

Methodology and research methods. Among the most serious topics with societal impact, there are oncological diseases, including breast carcinoma and the expansion of this disease. This negative trend relates to Slovak women too. Despite the increased number of campaigns aimed at supporting prevention, the development of breast carcinoma has an increasing tendency. While in 2004, the number of its new cases was 2121, in 2020, the limit exceeded 3000 cases. However, the biggest problem is not the incidence itself but mortality. The high mortality is conditioned by late diagnosing of the disease connected with the low participation in preventive health checks (European Commission, 2020). The awareness, motivation, and activities connected with them are negligible in this area in Slovakia. It is relevant to research that is missing in the first place, related to indicators other than those immediately connected with the disease and incorporate awareness, motivation, understanding, attitudes, etc. Equally absent are the referring initiatives such as educational and informational activities that might reverse or improve the current situation. This study proposed recommendations for the prepared marketing programs to achieve the desired and sustainable social change.

The paper's main goal is to illuminate the possibilities of marketing approach implementation in the social innovations concerning the health sphere, point out some specific marketing areas that may contribute to more efficient social innovations, and reach the desired change with a social added value. The main goal was specified in several partial goals as follows:

- 1) to define the key areas and the approaches/procedures within them to reach social changes which will be subjected to this examination;

- 2) to create a database of knowledge in the key areas;
- 3) to gain an overview of the current situation in the sphere of attitudes and behavior of women concerning breast carcinoma and its prevention;
- 4) to find possibilities to eliminate the discovered shortcomings in the form of a procedure proposal that will make it possible to achieve a socially desirable change of women's behavior.

Social innovations were defined as a key area because they are outputs of socially desirable changes. Two marketing approaches were defined as appropriate procedures to reach such changes: 1) traditional marketing in social marketing and 2) innovative marketing in the shape of neuromarketing metrics with partial overlap with nano-marketing.

Subsequently, the given areas and approaches were described, focusing on that part of available literary resources relevant to the topic and contained substantial elements of these areas (definitions, development, applicability). It granted a space large enough for both the proposal and argumentation parts. To identify the actual condition and situation in the target groups' behavior concerning breast carcinoma and its prevention, research aimed at identifying the attitudes, awareness, motivation of the researched women, especially concerning the prevention of this disease. The research was conducted in cooperation with the Healthy Woman foundation on a sample of 377 women. To process and evaluate the results, cluster and binary logistic regression were used. The results were processed in the SPSS program. Figure 1 and Figure 2 show the results of the cluster analysis from this program.

Cluster analysis divided respondents into groups as homogenous as possible. Ward's method of clustering proved to be the most appropriate. It belongs among the hierarchical methods of clustering, and it is trying to optimize the loss of information that may occur by uniting two clusters (Kaya et al., 2017). First, each element is independent, and then step by step. More elements were ordered to a cluster. The appropriateness of this method was also underlined by Hands and Everitt (Eszergar-Kiss and Caesar, 2017). Subsequently, binary logistic regression determined the significance of individual factors influencing the frequency of women' appointments for the mammography/ultrasound examination. In statistics, binary logistic regression analysis is a regression model where the dependent variable is a dichotomous categorical variable. A binary logistic model is being implemented to estimate the probability of binary reaction based on one or more independent variables. Binary logistic regression uses one or more predictor variables which may be continuous, ordinal, or categorical (Kılıç, 2015).

The research results demonstrated the unfavorable situation in the sphere of breast carcinoma prevention and certain limits of such research, such as the topic's sensitiveness for young women. The study conceived here several ideas. Implementing them can bring improvements and effects in favor of achieving sustainable social change in the form of information, positive attitudes, higher motivation, and especially the implementation of socially desirable behavior, i. e. increase in the number of women undergoing regular preventive check-ups.

Results. Cluster analysis provided information about the distribution of respondents into individual clusters and the basic characteristics of each cluster. The decisive questions for the distribution focused on the responsibility and prevention of the respondents. The model incorporated the following questions:

1. Do you do the breast self-examination?
2. Do you regularly go to ultrasound or mammography examinations?
3. Do you regularly go to preventive gynecological checks?

The respondents who did not answer one or more questions were excluded from the model. To create a dendrogram using more methods and in such a way to test their suitability, the appropriateness of individual models was verified. The best results were obtained using the Ward method. The propriety of combining the Ward method with the Euclidean distance is confirmed by the research of Wang and Phan (2020). Applying the Ward method, the result of the program processing is 7 clusters, which shows a graph of the clustering coefficient, where the increase occurred only at the value 370 (Figure 1).

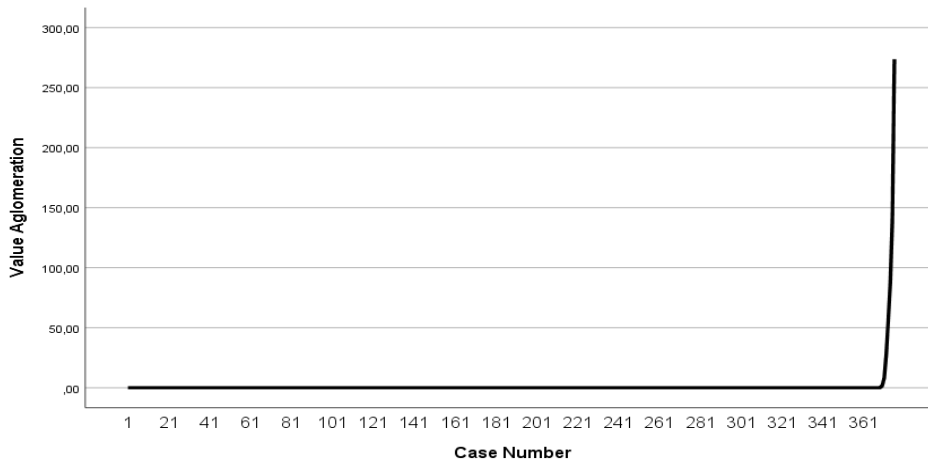


Figure 1. Clustering coefficient

Sources: developed by the authors.

Having selected the Ward method, the average values of newly formed clusters were monitored to formulate the results.

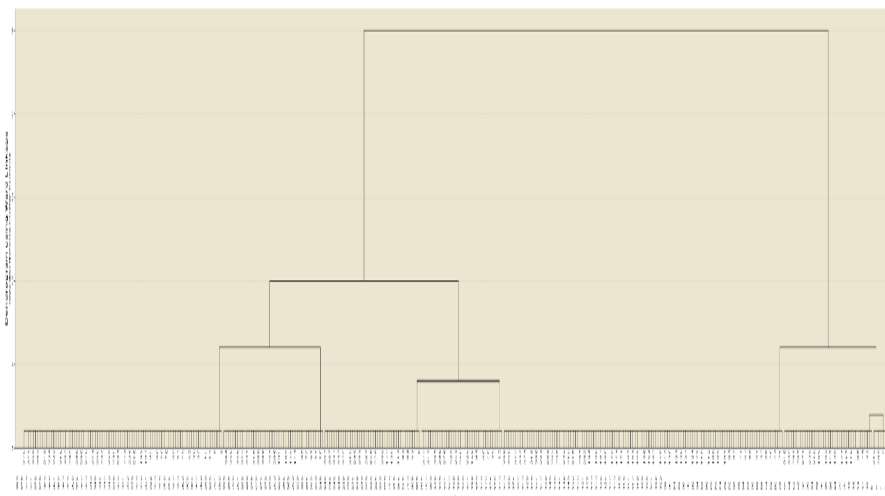


Figure 2. Dendrogram by using Ward method

Sources: developed by the authors.

Table 1. Cluster 1

Cluster 1	X1	X2	X3
Average	0	0	0

Sources: developed by the authors.

The first cluster incorporated 87 responses (23.1%). Thus, it is a dominant group in the set. Cluster 1 represents a risk group of respondents who are not monitored.

Table 2. Cluster 2

Cluster 2	X1	X2	X3
Average	1	0	0

Sources: developed by the authors.

The second cluster included 44 respondents (11.7%). The group is created by respondents who only do regular self-examinations. In their case, education related to the implementation of self-check is important to identify a problem in the early phase.

Table 3. Cluster 3

Cluster 3	X1	X2	X3
Average	0,04	0,85	1

Sources: developed by the authors.

In the third cluster, 46 respondents were placed (12.2%). Cluster 3 represents respondents who regularly go to gynecological examinations and undergo ultrasound/mammography exams. The majority of these respondents do not do breast self-examination.

Table 4. Cluster 4

Cluster 4	X1	X2	X3
Average	1	1	0

Sources: developed by the authors.

The fourth cluster incorporated 64 respondents who do self-checks and regularly go to gynecological examinations. These respondents cannot be labeled as monitored since 69% do not undergo breast examination by the gynecologist.

Table 5. Cluster 5

Cluster 5	X1	X2	X3
Average	0	1	0

Sources: developed by the authors.

The fifth cluster was formed by 36 respondents (9.6%) out of 377 ranked respondents. It is composed of respondents who only go to the gynecologist for usual checks. The problem of respondents in cluster 5 is that only 31% undergo breast examination by a gynecologist.

Table 6. Cluster 6

Cluster 6	X1	X2	X3
Average	1	1	1

Sources: developed by the authors.

The sixth cluster consists of 122 respondents (32.4%). Cluster 6 can be labeled as «exemplary responsible» respondents, and as a part of early diagnostics, they do maximum to prevent breast carcinoma. Cluster analysis resulted in interesting outcomes. The crucial finding is that almost a quarter

of respondents is not monitored. This number justifies the implementation of social campaigns on the importance of prevention. Another critical group is the second cluster which contains respondents who are only monitored via self-examination. It would be suitable to create a corresponding social marketing program for these respondents as a prevention component.

The study employed logistic regression to analyze significant relations, which manifested the relationship between the binary dependent and categorical independent variables. The question represents a dependent variable entering the model: Do you regularly go to the ultrasound and/or mammography examinations?

Table 7. Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	9,588	6	0,143

Sources: developed by the authors.

Hosmer and Lemeshow test confirmed the appropriateness of the input data and model. The p-value is higher than 0.05.

Table 8. Appropriateness of the model

Model Summary	Cox & Snell R Square
	0,466

Sources: developed by the authors.

The lower value of variability of the dependent variable 0.466 does not indicate the inappropriateness of the model. It manifests the presence of other factors and arbitrary influences.

Table 9. Estimate of logistic regression parameters

Legend	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Do you regularly go to preventive gynecological checks? (1)								
Education			39,271	2	0,000			
Education (1)	1,454	0,380	14,665	1	0,000	4,282	2,034	9,015
Education (2)	2,834	0,452	39,267	1	0,000	17,01	7,011	41,27
Does your gynecologist examine your breast? (1)								
Constant	-1,395	0,345	16,331	1	0,000	0,248	2,152	7,097

Sources: developed by the authors.

The results (Table 9) indicated that the parameters are statistically significant because the p-value equals 0,000 in all cases. The respondents, who regularly go to see their gynecologist, have a 0.035 times higher chance of regularly going to ultrasound or mammography exam. This result points out the low frequency of gynecologists' breast examinations, which was also demonstrated by the result of the cluster

analysis. Women with secondary education have a 4.282 times higher chance of regular ultrasound/mammography exams than respondents with basic education. Among respondents with tertiary education, the chance to go to regular ultrasound/mammography examinations is 17.010 times higher than respondents with basic education. A significant factor is also whether the gynecologist carries out breast examination. Suppose a respondent comes to see a gynecologist, and she checks her breast. In that case, the respondent's probability of going to regular mammography/ultrasound exams is 3.908 times higher, emphasizing the important role of gynecologists in preventing breast carcinoma. Despite the relevant results, it would be suitable to complement the traditional quantitative research in such sensitive and societally meaningful topics by neuromarketing. The afore-mentioned sensitiveness of the topic is a limitation of the given area. It became apparent even in the respondents' answers to numerous questions, e.g., Do you regularly go to preventive gynecological checks? Does your gynecologist examine your breasts? Respondents find it difficult to answer more personal questions, and they often refrain from responding to them. It is a substantial problem not merely from quantity but especially the quality of the achieved results and their validity. Application of neuromarketing and its metrics in combination with social marketing program will probably be a beneficial and efficient approach to reaching a desirable social change in the shape of social innovation, which will add value in the sense of long-term sustainable change of behavior. It will require the following procedure.

1. To create an ethical framework for neuromarketing research which will rest in determining an adequate way of working with respondents and its implementation. The following algorithm may constitute the ethical approach:

- a) familiarisation with legislation in the researched area;
- b) informing respondents on the goals and risks of the research;
- c) obtaining informed consent from the respondents;
- d) collecting and evaluating the data gained by neuromarketing metrics;
- e) protecting the data and privacy of respondents during the whole process of neuromarketing research.

2. Based on the results achieved by neuromarketing procedures, define in detail the target groups of the public on which the social marketing program will focus and compile their profiles. Accurate segmentation of the target audience will help to approach specific addressees and minimize spilling the communicated information. It must be added that the concerned audience does not involve only women as primary addressees of such a marketing program. There are other target groups too, e.g., doctors (mammologists, gynecologists, GPs), schools, media, non-profit organizations.

3. Apart from segmentation of the public and identifying the target audience, it appears to be advisable to apply analytical procedures in individual areas of the public, potential social marketing programs, and all relevant subjects.

4. To work out a marketing plan and other aspects of marketing management on a long-term basis. The short-term approach is appropriate only for reaching certain short-term effects that may fulfill a supportive role in creating a social marketing program. For example, women will read the information on the inevitability of preventive medical checks with a gynecologist. Nevertheless, their realization and launching in practical life will be a long-term process. For this reason, it is necessary to use mainly strategic approaches in social marketing programs.

5. Within the strategic plan of social marketing to consider a broader concept of marketing mix than the one with traditional 4P. It is recommended to expand it by the fifth P – people, the sixth P – partnership, and the seventh P – physical environment.

6. To compose social marketing programs to include elements of efficiency and motivation to a change depending on the profiles of target groups.

7. To orientate the strategies of the social marketing program at the awareness and education.

8. Financial analysis and a financial plan deriving from it must become indivisible parts of social marketing program preparation. It should also contain a strategy for obtaining financial means.

It is proposed to focus on nano marketing which is expected to become useful in technological development. The advantage of nano marketing equipment in the area of research is its small size. They may include such devices as chips, bracelets, watches, or special sleeves that monitor the brain's activity and frequencies. Their small size will guarantee that the marketing research could occur even during the respondents' usual life activities and will not interfere with their daily program or influence it. The great benefit of applying nano marketing technologies in the area of social innovations may be the accuracy of obtained data.

Conclusions. Oncological diseases represent a social problem in the whole world. Their consequences are enormous from the perspective of the lost human lives. They bring economic loss as well as negative social effects. Such diseases can be successfully fought at their outbreak. They can even be prevented to a large extent by good quality prevention. In the case of breast carcinoma, it is evident that active prevention reduces morbidity and mortality. It requires the cooperation of women themselves, who constitute the main target group, doctors, and other subjects (non-profit organizations, schools, media). Marketing opens a significant space for implementing social innovations and initiatives for their application, aimed at achieving a change in attitudes, motivations, awareness, and behavior of this target group in general, leading towards prevention. Social marketing is a traditional approach focused on achieving a desirable social change. Just like any other area of marketing, social marketing is dependent on accessible and valid data too. Their quality can be taken advantage of by using neuromarketing research metrics instead of the traditional ones, which will ensure the sufficiency of needed data and be of much better quality than the data obtained by the traditional research metrics. Despite certain shortcomings and limits (e.g., high financial demandingness, sensitiveness to the ethical dimension, or low awareness of the possibilities of their implementation), neuromarketing metrics are capable of compensating for the weak points of the traditional research methods, such as the unwillingness of respondents to answer some questions correctly and truthfully, which makes research results more accurate. The current trend suggests that nanotechnologies whose contribution in combination with marketing into nano marketing and their employment in the sphere of social innovations may dwell just in the accuracy of the acquired data.

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Маркетинг соціальних інновацій: на прикладі сектору охорони здоров'я

У рамках статті систематизовано аргументи та контраргументи щодо застосування маркетингових підходів у соціальних інноваціях. Головною метою дослідження є визначення найбільш ефективних маркетингових інструментів, що сприяють впровадженню соціальних інновацій та досягненню соціальних вигід у сфері охорони здоров'я. У статті проаналізовано ставлення населення до захисту власного здоров'я та профілактики раку молочної залози. Підґрунтям дослідження стали результати опитування жінок Словаччини щодо рівня обізнаності у методах захисту здоров'я та їх дотримання. Методологія даного дослідження заснована на методах кластерного аналізу та бінарної логістичної регресії. За результатами дослідження виявлено недостатній рівень обізнаності жінок щодо методів захисту здоров'я та профілактики гінекологічних захворювань, низьку мотивацію, наявність бар'єрів у доступі до необхідних даних, їх недостовірність та неточність, а також низький рівень обізнаності медичних фахівців у методах та інструментах подолання зазначених вище проблем. У ході дослідження автори прийшли до висновку щодо необхідності застосування маркетингових інструментів для забезпечення бажаних суспільних змін та впливу на поведінку жінок. Обґрунтовано, що впровадження програм соціального маркетингу дозволить підвищити рівень мотивації жінок до більш уважного ставлення до власного здоров'я. Авторами відмічено, що на противагу інструментарію традиційного маркетингу, нейромаркетинг забезпечує ефективну та таргетовану комунікацію з цільовою аудиторією, а також сприяє підвищенню якості опитування та вірогідності отриманих даних. Таким чином, це покращує маркетингові кампанії та стратегії соціального маркетингу. Результати проведеного дослідження можуть бути корисними маркетинговим агенціям, лікарям (гінекологам, мамологам) та некомерційним організаціям у сфері охорони здоров'я.

Ключові слова: інновації, інноваційні рішення, нейромаркетинг, соціальні вигоди, суспільно корисна поведінка, соціальний маркетинг, соціальна поведінка.