Conversion's forecast model for ADs in social networks

A. Krasnov1, S. Krasnov2, R. Griffith3, M. Draganov4, K. Kostenarov5

1,2 Peter the Great St.Petersburg Polytechnic University, St.Petersburg, Russian Federation
3 Florida Institute of Technology, Melbourne, Florida, USA
4 Technical University of Sofia, Sofia, Bulgaria
5 New Bulgarian University, Sofia, Bulgaria

*E-mail: krasnov_as@spbstu.ru

Abstract. In this paper, the authors evaluate the characteristics of customers. Established interconnected segmentation and consumer targeting. Formulated groups of consumer characteristics, as well as the characteristics themselves, applicable in a digital environment. Based on data analysis, the effectiveness of targeting by behavioral and psychographic characteristics was determined. The authors proposed a model to predict the conversion rate of advertisements through the use of socio-demographic, psychographic, behavioral and geographical characteristics. The reliability of the models was checked for compliance and its testing. The results obtained during testing turned out to be comparable with the predicted ones, which allowed us to conclude that it is possible to predict conversion rates in order to increase the efficiency of resource use, including when promoting goods and services on social networks.

Keywords: consumer's segmentation, targeting, social networks, conversion's forecast, consumer's characteristics

1. Introduction

The increase in production and output of new products in the face of fierce market competition require the use of various marketing tools. According to specialists, the forecast for the global adspend in 2019 amounted to US $ 594bn, and the cost of online advertising amounted to about US $ 231bn of them. According to forecasts for 2021, adspend volumes will increase by 18% [1].

The online advertising market in Russia in 2018 amounted to 193.4 billion rubles, including 158.4 billion rubles for contextual advertising [2].
Figure 1. Global ad spend, bn USD [1]

A special place among digital advertising tools is occupied by social networks, the costs of which in 2018 in Russia amounted to 23.2 billion rubles, and the increase amounted to about 60% [2]. Thus, social networks are a fast-growing channel for promoting new goods and services; therefore, it is necessary to correctly use this tool for interacting with consumers to get the most efficiency.

The aim of the research is to study ways to increase the effectiveness of advertising campaigns conducted on social networks, due to the conversion calculation model.

As an object of research, the authors highlight advertising campaigns conducted on social networks in order to promote goods and services to the end consumer.

The subject of the study is to assess the impact of consumer characteristics on the effectiveness of an advertising campaign conducted on social networks.

2. Methods

For the implementation of high-quality promotion of goods and services in the digital environment, the manufacturing company needs to determine the target audience and reliably describe it, highlighting individual target groups. This process is called segmentation, the essence of which is preserved both in online and offline environments.

The essence of segmentation can be defined through the definition of a term. In marketing theory, there are several interpretations of the consumer segmentation process that marketing companies and agencies rely on to identify target audiences.

Customer segmentation is the process of dividing customers into groups based on common characteristics so companies can market to each group effectively and appropriately [3-6].

Marketing agency SearchSalesforce defines customer segmentation as “the practice of dividing a customer base into groups of individuals that are similar in specific ways relevant to marketing, such as age, gender, interests and spending habits”[7].

After determining the target groups for the promotion of goods and services through social networks and setting up advertising campaigns, it is necessary to properly configure this campaign and describe the selected group of the target audience in the advertising panel.

Targeting in marketing is a strategy that breaks a large market into smaller segments to concentrate on a specific group of customers within that audience. It defines a segment of customers based on their unique characteristics and focuses solely on serving them [8-11].
To configure the targeting process, it is necessary to use a consumer’s digital portrait, which is a combination of characteristics and target actions performed by the user in digital space. The consumer's digital portrait is formed from such groups of characteristics as socio-demographic, behavioural, psychographic and geolocation [12].

Each of the groups of characteristics is important and, through their generalization, forms a full picture of the Internet user. For a more accurate portrait formation, it is necessary to investigate each group in detail and form the list of characteristics to be examined.

2.1. Socio-demographic characteristics

The importance of socio-demographic characteristics for offline sales is incredibly high: in direct contact, the consultant works with a specific client, which creates an extraordinary value of the buyer. The possibility of answering the question "Who is the buyer?" allows the employees of the company to choose the most appropriate motivational and psychological tools to stimulate the purchase. However, in the digital environment, the importance of owning such knowledge is reducing, since there is no direct contact with the consumer. Nevertheless, the socio-demographic portrait of the consumer in the digital environment is formed from similar offline marketing characteristics: gender, age, education, occupation, professional and family status, income level [13, 14].

2.2. Psychographic characteristics

Dependence of sales on the popularity of online resources of the company inevitably increased interest in studying their consumers. And today retailers have a desire to study their consumers in more detail and to find out what motivates them to buy, their choice and preference, while asking the question "Who is the buyer?", which forms a psychographic portrait in the Internet.

For analysis and classification of consumers, American Internet marketing specialist Jeremy Smith identified nine psychographic characteristics that determine the motivations of Internet users in a virtual environment:

- (1) Traits;
- (2) Interests;
- (3) Beliefs;
- (4) Behavior;
- (5) Habits;
- (6) Way of life;
- (7) Attitude;
- (8) Values;
- (9) Cognitive prejudice[15].

The research carried out by the author made it possible to identify the three most important characteristics, the study and the analysis of which is possible in social networks:

- (1) **Hobbies**: Every person tries to take his spare time, doing something special, bringing pleasure. For someone it is watching TV on the couch, for someone - climbing the mountains. Given the fact that hobbies can take up most of the free time, online shopping and marketers need to consider this factor: The consumer not only devotes a lot of time to this, but also expresses deep interest in this area;

- (2) **Beliefs**: Each person has his own beliefs, some of them were formed on the basis of his own experience and mistakes, part of the socialization of a person in society, but all of them are based on facts. For some, these are political preferences, formed either from a personal relationship or under the influence of the environment, others see it in the worldview of a person, his relation to various aspects of life. Beliefs influence the choice of the consumer, because they determine the life guidelines of human behavior. This factor should be taken into account when forming the profile of the Internet consumer, and in building the cause-effect relationship of a particular buyer's choice;

- (3) **Interests**: Each person has a presence of interests. Interest is characterized by passion for certain events or activities connected with obtaining satisfaction. The presence of people's interests reflects the purposeful behavior of a person to achieve new results important for the person himself [16].
2.3. Behavioral characteristics
Behavioral factors are the actions of visitors on the site, among which you can distinguish: logging in, viewing of pages, following a link, time on the site, return to search results.

Evaluation of these actions is a significant factor of ranking, since it is based on the real opinion of people about the site.

The emergence of the method of ranking by behavioral factors forces optimizers and owners of online resources to pay more attention to the content uniqueness, the relevance of requests, the convenience of the site from the user's point of view.

From the point of view of analyzing consumers' behavior and identifying the significant factors of their behavior, it is possible to distinguish such characteristics as:

1. bounce rate;
2. time on the site;
3. depth of transitions;
4. return to search results [17].

Behavioral characteristics, which are the subject of behavioral marketing, are classified on the basis of the above models of consumer behavior.

The research of the most important behavioral characteristics of the user carried out by the author, that are of greatest interest to marketing structures, include:

1. **loyalty**: a behavioral characteristic that reflects changes in the buyer's behavior, caused either by discount programs for goods, or by production of a product targeted at a certain group of people;
2. **event**: a behavioral characteristic associated with a change in the buyer's behavior, which occurs in a certain period of time. The reason for this can be a holiday and the corresponding demand for current products during the given period of time;
3. **frequency of use**: a behavioral characteristic that shows how often buyers buy this product;
4. **attitude to the brand**: behavioral characteristics, determining the buyer's attitude to a certain brand, the willingness to buy products only from this manufacturer;
5. **attitude to the product**: a behavioral characteristic that reflects the degree of consumer confidence in the product;
6. **consumer status**: a behavioral characteristic that takes into account the acquisition regularity of the proposed product;
7. **buyer's level of readiness**: a behavioral characteristic that assesses consumers' awareness of the product, tastes and preferences that allow to offer them more personalized products [18].

Behavioral characteristics not only make it possible to understand the process of making purchases on the part of the consumer, but also are closely related to the reputation of the resource and its ranking in the Internet. In this regard, behavioral characteristics not only help to understand the target audience, but also contribute to improving the quality of content presented in the digital space.

2.4. Geographical characteristics
The group of geolocation characteristics that form the geographical representation of the consumer underwent the most significant transformation in the transition to the digital space. If you previously gathered the information about the consumer at the level of large geographical information (region, city), today the information is collected up to the house number. Coverage of this kind of information became possible due to the active introduction of GPS-technologies in mobile devices and the research of data from them. Thanks to such information, companies can understand not only the home and work address, but also, the time and routes of customers' movement. Such detailed information allows companies to seize consumers at their places of residence and movement due to targeted advertising according to geolocation characteristics.

The main geolocation characteristics include:

1. **places**: home, work, place of getting education, etc.;
2. **routes**: user's motion path.
Thus, the use of consumer characteristics contributes to the efficient allocation of the necessary users of social networks within certain groups of the target audience and the implementation of targeted promotion of goods and services and bringing information about them to the final consumer, who is a representative of the target audience.

To determine the patterns and effectiveness of advertising campaigns during the study, data were collected and processed on seventy advertising campaigns conducted on social networks. The authors used the Experiment to process these data as a research method.

Partial data of the conducted advertising campaigns is shown in Table 1. The following columns are presented in the table: geographical, gender, age, psychographic and behavioral characteristics, as well as the size of the target audience. In each of the columns, a value is presented that corresponds to the number of users of the social network remaining after the consistent application of the characteristics when setting targeting. The base number of users of the social network amounted to 60 million people.

For each advertising campaign, two cloning announcements were launched, however, in the first case, the advertising campaign was launched exclusively according to geographic and gender-specific characteristics (Experiment A), and in the second case, promotion was carried out according to all available targeting settings (Experiment B). The partial results of targeting in kind and the volume of conversion and the effectiveness of an advertising campaign will be conducted. This model will be used as part of an Experiment C in which the forecasted conversion values will be determined.

| #  | Geographical | Gender | Age   | Interests | Behavior | Target audience |
|----|--------------|--------|-------|-----------|----------|-----------------|
| 1  | 3 459 000    | 2 976 000 | 278 000 | 76 000    | 57 000   | 35 000          |
| 2  | 4 275 000    | 2 470 000 | 421 000 | 65 000    | 54 000   | 41 000          |
| 3  | 4 896 500    | 2 987 000 | 472 000 | 85 000    | 65 000   | 52 000          |
| 4  | 4 687 000    | 2 475 000 | 345 000 | 81 000    | 72 000   | 59 000          |
| 5  | 4 217 000    | 2 237 000 | 328 000 | 78 000    | 62 000   | 49 000          |
| 6  | 3 975 000    | 1 326 000 | 267 000 | 76 000    | 59 000   | 51 000          |
| 7  | 4 235 000    | 2 278 000 | 335 000 | 76 000    | 60 000   | 49 000          |
| 8  | 4 678 000    | 2 221 000 | 341 000 | 89 000    | 71 000   | 57 000          |
| 9  | 4 784 000    | 2 457 000 | 299 900 | 85 000    | 67 000   | 54 000          |
| 10 | 4 782 900    | 2 359 000 | 315 000 | 81 000    | 66 000   | 50 000          |
|    | ...          | ...     | ...   | ...       | ...      | ...             |
| 60 | 5 016 000    | 3 012 000 | 331 000 | 82 000    | 66 000   | 55 000          |
| 61 | 4 927 000    | 3 426 000 | 342 000 | 88 000    | 61 000   | 57 000          |
| 62 | 4 827 000    | 2 764 000 | 312 000 | 81 000    | 65 000   | 52 000          |
| 63 | 4 765 000    | 2 765 000 | 303 000 | 83 000    | 64 000   | 55 000          |
| 64 | 4 675 000    | 2 975 000 | 308 000 | 88 000    | 61 000   | 59 000          |
| 65 | 4 987 000    | 2 947 000 | 327 000 | 84 000    | 65 000   | 57 000          |
| 66 | 4 789 000    | 2 937 000 | 322 000 | 90 000    | 62 000   | 49 000          |
| 67 | 4 857 000    | 2 963 000 | 318 000 | 85 000    | 63 000   | 51 000          |
| 68 | 4 578 000    | 2 865 000 | 302 000 | 83 000    | 65 000   | 57 000          |
| 69 | 4 865 000    | 2 876 000 | 316 000 | 81 000    | 63 000   | 54 000          |
| 70 | 4 564 000    | 2 876 000 | 329 000 | 88 000    | 62 000   | 55 000          |
3. Results

As a result of two studies, the conversion was determined for each of the advertising campaigns, which was initially determined as a key indicator of measuring effectiveness.

Conversion is the proportion of users who have made the transition through the advertisement to the number of users to whom this advertisement was shown [19].

The generalized results of the experiments are presented in Table 2.

Table 2. Conversion's results for A- and B-Experiment

| Experiment   | Minimal conversion | Maximal conversion | Average conversion |
|--------------|--------------------|--------------------|--------------------|
| Experiment A | 2.91               | 5.15               | 4.034783           |
| Experiment B | 0.102              | 0.398              | 0.253797           |

Based on the analysis of two experiments (A and B), during which 70 advertising campaigns were conducted, it was found that greater efficiency is observed in experiments using behavioral and psychographic characteristics when targeting.

Based on the data obtained, a model for calculating the conversion of an advertising campaign was obtained taking into account all groups of consumer segmentation characteristics. The proposed model was based on the multiple regression model [20]:

\[
Y = 3.8697 - 0.6968X_1 + 2.4452X_2 + 1.8X_3 - 6.9962X_4 - 84.8452X_5, \\
\]

where \(X_1\) - behavior,
\(X_2\) - interests,
\(X_3\) - age,
\(X_4\) - gender,
\(X_5\) - geographical characteristics.

The obtained model was tested for adequacy, the RS criterion fell into the interval, which indicates the fulfillment of the normal distribution property, according to the results of which we can conclude that the model is adequate for the normal distribution of the residual component [21].

In order to verify the results of experiments, the author carried out work on testing the obtained model. In order to evaluate the results of the work, the results of three advertising campaigns should be planned, taking into account the permissible 5% deviations based on targeting consumers according to specified characteristics. The forecast results are shown in Table 3.

Table 3. Conversion's forecast for model's aprobation

| #  | Geographical | Gender | Age | Interests | Behavior | Target audience | Forecast (0.95) | Forecast (1.05) |
|----|--------------|--------|-----|-----------|----------|----------------|-----------------|-----------------|
| 1  | 4 967 000    | 2 634 000 | 330 000 | 51 000 | 32 000 | 32 000 | 4.038 | 4.463 |
| 2  | 4 967 000    | 2 634 000 | 278 000 | 62 000 | 40 000 | 37 000 | 3.984 | 4.403 |
| 3  | 3 975 000    | 1 326 000 | 198 000 | 65 000 | 27 000 | 18 000 | 3.578 | 3.955 |

According to the results of advertising campaigns, each of which lasted 2 weeks with a limit of 100 impressions per user, the following conversion values were obtained (Table 4) (Experiment C).

Table 4. Conversion's values for Experiment C

| #  | Conversion 1st week | Conversion's results |
|----|---------------------|----------------------|
| 1  | 4.657               | 4.113                |
| 2  | 4.443               | 3.991                |
| 3  | 4.101               | 3.768                |
Based on the analysis of the data obtained, it can be concluded that the resulting final conversion value falls into the acceptable deviation norm obtained as a result of calculations based on the model. It can also be noted that the conversion rate in the first week of the advertising campaign is higher than forecasted values, but decreases in subsequent periods. This is due to the fact that the advertising campaign is not displayed in the future to those users who have made the transition through advertising.

Thus, based on the results of advertising campaigns and obtained on the basis of the forecast model, we can conclude that the resulting model allows us to predict the value of the conversion of the advertisement, which will increase the efficiency of both the advertisement and the invested funds.

4. Discussion

In this paper, an analysis of advertising campaigns conducted on social networks was carried out in order to evaluate the effective targeting settings to obtain the optimal conversion value. Based on the results of the analysis, a multiple regression model was obtained, which allows forecasting based on the management of targeting settings. The resulting model was tested for adequacy, and also passed the testing procedure, during which three advertising campaigns were conducted on the social network.

The obtained values were within the interval obtained with a 5% deviation using the obtained model.

Thus, the authors believe that using this model it is possible to predict the conversion rate, correctly target and, therefore, segment consumers, evaluate the results of financial investments and effectively manage resources during the advertising campaign.

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