Improvement of the consumers’ satisfaction research technology in the digital environment

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Abstract. The article is devoted to the problem of satisfaction estimate, based on the technology of content-analysis of the consumer feedback in the digital environment. Consumers are becoming an increasingly powerful competitive force. They generate content by themselves. The feedback is an important source of information about consumers’ opinion. The consumers’ impact in the digital environment is manifest, primarily, in the consumption expectation forming. The authors propose a methodic of the satisfaction evaluation research, which is based on the systematic analysis and synthesis of individual methods and theories of consumer behavior, competitive analysis, and marketing research. Evaluation of customer satisfaction involves considering the object as a set of attributes for each of which is determined by the assessment of the embodiment, the assessment of importance, and then - the assessment of private utility. The final value of satisfaction is defined as the sum of benefits.

Keywords: evaluation of satisfaction, consumer loyalty, marketing communication, digital environment

1. Introduction

Today the task of assessing customer satisfaction does not lose its relevance. A high level of satisfaction is the basis of customer loyalty to the organization and, as a result, a prerequisite for creating a sustainable external competitive advantage of the organization in the market.

Many organizations solve this problem by studying the opinions of customers. The main goal of such studies is to identify sources of displeasure, to be able to strengthen their weak points and promptly compensate for the damage to their reputation. This work “corrections of mistakes” is useful not only in terms of auditing and improving the organization's processes, but also strengthening relationships with consumers. Customers show great loyalty to organizations that respond correctly to criticism.

Traditionally, customer satisfaction research is carried out through telephone surveys. Standardized technology provides data comparability, which allows tracking the dynamics of changes in opinions. As a rule, such studies are carried out after purchase; they are quite tiresome for the client and time-consuming for the researcher.

When conducting a telephone survey, clients are not always able to find a convenient time for a conversation and often express their opinion disingenuously. In the digital environment, many consumers have time to share their negative experiences with others before the survey [9-11].

The emerging mobile technologies that use links to automatic response forms greatly simplify the process of fixing customer opinion about service. These technologies are very operational, as they allow sending a notification to the client (SMS or message in the application) with a link almost as soon as its service has ended. To express an opinion to the client, it is often enough to rate one or more parameters on a five or ten scale. That does not take much time from the client and is very convenient. The basis of this relationship measurement is the NPS (Net Promoter Score) method, since for the most part the client...
is asked: “What probability do you recommend us to your friends?” The NPS method interprets the level of consumer favor on a scale [1]:
- 0-6 points - “critics”: these consumers have absolutely no loyalty to the company/brand/product;
- 7-8 points - neutral buyers: they see any shortcomings with the manufacturer, but at the same time have some loyalty to him;
- 9-10 points - supporters (advocates): they are the most loyal to the organization/brand/product.

Such a study is useful for quick monitoring, but not very informative. Putting a low rating, the client often does not detail his claims in the message. Subsequent calls or calls to clarify the problem are not always effective. The client, being under the influence of his own emotions, can regard all attempts to find out the details as pressure and obsession [12].

Thus, the existing technologies for conducting customer satisfaction surveys have some disadvantages. In modern conditions, organizations need a simple and operational method to identify sources of customer dissatisfaction.

The purpose of the study is to determine the main stages and features of the implementation of the consumer satisfaction research method using the technology of content analysis of consumer feedback. [13,14]

The research methodology is based on system analysis and synthesis of individual methods and theories of consumer behavior, competitive analysis, marketing researches.

2. Methods of research

Digital technologies expand the boundaries of consumption, change the mechanism of consumer choice of goods and services, and determine consumer experience and requirements, form an information-rich environment. New technological capabilities are taking the competition to a new level. Today, the C2C communication model actively competes with the B2C option. On the one hand, the content is actively generated by organizations in order to attract the attention of consumers. But on the other hand, consumers generate content themselves, thus becoming an increasingly influential competitive force. M. Porter, analyzing the power of influence of buyers in his model of the five forces of competition, focused on the factor of customer satisfaction with existing variations of goods. The influence of consumers in the digital environment is manifested primarily in the formation of expectations from consumption. Feedback is a valuable source of consumer opinion. A negative attitude, reflected in customer reviews, can lead to the rejection of the purchase of goods disapproved by other consumers. Organizations understand the threat; therefore they carry out systematic communication in social networks and work with negative content. However, reviews do not always have a uniquely negative meaning. The proposed method allows identifying both the strengths and weaknesses of the product/brand/organization.

The proposed method of analyzing customer feedback is based on assumptions:
- Customer satisfaction is formed as a result of evaluating the total utility (the sum of the attributes) of an object (product/brand/organization); i.e. an object is considered as a set of attributes [2]
- Private utility is represented as a separate attribute, the degree of satisfaction with a separate attribute depends on the degree of presence of this attribute in the object and its significance (importance) for the consumer; attributes can have different importance to the consumer;
- The overall utility assessment is integrated by the consumer according to the compensatory principle, i.e. a low score of one attribute can be compensated by a high assessment of another one.

The degree of the presence of the attribute is measured by the implementation assessment; the importance assessment is based on the weight coefficient.

A typical structure for assessing the level of customer satisfaction with some object is shown in Table 1.
Table 1. Assessment of the level of customer satisfaction for the $k$-th object

| Attribute of the analysis object | Implementation assessment $O_i$ | Importance assessment $V_i$ | Assessment of private utility $R^K_i$ |
|---------------------------------|--------------------------------|-----------------------------|---------------------------------|
| Attribute 1                     |                                |                             |                                 |
| Attribute 2                     |                                |                             |                                 |
| …                               |                                |                             |                                 |
| Attribute N                     |                                |                             |                                 |
| Total                           | -                              | 1                           |                                 |

Utility evaluation is carried out by the formula [2]:

$$R^K_i = \sum O_i \cdot V_i$$  \hspace{2cm} (1)

where $R^K_i$ is the evaluation of utility by the $i$-th attribute of the $k$-th object,

$O_i$ is the implementation assessment of the $i$-th attribute,

$V_i$ is the importance assessment of the $i$-th attribute.

Initial data on the implementation evaluation of characteristics and their importance are collected by the method of content-analysis of consumer feedback.

3. Results

This sequence of customer satisfaction analysis is proposed:

- The object of analysis and a set of attributes are determined to assess customer satisfaction with the selected object.
- The measurement system of attribute implementation is determined.
- Sources are selected for the survey.
- Depth of the temporary period for the considered responses is specified
- Selection of reviews is formed.
- Information is collected, reviews are processed and interpreted.
- Calculations of importance of attributes are carried out.
- The total value of satisfaction is defined.

1) Definition of the object of analysis and a set of attributes to assess customer satisfaction with the selected object.

Highlighted attributes should cover all aspects of customer satisfaction, i.e. be exhaustive. Attributes can have a functional nature, as well as emotional and aesthetic.

The surplus of attributes should be avoided; therefore, it is advisable to include relevant attributes in the set in question that are important for the consumer and allow distinguishing different objects among themselves (determining consumer choice). The price is always an important attribute, but not always determines the choice, since the price of all the objects in question may be the same.

When determining the attribute, the implementation of which involves a combination of benefits, there should conduct an analysis of the need for its further decomposition. Examples of such attributes are “quality”, “economy”, “convenience”, “design”, etc. In particular, “cost-effectiveness” consists of a number of components: low purchase price, low operating costs (for consumables, maintenance, etc.), low cost of ownership (installation, connection, insurance, rent, etc.). Obviously, for some objects (for example, for food) the full list of cost-effectiveness components will be surplus, for others, on the contrary, it can be expanded to take into account the costs of getting rid of the goods. The more specific is the consumer benefit, the better it is. In this case, the results are easier to interpret.

2) Defining an attribute implementation measurement system.

The scale of measurement of the embodiment of the attribute should be simple to avoid errors of interpretation of reviews. The three-point scale showed high reliability of measurement due to its simplicity: 1 point - the attribute is poorly implemented, 2 points - the attribute is implemented at an average level, 3 points - the attribute ensures the satisfaction of the need.

Some aggregators of feedback use their scales to evaluate individual attributes, so when choosing a scale, it is advisable to familiarize yourself with the sites that act as sources of feedback.
Using content analysis units, the presence in the text of a reference to a specific attribute is diagnosed and its implementation is evaluated. A content analysis unit is a qualitative element of a review text, some of its semantic unit (term, word, expression, sentence, etc.).

Content analyses units help determine to which level of the scale a particular consumer’s opinion can be attributed. Therefore, a list of absolute (for example, using the words "favorable", "neutral", "unfavorable"; "good", "indifferent", "bad") and relative ratings ("better", "equivalent", "worse") is formed for each level of the scale. An example of a system for measuring the implementation of the attribute "price" is shown in Table 2.

The example, shown in Table 2, demonstrates how the direction of the scale changes depending on the nature of the attribute. Consumer satisfaction is ensured by a low price level; therefore the reverse direction of the scale is used.

| Table 2. The system of indicators of the scale of the attribute "price" |
|---------------------------------------------------------------|
| **Attribute** | **Measurement Levels** | **Quality text elements for content-analysis** |
|----------------|------------------------|-----------------------------------------------|
| **Price**      | High price (1 point)   | "expensive", "the goods are not worth it", "above others", "unjustified", "overstated", "does not correspond" |
|                | Average price (2 points)| "normal", "not above others", "acceptable", "optimal", "satisfactory" |
|                | Low price (3 points)   | "below others", "nice price", "profitable", "good price", "price surprised", "best price" |

For the purposes of studying customer satisfaction, a single reference to an attribute in a recall is sufficient as a unit of a content analysis account.

For each attribute, a measurement system is developed, similar to the version of Table 2.

3) Selection of sources for the survey.

At this stage, it is determined: which sites can provide feedback, how many they should be and what requirements the information sources should meet.

The source of feedback can be the websites of the organizations or independent portals that provide users with the opportunity to leave feedback about a particular product, brand or organization. The opinion was fixed that the reviews on the website of the organization itself are rarely objective, since they often have an advertising character. Reviews on independent portals do not have an excessive interest. Such popular reviews aggregators can be used for the study:

- Otzovik.com is a community where users exchange useful information about any goods or services and help each other. The choice of this source is due to the presence of a large number of useful reviews and real ratings of real visitors.
- «IRecommend» (http://irecommend.ru/) is the site where reviews of goods and services, unique photos and experience of the owners are presented.
- Tripadvisor.ru is a community that allows users to leave their reviews and ratings (positive or negative) to hotels, restaurants, etc.

When selecting sources, it is important to understand the policy of the information portal to provide feedback. The source ensures the accuracy of the information if a number of conditions are met:

- Reviews are left by real users who really have experience using the products or services of the organization. A good practice is to recognize the option of providing feedback on an invitation. For example, the online clothing store La Redoute invites to leave feedback on a particular product only to those consumers who purchased this clothing. Booking.com also ensures that reviews are left by real users who have visited the placement.
- Review, regardless of whether the assessment is positive or negative, uses the correct vocabulary and contains a reference to the specific attributes of the assessment of the selected object. It makes no sense to take into account too emotional non-specific reviews, as well as reviews with profanity. If the review does not contain constructive criticism, then it should be considered as trolling and not taken into account in the analysis process.
The number of reviews contained on the site should be large enough. Feedback is the carrier of the subjective opinion of the consumer. With a small amount of feedback, the final results have distortions that cannot be estimated by statistical methods.

4) Refinement of the depth of the time period of considered reviews

When selecting reviews, it is also important to consider the period of time when the review was given. If an organization performs satisfaction analysis on a regular basis, for example, once a quarter, then only reviews received in the last quarter should be considered. The shorter is the accumulation of reviews, the fewer reviews are available, the more difficult it will be to provide the desired set of reviews for analysis.

5) Forming of a selection of reviews.

At this stage, it is determined which reviews to select for analysis, to what extent it is necessary to study the responses.

Statistical methods are used for determining the sample size, if the number of available reviews is large (more than 5000). One can use the online sample calculator to simplify volume calculations. Each available review is assigned a unique number. Using a random number generator, reviews are selected for analysis (simple random sampling). Mechanical screening can be applied when the first review is randomly selected and subsequent reviews are selected through the sampling step until the entire sample size has been processed.

As a rule, 400 reviews are sufficient for obtaining reliable results. When the number of available reviews is less than 400, it is advisable to conduct a complete survey of all options.

6) Data collection and interpretation.

The objectives of this stage are the accuracy of the registration of the consumer's opinion on the attributes in accordance with the developed scale and the control of the completeness of data collection in accordance with certain sample size.

To accomplish these tasks, a form of data collection is offered, which contains a hint on the qualitative elements of the text and records the numbers of reviews to control the sample (Table 3). If data collection is automated, the form can contain only columns 1, 2 and 5.

Table 3. Fragment of the data collection form for content analysis on the “price” attribute with conditional results

| Attribute | Scale | Qualitative text elements | Reference numbers | Total mentions |
|-----------|-------|---------------------------|-------------------|---------------|
| Price     | High price (1 point) | “Expensive”, “the product is not worth it”, “above the others”, “unjustified”, “overpriced”, “does not match” | 1, 8, 13, 14 | 4 |
|          | Average price (2 points) | “Normal” “not higher than others”, “acceptable”, “optimal”, “satisfactory” | 2, 11, 15 | 3 |
|          | Low price (3 points) | “Lower than others”, “pleasant price”, “good price”, “price surprised”, “best price” | 3, 4, 5, 10, 12 | 5 |
|          | not mentioned | - | 6, 7, 9 | - |

Evaluation of the implementation of the \(i\)-th attribute when using a three-point scale is calculated by the formula:

\[
O_i = \frac{3n_{3i} + 2n_{2i} + 1n_{1i}}{n_{3i} + n_{2i} + n_{1i}},
\]

where \(O_i\) is the evaluation of the implementation of the \(i\)-th attribute, \(n_{mi}\) is the number of mentions of the \(i\)-th attribute in each \(m\)-cell of the scale, \(m\) is the number of scale levels (in this example - 3).

In the given fragment, the evaluation of the implementation of the attribute "price" is determined in this way:
O_{price} = (3*5+2*3+1*4)/(5+3+4)=2.08
That is, consumers in the example estimated the price at the average level.

7) Determining the importance of attributes.

The basis of determining importance is the observation that consumers are most actively discussing the most important reviews for them, and it doesn’t matter whether the customer is satisfied or not. Therefore, the importance is assessed by the specific weight of the references to the i-th attribute in the total attention volume for all attributes:

\[ V_i = \frac{n_{3i}+n_{2i}+n_{1i}}{\sum_{j=1}^{S}(n_{3j}+n_{2j}+n_{1j})} \]  \hspace{1cm} (3)

where \( V_i \) is the assessment of the importance of the i-th attribute,
\( n_{mi} \) is the number of mentions of the i-th attribute in each m-cell of the scale, \( m=3 \),
\( S \) is the number of considered attributes.

The determination of the importance of attributes can be carried out in other ways: by an expert method or by interviewing consumers. However, the proposed option is the easiest one.

8) Determining the total value of satisfaction.

The final value is given by formula 1 as the sum of private utilities. The results can be interpreted both in absolute terms and relative to the nearest competitors.

If the value is in the range of 1 ≤ R_K ≤ 2, then consumers are not satisfied with the product/brand/organization in question. If in the range of 2 ≤ R_K ≤ 3, then they are satisfied.

Relative evaluation of utility is carried out by comparing the achieved level of satisfaction with the value obtained by the leading competitor.

The analysis can also be performed at the level of private utilities, taking into account the matrix proposed by J.J. Lamben (Fig. 1)

| Degree of attribute implementation | Degree of importance |
|-----------------------------------|----------------------|
| False | Strong sides | 3 |
| Forces | 2 |
| 1 |
| False problems | 3 |
| 1 |
| 3 |
| Weaknesses |

Figure 1. Matrix analysis of private utilities of the attributes of a product/brand/organization

4. Discussion

The proposed method is not without drawbacks. Of course, it should be taken into account that consumers are more likely to share negative feedback than positive. Moreover, too enthusiastic feedback can be seen as biased and cause suspicion in the Internet community of bribery. However, this distortion is understandable and does not contradict the objectives of the analysis – to identify sources of displeasure, to be able to strengthen their weaknesses and timely compensate for the damage to reputation.

The implementation of the study depends significantly on the availability of review. For unpopular objects, about which consumers do not want to give feedback, the method cannot be applied.

The method uses a coarse scale to measure satisfaction. With this range of estimates, it may be difficult to track the dynamics of satisfaction estimates, as these changes are not always significant.

5. Conclusions

The essential advantages of the method are the possibility of automating the collection and processing of data, the speed of implementation, and the relative independence from the willingness of consumers to participate in the study. The latter also increases the objectivity of the estimates, as consumers express their opinions solely of their own will, not wanting to please anyone or spare anyone's feelings.
In general, the authors consider it possible to use this method for express analysis of customer satisfaction. In the case of the identification of research problems, it is advisable to continue with other methods.

References

[1] Anisimov A.Y., Bozhuk S.G. Methods for customers loyalty study based on the index NET PROMOTER SCORE//Week of Science SPbPU. Matherial of the Scientific Conference with International Participate. Institute of Industrial Management, Economics and Commerce. – SPb: St. Petersburg Polytechnic University, 2018. pp. 432-435.

[2] Lambin J.J. Market-Driven Management: Strategic and Operational Marketing. 2007.

[3] Bozhuk S.G., Krasnov A.S. Methodics of research of consumers psychographic characteristics in the Internet // Proceedings of the 2017 International Conference "Quality Management, Transport and Information Security, Information Technologies", IT and QM and IS 2017, p. 166-172.

[4] Bozhuk S. G., Pletneva N. A. The impact of environmental and social initiatives of companies on the formation of consumer loyalty //Practical marketing No. 2-1 (240) 2017, pp. 11-18.

[5] Pletneva N. A. Bozhuk S. G. Prospects for the spread of innovation in the automotive market of Russia //Fundamental and applied research in the field of management, economics and trade. Proceedings of scientific-practical and educational conference, 2018, pp. 200-205.

[6] Bozhuk S. Pletneva N. The problems of market orientation of Russian innovative products (electric cars as a case study) // Advances in Intelligent Systems and Computing 2018 (AISC, volume 692), pp. 1234-1242.

[7] Bozhuk S. G., Pletneva N. A. Evdokimov K. V. The impact of environmental innovation on consumer preferences on the example of the Russian automotive market // Bulletin of the Belgorod University of cooperation, Economics and law. - 2017. - № 3 (64), p. 96-109.

[8] Zhgulev E., Bozhuk S., Evdokimov K., Pletneva N. Analysis of barriers to promotion of electric cars on Russian market // Engineering for rural development, Elgava (Latvia), 2018, Volume 17, p. 2110-2117.

[9] Klimin, A. I., Tikhonov, D. V., & Efimov, A. M. (2017). Evaluation of the effectiveness of marketing communications in russian business using the example of st. petersburg enterprises. Paper presented at the Proceedings of the 30th International Business Information Management Association Conference, IBIMA 2017 - Vision 2020: Sustainable Economic Development, Innovation Management, and Global Growth, 2017-January 1465-1482.

[10] Krasynik, I. A., Krymov, S. M., Medvedeva, Y. Y., Chernisheva, A. M., & Lashko, S. I. (2017). Marketing management in retail chains. International Journal of Applied Business and Economic Research, 15(12), 83-91.

[11] Velichko, N. Y., Kobersy, I. S., Radina, O. I., Khnikina, T. S., & Ivashhenko, S. A. (2017). Sales promotion in the marketing communications. International Journal of Applied Business and Economic Research, 15(13), 133-142.

[12] Ianenko, M., Ianenko, M., Huhlaev, D., & Martynenko, O. (2019). Digital transformation of trade: Problems and prospects of marketing activities. Paper presented at the IOP Conference Series: Materials Science and Engineering, 497(1), Article number 012118. doi:10.1088/1757-899X/497/1/012118

[13] Klokchov, Y., Klochkova, E., Alasas, B. M., Kuzmina, T., & Konakhina, N. (2018). Development of external customer classification based on the analysis of interested parties. Paper presented at the 2017 International Conference on Infocom Technologies and Unmanned Systems: Trends and Future Directions, ICTUS 2017, , 2018-January 729-732. doi:10.1109/ICTUS.2017.8286103

[14] Efremov, A. A., Loginova, A. V., Mikeladze, B. D., & Shirokova, S. V. (2017). The models and technologies for supporting decision making in design of information-control complexes. Paper presented at the Proceedings of 2017 20th IEEE International Conference on Soft Computing and Measurements, SCM 2017, 846-848. doi:10.1109/SCM.2017.7970742