Customer feedback analysis: case of Russian agricultural bank

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Abstract. The paper considers a comparative analysis of reviews (2008-2019) on the Internet about the Russian Agricultural Bank. We visualized the graphs using the Matplotlib package in the Python programming language. An interesting observation is a fact that users are more likely to share negative experiences and reviews than positive emotions. In this regard, negative reviews in all their diversity can be found much more often. Negative reviews can be useful for the company; however, only if they are written by real customers and carry enough constructive criticism.

1. Introduction
In recent years, the average consumer profile has undergone dramatic changes, determined by the growing inclusion of generation Y, born between 1980 and 2000, in the labor activity. [1,2] These buyers are finicky. This process must be realized with modern digital [3], innovative technologies, as fast as possible.

Under the influence of digitalization, cardinal shifts in the boundaries and competitive positions of participants in all sectors of the economy are taking place. Despite the close attention to the process of digital transformation, the concept of the digital economy still has not been formulated. As a result, leading professionals set market trends. [4]

Managing the company's online reputation illustrates a significant role, formed by Internet customers who leave feedback. [5,6,7,8] The feedback mentioned is essential for making an effective decision on cooperating.

2. Research methods
We chose the Russian Agricultural Bank as an object of research. It is one of the Russian Federation's largest banks, specializing in financing enterprises in the sphere of agro-industrial complex. They are included in the list of systemically important credit organizations of the country mentioned. According to actual statistics, about 100% of the shares of the Russian Agricultural Bank are state-owned. The key areas of its activity are: 1) servicing and lending to corporate clients, 2) attracting public funds in deposits.
Pandas is a high-level Python library for data analysis. Matplotlib is a custom Python library for charting. We have collected 6802 customer reviews on the Russian Agricultural Bank service on the website “banki.ru” and built several diagrams.

3. Research results
The quantity rating distribution (figure 1) shows us that negative customer reviews prevail on the website; this indicates a gap between customer expectations and the customer service provided.

The client can leave a response on the banki.ru website about the bank's service, having before registered, and entered an alias or email as a login. According to Federal Law No. 152-FL “On Personal Data”, personal data means any information relating directly or indirectly to a specific or determinable natural person (personal data subject). Thus, if, according to particular data, it is possible to identify the user who owns the specified data, then such data is personal. Therefore, email refers to individual data objects. Banki.ru encrypts such a login, and it makes no sense to study it in terms of the maximum/minimum number of messages from one user. Thus, we filtered the data and only considered users with an alias as a login.

Minimum posts: 1; maximum number of posts: 7; the average arithmetic number of messages from one user: 1.11; fashion, number of messages: 1. figure 2 shows the distribution of the number of messages left (x) from one user in the relative value (y).

We observe that most customer reviews contain up to approximately 3,500 letters. A minority of reviews containing more than 3,500 messages are distributed in the tail of the graph (figure 3). We created the following rule that reviews rated 1 and 2 are negative (average message length = 1392 symbols); 4 and 5 are positive (average message length = 672 symbols); 3 are vague reviews that we will work on in the next report.

Figure 4 is describing the distribution of ratings depending on the season. The graph shows the average values. As we can see, negative assessments prevail in 2008-2009 (the global economic crisis), and also without a definite trend since 2012.

Figure 5 shows a graph of the average score versus time of day. The territory of Russia, according to the law, "On the calculation of time" by longitude, has a length of 171 ° 22 ′, or about 11.4 hours. Moscow time (MSK) "corresponds to the third time zone in the national time scale of the Russian Federation UTC (SU) +3". Russia has eleven time zones, from the 1st to the 11th, correspond according to the international numbering to the time zones from the 2nd to the 12th. Based on this, our time deviations can fluctuate both to a lesser extent (if a user from the UTC (SU) +3 geolocation left a review) and to a larger one (a user from the UTC (SU) +8 geolocation ... UTC (SU) +14 left a review) side.
Let's look at the distribution of views depending on the review’s ratings (table 1).
Figure 6. The distribution of views by reviews.

Figure 7. The distribution of views by reviews (limit is 5000).

Table 1. The distribution of views depending on the review’s ratings.

| Responses rating | Average views  |
|------------------|----------------|
| 1.0              | 1470.590564    |
| 2.0              | 1504.967568    |
| 3.0              | 1553.876190    |
| 4.0              | 1393.818182    |
| 5.0              | 928.292872     |

Figure 8. The distribution of responses rating depending on the views.

Negative reviews cause genuine interest from users. The vast majority of users when choosing goods and services are guided by reviews on the Web but do not fully believe in their sincerity. Perhaps users are studying the negative experiences of other customers before deciding whether to get a loan.

4. Conclusion

To sum up, national financial system is actively developing by the latest digital achievements. There is a fundamental change in the models and concepts of development of commercial banks. It is an innovative development that is the key to the sustainable long-term functioning of organizations. In the coming decades, the acceleration of digital progress should be expected; innovations in the banking sector will become a prerequisite for competition. Despite the slight lag in Russian remote banking
services from world leaders, the high penetration rate of the Internet can be used as a potential for a qualitative breakthrough. The determining factor for the success of digital technologies in the Russian market is the reduction of the "digital divide", i.e., increasing the digital literacy of the population and, as a result, improving the service policy of Russian Agricultural Bank with a possible reduction in negative reviews.

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