

## ARTICLE

# FEATURES OF THE INTRODUCTION AND USE OF BIG DATA, DATA SCIENCE TECHNOLOGIES IN SINCERITY MARKETING

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## ABSTRACT

This article discusses the problem of the introduction, features and complexity, as well as the feasibility of using big data technologies in sincerity marketing. The purpose of this work is the lack of coverage of the problems of introducing Big Data, Data Science technologies in company marketing. The analysis of the tasks that Data Science can solve on the basis of Big Data is carried out. The advantages for using these technologies in sincerity marketing are highlighted. The authors pay special attention to the reasons for the development of Big Data, Data Science technologies in Russia and current restrictions. The necessary actions before the introduction of the technology are identified and described. The authors focus on the implementation of these technologies, as well as on the use of metrics for sincerity marketing, which underlie the technologies. The difficulties that companies face when introducing Big Data, Data Science technologies into the company's work are considered. Examples of services for working with these technologies are given. In practice, an example of the use of the technologies in the work of a network of shoe stores, bags and accessories is given. ROPO analysis is performed. The value of the work is emphasized by its practical focus on marketers and the scientific community.

## INTRODUCTION

**KEY WORDS**  
sincerity marketing, use of Big Data, Data Science, implementation, recommendations

Big data increases profitability and reduces expenses of sincerity marketing. According to BCG research, companies leading in the implementation and use of big data tools have 2.5 times more profitability, while marketing costs are reduced by 1.4 times. Oddly enough, only 2 percent of the companies in the study mentioned above use the latest technologies in digital marketing. At the same time, real efficiency shows an increase in income by 20 percent and a decrease in expenses by 30 percent [11, 18]. Data Science is based on three Big Data properties: volume, regularity of updating and variety of forms. The Data Science and Big Data infrastructure consists of the following groups [Fig. 1]. Every year the level of service and the quality of marketing is growing. Consumers are getting used to a personalized approach. People like being offered the product that they are likely to enjoy. Personalization is not the future, and is not even a trend; it is already the present, taken for granted. One of the most important tasks of sincerity marketing is to attract the attention of consumers. The development of Data Science, Data Driven and Big Data technologies helps to understand what the customer needs.

Analytics tools facilitate the company's appeal to the target audience, which increases the likelihood of successful completion of transactions, that is, it increases conversion, and, as a result, profit. The analytics and application of information lead to a better understanding of consumers and taking informed decisions, rather than random actions [3, 5]. The use of approaches based on the processing of large volumes of data present new opportunities. First of all, this is the understanding of the company's work in specific figures and data; secondly, the study of competitors and the possibilities of competition; thirdly, the understanding of their consumers both current and potential.

If data is effectively collected, grouped, pre-analyzed and further analyzed, then it becomes valuable information. At the same time, there arises the problem of decoding and correct interpretation of the collected information. The development of Data Science now allows for more efficient information processing increasing the effectiveness of strategic and tactical sincerity marketing, as well as of the understanding of current consumers. Technologies and tools of Data Science help in the work of the marketing department and marketers in general. They solve the following problems [1, 17]:

Clustering of information; approximation of experimental information based on a descriptive or prognostic model; automation of various processes in decision making; assessment of the degree of objects potential; factor analysis of individual data; and construction and training of neural networks.

The advantages of using Big Data and Data Science in sincerity marketing are - Increasing the speed of planning advertising campaigns; optimization of budget funds; data online; increasing the degree of

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loyalty; consumer segmentation; data visualization [9]; predictive analysis [2, 14]; decrease in the level of outflow coefficient of consumers [7, 10]; prediction of sales [16]; predicting customer reactions to various messages; and definition and understanding of the popularity of individual products and services.



**Fig.1:** Data Science and Big Data Infrastructure

Big Data and Data Science are actively developing in Russia and abroad. The reasons for the rapid development and its limitations in the Russian Federation will be considered below in [Table 1].

**Table 1:** Causes and limiters of the development of Bid Data and Data Science in Russia

Causes	Limiters
Demand for competitiveness enhancing tools	Need for a high level of data protection
Increasing demand for the services of providers and integrators from Russia	Lack of adequate qualified staff
Placement of servers in Russia	Russian companies accumulate insufficient data
Improving media content processing possibilities	High cost of technology implementation
Techno parks development	The complexity of introducing new technologies into applied systems

## METHODS

To implement an approach based on the collection, analysis and use of big data, intra-company changes are needed. Changes should be aimed at creating the foundation for the efficient operation of big data. The foundation is based on:

- willingness to invest in working with big data (time and costs);
- willingness to see and listen to the information received, making decisions based on the prepared figures;
- readiness to understand data. Analytical thinking and understanding of the data provided are necessary;
- willingness to trust data and the need to make decisions based on them. It is important to build trust between analysts and decision makers.

Before implementing Data Science and collecting big data, it is necessary to evaluate current and strategic goals and objectives, analyze the possibilities of application and prepare the ground for implementation. Of course, bonuses from the introduction of technologies are received by companies that carry out hundreds of transactions per day, have tens of thousands of consumers and thousands of positions in the product range. Consideration of future implementation can be carried out in three directions. The first direction is the database. It is necessary to evaluate its structure, interconnections and unity. If the company has several independent or weakly interconnected databases, then one needs to evaluate the possibility of setting up an effective and stable communication for the exchange of information. In addition, it is worth pre-evaluating the quality of the available data and its depth, as well as relevance. The second direction for evaluation is analytics. Who has the responsibility for conducting marketing analytics in the company, what tasks take the most time? What reports are generated at specific hours, weeks, and months? One should assess the current use of collected analytics for solving particular problems and for decision making and the level of development of consumer segmentation and product range. The third direction for evaluation before implementation is communication. Use of customer information by the company to target and apply personalization; whether profiles contain information about customers, the history of viewing advertising messages and responses to them. The level of data security and the load on them is also evaluated.

To start implementing the Data Science and Big Data approaches in sincerity marketing, the following steps should be taken:

- Adapting audience data aggregation.
- Building consumer segmentation, strategies, KPI.
- Combining campaigning.
- Establishing feedback with the used CRM systems.
- Implementing data analytics as part of ongoing marketing tactics

The implementation of technologies for big data processing and decision-making on their base is grounded on information about customer service, user satisfaction, visitor’s behavior on a website or in applications. Before you start working with big data in sincerity marketing and making decisions based on big data, you need an action plan, an example is presented below:

- i. Definition of data sources, verification of their relevance and accuracy, as well as the purity of the information received.
- ii. Forming a team based on specialists and analysts. To begin with - a marketer and data scientist. It requires employees who are willing to share knowledge and work on a common task. And the task of the team at this stage is to understand how to collect, analyze and use the information received in the future. The basic goal is the coordination of hypotheses, ideas and a budget for the implementation of work with big data. It is important that the final data is clear to managers and ordinary specialists, the right questions give the right answers that marketing can apply in its work.
- iii. Collection of all sources and information on one of the platforms. Data should be collected from as many sources as possible: information on products and services, advertising platforms, CRM and ERP systems. Here can be both online and offline data. Notes of the sales service, call center information, CRM and e-mail database. In addition, user behavior on the network and on the site [4, 19].
- iv. Formation of infrastructure for storing the received information. It must be systematized in the required form. It is advisable to provide all information, except confidential, in the domain for access of employees of the organization.
- v. Visualization of the data obtained on the basis of BI-platforms and dashboards. Here we segment the audience, calculate market shares, share of the target audience, history of purchases and sales. Among the consumers of the company, we choose the really best customers according to the Pareto principle. Having identified the best customers, their characteristics, one can start looking for other customers whose profile matches or resembles the best customers. Creation of detailed customer profiles [6, 8].
- vi. Conducting experiments, evaluating various options of actions, the results obtained, interpreting data and testing hypotheses. Forecast modeling, impact on consumer behavior, anticipation. Creating a media plan for each of the segments.
- vii. Optimization. The collected, analyzed information must be constantly cleaned, structured, and verified. Testing and pilot use of big data technologies in decision making. Analysis and review of the results obtained. Comparison of reality with set goals.
- viii. Formation in the organization of a real culture of decision-making based on information and collected data. The launch of full-scale work with big data, the use of information. The work should be based on the principles of continuity and consistency of work, comprehensive and comparable data.

For sincerity marketing and Big Data, Data Science technologies, the use of effective metrics is very important. Effective metrics should be comparative. Metrics indicators should be comparable across different time ranges, advertising projects, or target groups. In addition, the metric should be understood by most team members. If they cannot adequately explain why the analysis of this or that metric is necessary, then achieving goals on it will be difficult.

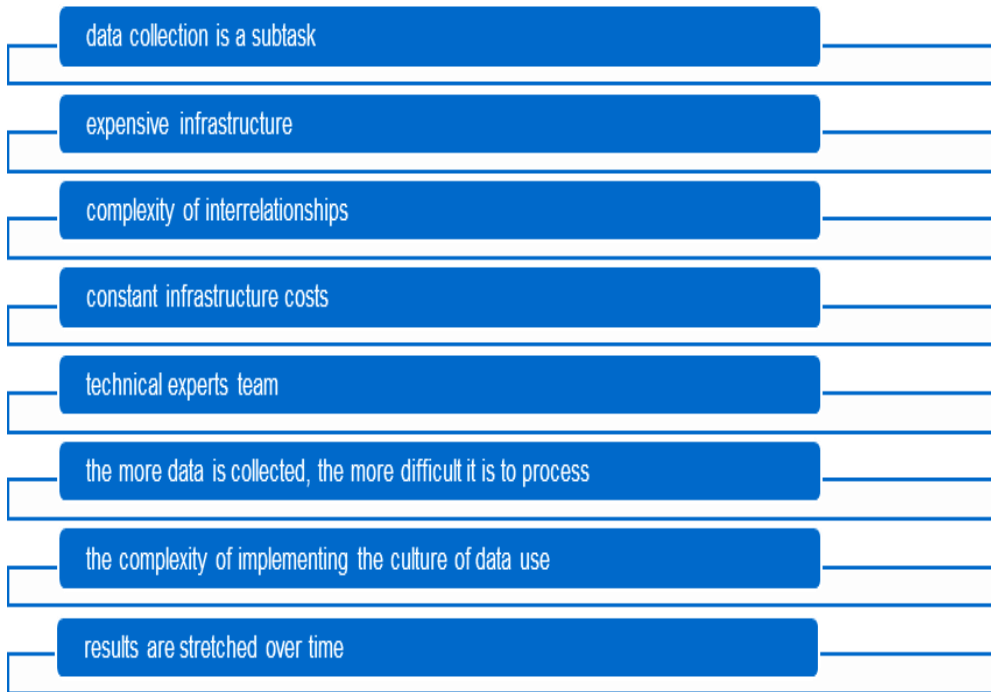
Metrics should be expressed in relative indicators. This is important because relative indicators are convenient for making decisions. In addition, relative indicators are easy to compare with each other. It is easy to find out long-term effects or short-term outbreaks, to determine current and future trends. At each stage of work, tasks and goals, there should be no more than 3-5 metrics. Below are the possible metrics for online commerce and SaaS services in the [Table 2].

**Table 2:** Sincerity marketing metrics while using Big Data and Data Science

	Online Commerce Metrics	SaaS Services Metrics
1	CPC (Cost per click): The cost that the company pays, attracting one customer. It demonstrates the effectiveness of a particular channel, return on investment.	Regular monthly revenue: It gives an understanding of how much the company receives on average each month or during a specified time range.
2	Conversion rate: Various conversions: from leaving applications to purchases. The conversion contains valuable information for predicting future profits.	Outflow of customers: The volume of customers who were regular and quit. Such an indicator helps in forecasting losses and an adequate perception of the current situation.
3	Abandoned baskets: The volume of visitors to the online store who quit making their purchases at a certain stage. Using the indicator, one can evaluate and find the so-called bottlenecks in the sales funnel.	Lifetime customer value: Income from the user for the entire time of using the service. Here we can calculate how much to invest in advertising in order to attract a customer.
4	Average income per account / customer: The indicator shows how much income each customer brings.	Customer retention rate: Providing data on what percentage of consumers the company translates into regular customers

When implementing and using big data, it is worth remembering about the principle of 1-10-100. It is used in various fields and can be interpreted in different ways. Any project, also if it is the introduction of the use of big data technologies and decision-making based on them, consists of three stages: planning, implementation and using. What does this principle say? It states that, having discovered an error at the first stage (planning or data analysis), the cost of fixing it is 1 conditional ruble. At the second stage (when implementation or work with data is already underway), fixing the error costs 10 conditional rubles. At the third stage (when the product works, the big data technology is introduced), the correction of the same error will cost 100 conditional rubles.

The implementation of Big Data, Data Science and Data Driven technologies is accompanied by a number of difficulties in sincerity marketing, which are presented in [Fig. 2].



**Fig. 2:** Difficulties in implementing Big Data and Data Science technologies in sincerity marketing

- data collection is a primary but not the only task. The constant collection of information becomes insufficient, the data must be cleaned, processed, structured, analyzed and interpreted, based on which hypotheses are formed, tested, and the obtained data must be analyzed again;
- expensive infrastructure. The establishment of various services for analytics, resource accounting, CRM and ERP systems, as well as call tracking and tools for end-to-end analytics. Adequate visualization of the collected data, metrics and reporting clear to employees and management of the organization;
- the complexity of the interrelationships. Many elements must be configured to work effectively and consistently with each other. Services are updated, new ones appear, new tasks are set, etc.;
- constant expenses for the maintenance of infrastructure. The staff of specialists, rental and purchase of equipment / services may be underestimated at the implementation stage;
- a team of technical specialists. To begin with, a team may consist of one specialist and analyst. However, third-party service specialists will be involved in the work for the initial setup of interaction;
- the more data is collected, the more difficult it is to process. The more indicators, sites are included in the data collection, the more time and money is spent on processing them. It is more difficult to separate important indicators and their impact from the “garbage” ones. Hypothesis testing costs increase;
- the complexity of introducing the culture of data use. Managers and ordinary employees should be prepared to work with information, hypotheses, make decisions timely. The company must develop along with the development of big data technologies;
- the results are stretched over time. To get the first results from implementation, a long time must pass till there come the results from past decisions made on the basis of data.

The implementation of technologies for working with big data occurs using various tools to solve various tasks. Examples of tools are presented in [Table 3].

**Table 3:** Tools for working with big data

Tool type	Description	Examples
Web analytics	Collection and storage of information about website visitors and their behavior	Google Analytics, Yandex.Metrics, Google Tag Manager
Big Data Technologies	Provide the collection, storage, structuring of large amounts of data	SAP 4 HANA, Hadoop, Spark, Yandex Data Factory, IBM Pure Data and Watson, Microsoft Azure
End-to-end analytics	Conducts the assessment of the effectiveness and profitability of advertising channels	Roistat, CoMagic Mixpanel, Rick, Alytics
CRM	Implements sales forecasting and performance evaluation of the work of marketing department	Salesapcrm, Bitrix24, MangoCRM, Wrike, Megaplan
Data visualization	Presentation of information in the form of visualization and a set of dashboards	Google Data Studio, Qlik Easel.ly, Tableau, Power BI, Piktochart, Infogr.am
Unit Economics	Tips for identifying points of organization growth	1C, SAP, Oracle, Microsoft

## RESULTS AND DISCUSSION

Here is an example of the implementation and use of big data technologies and analytics tools based on the work of one of the network stores of shoes, bags and accessories in the framework of sincerity marketing. The network has more than 90 stores, as well as a functioning online store. The online marketplace was quite convenient, but a network of physical stores with branded goods outperformed the online store. This was facilitated by the excellent personalized service of the stores chain.

However, marketers of the network of shoe stores noticed that many consumers before going to an offline store browse the site, evaluate the availability of models at retail outlets, immediately selecting models in various price categories. As a result, they come already prepared for a certain set of things.

The company's specialists had several hypotheses that could be tested on the basis of Big Data technology using Data Science and analytics tools:

- Find out the degree of influence of online marketing on the level of sales in stores.
- Evaluate and adjust network budgets for marketing on the Internet.
- Conduct a revision of the effectiveness of marketing channels and improve the current marketing strategy.

To test hypotheses, the goal was set to conduct a ROPO analysis, which includes researching information about online and offline acquisitions, as well as the paths that led to the sale.

The main problem was the need to combine data from online advertising and offline sales. The chain of stores previously generated a large amount of information on consumers who purchased or ordered in various ways:

- selected and bought goods in the store;
- browsed the products on the site and then came and purchased them in the store;
- selected and purchased on the site with delivery to a particular store or directly to their home address.

The stores chain generated information in various services, which is quite logical, given online and offline operating modes:

- information on the online store was collected in Google Analytics;
- information on orders, their execution, as well as all data on offline buyers were stored inside the CRM system.

Prior to this, the company collected data from Google Analytics in Google Big Query based on OWOX services. Now the goal was to implement ROPO analysis. The following tasks were set:

- collect information from advertising campaigns, actions of site visitors, offline purchases and executed orders within the same structure;
- link online orders with offline sessions;
- generate visual reports based on structured information to assess the contribution of various online sources.

The information transfer scheme is presented in [Fig. 3].

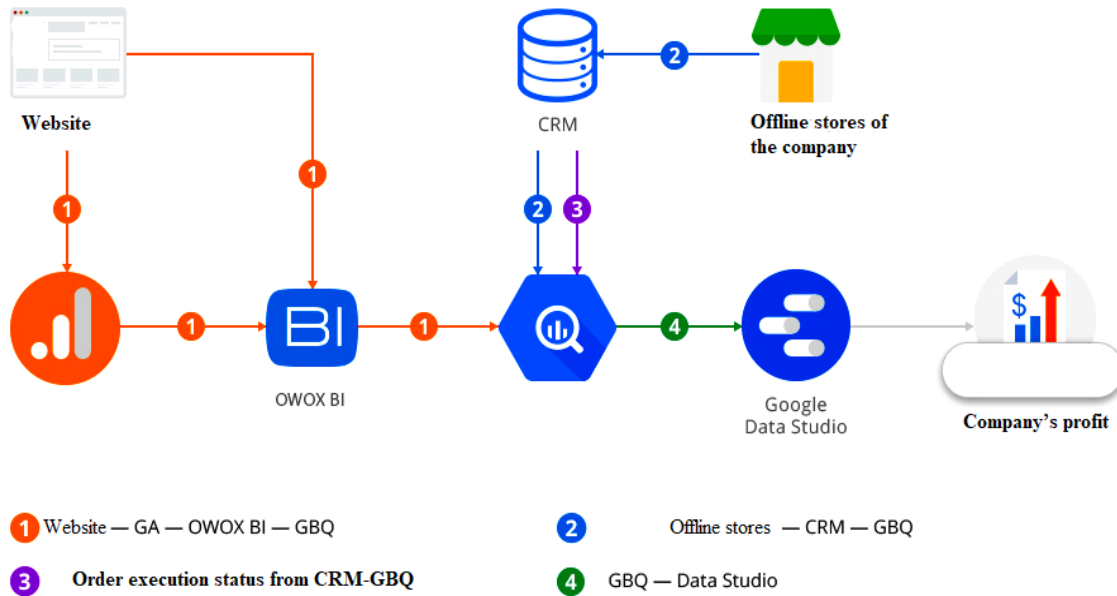


Fig. 3: Information transfer scheme

Now let us consider in detail the necessary steps.

**Stage 1.** Data collection in Google BigQuery.

Each registered visitor of the online store received his personal ID (user\_id), after the transaction was executed, he was also assigned another identifier (transaction\_id). All information was sent to Google BigQuery. Every day, data on online and offline orders from CRM was transferred to Google BigQuery and connected based on the two keys presented above.

**Stage 2.** Combining the information obtained.

Information on online orders was supplemented by information on the execution of each order (purchased or not purchased). Here transaction\_id was used. Next, user sessions are integrated with offline purchases data based on user\_id. For most users who bought in a physical store, there was a history of sessions on the site. The unification scheme is presented in the following [Fig. 4].

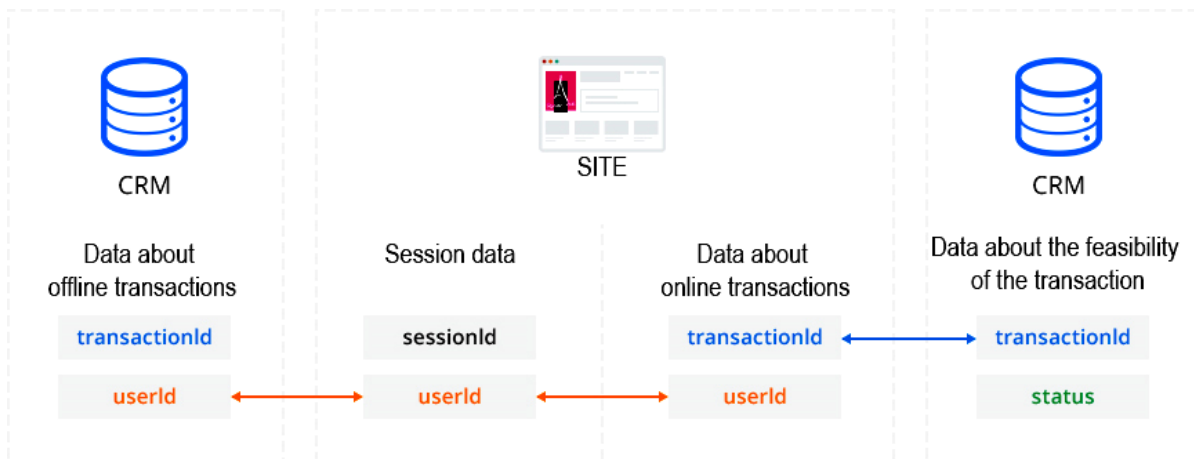


Fig. 4: The scheme of combining information

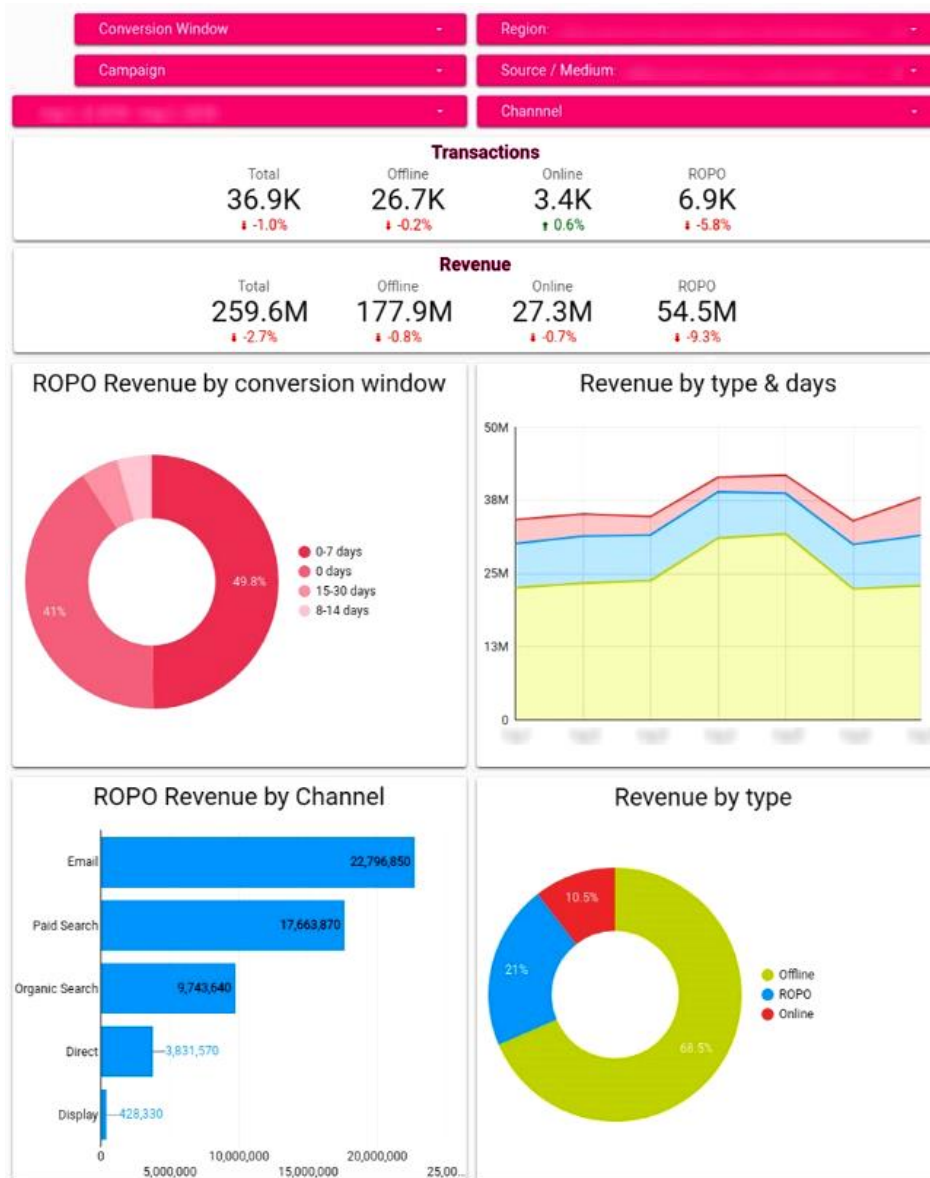
According to the results of the combination, the analysts had at their disposal the following information:

- does the transaction relate to online, offline or ROPO?
- what led the consumer to the purchase or what was the last source?
- the number of days passed between the last session in the online store and the purchase? Here we will explain in more detail. For consumers who have made purchases online, the indicator will always be "0", because the last visit to the online store is always a purchase. For offline

- purchases, this will also be zero, because the consumer does not have sessions offline. All other buyers can be attributed to the target sample of ROPO;
  - location of the last user session.

**Stage 3.** Visual presentation of the formed analytics.

For a visual presentation of the available information, the Google Data Studio service was used. An informative Dashboard was formed, which was equipped with dynamic charts, the capabilities of in-depth analytics and forecasting of the advertising budget. Dashboard is presented in [Fig. 5].



**Fig. 5:** Dashboard for data management

Let us explain its contents. For example, the pie chart on the right side provides us with information that ROPO purchases account for about 20 percent of the revenue share. The diagram on the left explains that almost 50 percent of all ROPO customers visited the website in a range of up to 7 days. In addition, the created template can be customized for different cities, regions of presence, sources, channels presented, campaigns, individual target segments.

The table at the bottom of the Dashboard determines what amount of additional income from ROPO purchases can be obtained as part of forecasting marketing activities and development of a marketing strategy. In addition, we see the amount of profit from specific sources, channels and campaigns conducted.

As a result of using Big Data, Data Science technologies and analytics tools, the store chain made the following conclusions:

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- the organization realized that online advertising contributed to 20 percent of online revenue. In fact, every fifth visitor to a physical store has already visited an online store;
- ROPO analysis showed that the organization underestimated offline companies as a source of revenue;
- the organization has changed its marketing strategy of sincerity based on the conducted research and increased advertising on the Internet.

In the research of Chintagunta et al., they say that marketing is becoming more and more a quantitative science. Previously, marketing focused on institutional knowledge and empirical rules. Now Big Data technologies are at the forefront. However, in their study, they did not take into account the implementation of the Data Driven approach in all areas of the company [12]. At the same time, in his article, Nadler says that it is important to take into account the principles of behavioral economics in marketing that uses data [13]. However, a timely question arises: "Can marketers and marketers handle the flow of data?" This question is given in the work by Sheth and Kellstadt. The presence of a huge amount of information, even processed, does not always affect the increase in profitability or the growth of competitiveness [15]

In our article, we offer a different perspective on the use of Big Data, Data Science and Data Driven technologies. With their help, we can know our client more, express our genuine concern, impartiality, and inner freedom. Technology helps marketers and companies strive to produce value for consumers, customers, and society generally. Big Data technologies, Data Science and Data Driven are not just new tools or mechanisms. They are a different paradigm of marketing, where the old philosophy of marketing is giving a way to a new paradigm, the marketing sincerity paradigm. Sincerity marketing is based on three principles: trust, facts and truth. It is worth remembering that data is interpreted by analysts, decisions are made by managers. Here, more than ever, the following values of sincerity marketing should be used: transparency, fairness, responsibility and honesty. Note that these are not just principles and values for marketing. Their use, demonstration in their work and promotion draw new customers and keep current ones. In the modern world there is a lot of data, but little sincerity. Sincerity marketing helps companies stand out using Big Data, Data Science and Data Driven technologies.

## CONCLUSION

It should be noted that the use of Big Data, Data Science and Data Driven technologies is not without drawbacks. Therefore, we give recommendations on the use of Big Data, Data Science and Data Driven technologies in the work of the company. The first recommendation is the use of information for decision making. It is not necessary to analyze the data for too long, because the goal is to help organizations make effective decisions, evaluate current processes, internal and external information. The second recommendation is involving senior management in analytics. Their mission is not only to support the development of analytics and big data technologies. They should maintain continuous communication with the heads of analytical departments, and, if necessary, gain new skills in analytics. The third recommendation is to train the team to work with data. If the implementation takes place on a top-down basis, then this is most often not that effective. For ordinary employees, it is necessary to create motivation for the use of data and analytics. The fourth recommendation is to attract individual employees as leaders in the transformation of the entire company. They will subsequently motivate, promote the use of data analytics and big data in their work. The effectiveness of Big Data, Data Science technologies and decisions made on their basis is proved by the success of many companies. Leading companies in the application of big data technologies achieve better results while reducing costs by 30 percent and increasing revenues by 20 percent. Sincerity marketing in companies, as never before, reaches a different level of understanding of ongoing processes based on Big Data and Data Science technology, the possibilities of their intermediate control and personalization, which allows to reduce costs and increase profitability.

### CONFLICT OF INTEREST

There is no conflict of interest.

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None.

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