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CUSTOMER SATISFACTION FACTORS ON THE MOSCOW TAXI MARKET³

The purpose of this paper is to identify factors that influenced customer satisfaction in the Moscow taxi market. The previous researches in customer satisfaction of transportation services laid the foundation of factor model. The resulting list of factors was revised by taxi market experts. The augmented model provided the basis for quantitative survey. The research sample included 310 respondents who have been using taxi services in Moscow during past 2 years. Survey data was analyzed using multiple choice regression method. Analysis results show significant differences between frequent and casual taxi users and a certain number of passenger experience factors that have no influence on customer satisfaction: for frequent users it is discount, for regular users - trip environment, and for rare clients - technical support&security and trip comfort.

JEL Classification: M3.

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Introduction

Nowadays, most organizations are engaged in providing services and often deal with a market saturation problem. High levels of customer satisfaction and loyalty have become more difficult to achieve (Sorel, 2004). High customer satisfaction evaluation is the best indicator of the company's future profits (Kotler, 1991). Companies increasingly use this parameter as a criterion for of the product or service performance diagnostics and often associate customer satisfaction ratings with executive employee benefits (Anderson, Sullivan, 1993). The concept of customer satisfaction is central in the marketing theory and practice. According to it, the company's profit is based on fulfillments of the needs of consumers (Gilbert, Churchill, 1982). Moreover, firms operating in highly competitive markets are constantly concerned about customer satisfaction and loyalty to their product (service). Without adequate attention to a customer, the probability of their leaving to competitors increases.

Taxi market is a modern example of a highly developed industry that forces companies to constantly look for their competitive advantages and offer consumers the best quality service providing new and more comfortable cars, increasing its value. Over the past few years, the taxi service has become very popular in Russia, especially in Moscow (Vedomosti newspaper, 2015). The market has a three-level structure: the bottom stage is the illegal taxi service that can be “caught” from a sidewalk or at a bus stop or legal taxi. Traditional taxi companies are in the middle tier, where trips can be arranged via telephone. The top level is occupied by modern online taxi aggregators, which are represented by a local oligopoly and are competing for higher market share (RBC newspaper, 2016). If taxi companies want to remain competitive and attractive to customers, they need to constantly monitor customer satisfaction.

The study was divided into several stages. Initially, a survey was conducted on the parameters of consumer satisfaction in the taxi and public transport markets. The data formed the basis of the factor model. The next step consisted of interviews with 5 experts from various taxi companies. The purpose of these interviews was to adjust the model, taking into account the specifics of the Moscow taxi market. The next stage consisted of a survey questionnaire of taxi consumers based on the adjusted model. After conducting an online survey, a static analysis was carried out using regression equations. As the result, the authors identified the most significant factors, which affected consumer satisfaction with taxi services to a greater extent.

Definition of customer satisfaction

Measuring customer satisfaction is one of the most important issues for business organizations of all types (Mano, Oliver, 1993). This is justified by the concept of consumer orientation and the basic principles of the continuous improvement of modern enterprises. The quantitative evaluation of this indicator is one of the five main management functions, allowing to understand, analyze, and improve the activities of any firm (Massnick, 1997). Over the past decades, the importance of customer satisfaction for business organizations has increased because of the expansion of competition in many markets. Companies need to retain customers, and the key to this lies just in measuring satisfaction, then in analyzing loyalty, and applying different ways to retain customers (Anderson and Fornell, 1994). Thus, the measurement of customer satisfaction is considered to be the most reliable client feedback, considering the fact that it provides an effective, meaningful, and objective proxy to their preferences and expectations fulfillment. Consequently, customer satisfaction is a basic standard of performance and a possible quality measurement for any business organization (Gerson, 1993).

Many researchers have expressed similar opinions, regarding the definition of customer satisfaction. Regarding the definition of consumer satisfaction, their opinions focused on two parameters, namely the expected value and value received from the consumption of services (goods). Some researchers define customer satisfaction as a retrospective estimation of purchasing decisions (Churchill, Surprenant, 1982). Oliver (1993) defined it as evaluation of how many goods (or services) have satisfied or disappointed a buyer as a result of comparison with perceived value. The existing approaches to the consumer satisfaction definition can be divided into two groups: satisfaction or dissatisfaction as the result of consumption, supporting Churchill's and Surprenant's definition, and as a process (cognitive, evaluative, psychological process contributing to satisfaction), according to Oliver's definition (Yi, 1991). Table 1 shows the definition classification based on these two groups.

Table 1 – Definitions of customer satisfaction

Approach	Definition	Author, year
Satisfaction as result	Emotional reaction to the experience associated with the consumption of specific products or services	Westbrook and Reilly, 1983
Satisfaction as process	An estimate showing that the obtained value was at least as good as expected.	Hunt, 1977
	An evaluation of the fact that the chosen alternative corresponded with previous beliefs about it.	Engel and Blackwell, 1982

	Consumer reaction to the discrepancy between previous expectations and the actual value of the product, which are perceived after its consumption.	Tse and Wilton, 1988
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Source: adopted from Grigorodius E., Siskos Y.2010

The definition analysis points out that satisfaction as a result is characterized by emotions and cognition associated with the goods and services consumption. On the other hand, satisfaction as a process is based on the consumer's logical reasoning and comparison of the resulting value with a certain ideal expectation. In this article we will adhere to the first definition approach, since the methodology of this study is based on it.

It can be concluded that companies can analyze the advantages and disadvantages of the products sold, and also identify their strengths and weaknesses vs competitors, based on the expected and actual client product evaluations. This data can help to optimize business processes and achieve profit maximization.

Factors of customer satisfaction

Customer satisfaction analysis is a popular research topic and can be frequently found in the international peer-review journals (Journal of Marketing, Journal of Customer Service in Marketing & Management, Journal of Consumer Research). The most popular categories for the research include hotel and restaurant services, social services and standard of living satisfaction. It is uncommon to find satisfaction studies from the emerging markets and especial by the field of Russian transportation.

Since the service is intangible, it is more difficult for firms to assess how satisfied consumers are with the quality of supplied service (Gronroos, 1982). That is why a system of signals should be used that will help companies and consumers to understand each other better. For example, Parasuraman, Zeithaml, Berry (Parasuraman, Zeithaml, Berry, 1985) distinguish the price as the main factor of satisfaction. Low switch barriers on the taxi market make consumers quite price sensitive as they can quickly switch between competitors. Price can be attributed to the basic and necessary categories because it is always included in the product and cannot be excluded (Mokonyama, Venter, 2013). High price negatively affects the consumer's willingness to engage the service, despite some companies putting higher prices to maintain higher quality of taxi cars (Kosyakova, Shuravina, 2014).

Another parameter that also affects the cost of trip is the ability to select the type of tariff calculation - fixed or by taximeter. Even though traditional taxis are dominated by the second type of cost calculation, modern taxi aggregators introduce fixed pricing (Zhidkova, 2016). This

innovation has driven the increase in the number of trips, both initial and repeated, which means that most customers have positively evaluated this system (Analytical Center of Government, 2018). The company's multi-choice travel option, which includes several classes of cars - economy, comfort, premium, minivan, etc., also has a positive effect on customer satisfaction. Companies cover a wider target audience and can serve more clients with various needs (Zhidkova, 2016).

- The atmosphere of the trip is also important to taxi customers (Ismailova, Kryukova, Nikolayev, Rakov, 2014). If a customer is not satisfied with a taxi company, he will look for another that is able to satisfy their needs (Kosyakova, Shuravina, 2014). In several taxi industry and public transport studies, it can be found that a vehicle (bus, trolleybus, tram or car) cleanliness is a major customer satisfaction factor. The car's condition, both external and internal, is of great importance for customers, and is also a problem for many companies as a large number of clients are dissatisfied with the current level of transport cleanliness (Shinkarenko, Dezhurova, 2014; Kosyakova, Shuravin, 2014) (Some researchers revealed unusual factors that turned out to be most significant). For example, Kotov and Yakunin, using the case of the Orenburg taxi market, determined that the car cleanliness and the driver's tidy look are equally significant for passengers (Kotov and Yakunin, 2011).

- The timely taxi delivery has a positive effect on the service attractiveness for customers because punctuality is a very important parameter. Consumers use taxi as an alternative to public transport, which is significantly slower (Kriger, Kvyatkovskaya, 2015). Moreover, many studies show that the delayed car delivery due to evening rush-hour or bad weather conditions negatively affects the customer satisfaction (Kosyakova, Shuravina, 2014).

- Another key factor of customer satisfaction is the convenience of ordering which includes several areas related to the interactivity of taxi services. Mobile application development allowed to maximize the utility and to simplify taxi order process for a client. The availability of these parameters has a strong positive effect on the taxi market (FOM, 2013; Analytical Center under the Government of the Russian Federation, 2018).

- Various long-term loyalty programs and short-term promotions and discounts have a significant impact on the taxi industry, since various types of bonus programs and incentives positively influence a customer. Passengers are encouraged to use the services of a particular taxi company if they can afford a car class or driver with high ratings (Zhidkova, 2016; Analytical Center for the Government of the Russian Federation, 2018).

- Technical safety of a trip should be considered as a separate factor of customer satisfaction. The absence of valid documents to drive a vehicle, technical inspection, and policy

will not explicitly affect the increased likelihood of getting into an accident. However, in any case, it will alert customers to dismiss the driver (Yakunin, Kotov, 2011).

So, based on the literature review, we created a factor model that explains customer satisfaction with taxi services in Moscow (Table 2).

Table 2 - Attributes of the factor model of consumer satisfaction

Authors, year	Factor	Influence on customer satisfaction
FOM, 2013	Mobile application for taxi order	Positive
Analytical Center, 2018	Opportunity to connect with driver	Positive
FOM, 2013	Free order cancellation	Positive
Zhidkova, 2016	Multivariative tariffs	No effect
Zhidkova, 2016	Cost calculation - fixed or by taxameter	Positive
Mokonyama, Venter, 2013	Final trip price	Negative
Kruger, Kvyatkovskaya, 2015, Loiz, Monzon, Hernandez, 2018	Timely taxi delivery	Positive
Shinkarenko, Dezhurova, 2014	Car cleanliness	Positive
Ismailova et al., 2014	Tidy look of a driver	Positive
Kotov, Yakunin, 2011, Loiz, Monzon, Hernandez, 2018	Abidance by traffic regulations	Positive
Interview Expert	Trip Atmosphere	Positive
Interview Expert	Driver's rating	Positive
Interview Expert	Presence of child seat	Positive
Interview Expert	Seasonal discounts, bonuses	Positive

Source: created by the author

Research methodology

Although customer satisfaction is a frequent research topic, it is still complicated to measure because that it is a latent variable. It cannot be quantitatively measured directly, but it can be derived through various mathematical models based on observable (explicit) variables. This paper considers the indices for satisfaction evaluation, and the models for factors determination that have the greatest impact on it.

The empirical phase of the research consists of three main stages.

1) Customer Satisfaction Index Calculation. CSI (developed by the Stockholm School of Economics in 1989) is an indicator which is based on customer judgment about the performance and importance of the product (service) characteristics. The basic model of the consumer satisfaction index reflects the decision-making process for the purchase of goods (services), based on two factors: consumer expectations and the experience of consumption of the company's products. (Hill, 1996):

$$CSI = \sum_{i=1}^n b_i * X_i, \quad (1)$$

$$\text{where } b_i = \frac{1}{M} * \sum_{j=1}^M b_{ij} \quad X_i = \frac{1}{M} * \sum_{j=1}^M X_{ij}$$

In the formula above, b denotes the weights of each of the parameter X , and X is the average value of the participants evaluations on three questions. First, how are they satisfied with the product (service) in general. Secondly, how much they meet the requirements. Finally, how close the product is to the ideal. The calculation of this parameter must be carried out, since then it forms the regression model basis and will serve as the dependent variable.

2) Factor analysis. It allows us to solve the main problem of the variables dimension reduction, combining them into factors by identifying a certain "latent" parameter. The basic method that is used is the principal component analysis, which distinguished orthogonal vectors using a covariance matrix and after the rotation procedure represents factor loads.

3) Regression modelling. There are many quantitative methods applied to the customer satisfaction problem, and their selection is a difficult task (Vavra, 1997). By studying the level of satisfaction and factors affecting it, it is more correct to use basic regression modeling method: ordinary least squares.

$$Y = b_0 + b_1 * X_1 + ... b_n * X_n + e_n +, \quad (2)$$

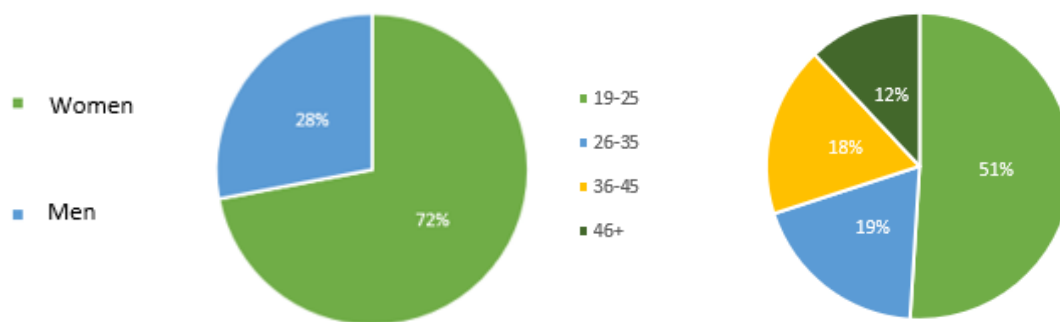
where Y is a dependent variable - CSI,
 b_n are regression coefficients, X_n is customer satisfaction
 with the n -th product characteristic, n is the number
 of product / service characteristics, e_n – residuals of model.

There are more serious classical methods developed specifically for analyzing consumer satisfaction and parameters affecting it, but several studies, which are devoted to the satisfaction factors with transport services use atypical methods (Fuzzy Set Theory, membership functions, group factor matching indices). This may be future directions for the study of taxi service satisfaction problem.

Data collection and sample characteristics

We choose survey as one of the main methods of data collection because it allows to obtain primary information directly from customers. It enables to find out directly more detailed information from respondents regarding most significant parameters for them. The survey was conducted individually with each respondent. Valid participants were supposed to have at least one taxi ride. The first part of the questionnaire was devoted to general questions regarding the use of taxi services, as well as the reasons and frequency of use. The next block contained questions that focused on the service component of taxi ride. In order to determine the socio-demographic characteristics of taxi services users, the questionnaire included questions about gender, age, family composition, and income level. In each of the described points, there was a choice of 2 to 5 answers on a nominal scale, with the exception of the question about the income of the respondents. It plays an important role in this context, as taxi service is considered rather expensive.

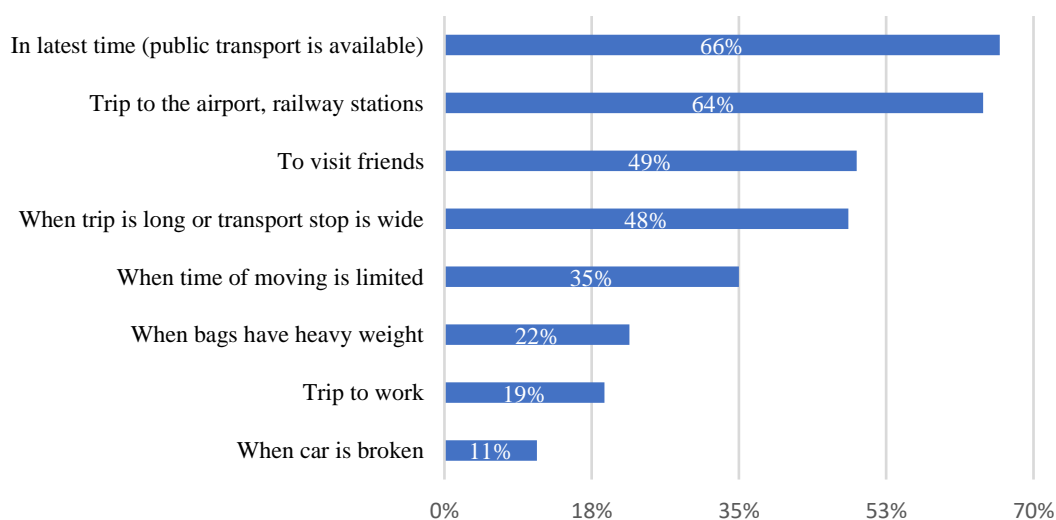
We selected an online channel as an exclusive chosen distribution method of the survey. Since there are specific features of service consumption - most of the orders are carried out by the aggregators through the mobile application (in total, three large online aggregators provide more than 60 000 cars) (Puzyrev , Telegin, Seregin, 2016). The online channels included social networks (Vkontakte, Facebook) on the author`s personal page and in some groups dedicated to users of the Moscow taxi - the Vkontakte community Taxi Club Moscow (a group of taxi users and professionals, the number of subscribers is 28,765 people, URL: https://vk.com/taxi_club_moscow), on Facebook the community Taxi Forum (the number of subscribers is 2040 people, URL: <https://www.facebook.com/groups/forumtaxi/?fref=ts>). Regarding other Internet channels, they also include various forums of taxi users such as the forum of one of the largest platforms for the sale of auto.ru cars (URL: <https://forum.auto.ru/taxi/>). The respondents' distribution by age and gender is presented below.



*Fig. 1. Age and sex of respondents in sample (n=310)
Source: created by the author according to survey*

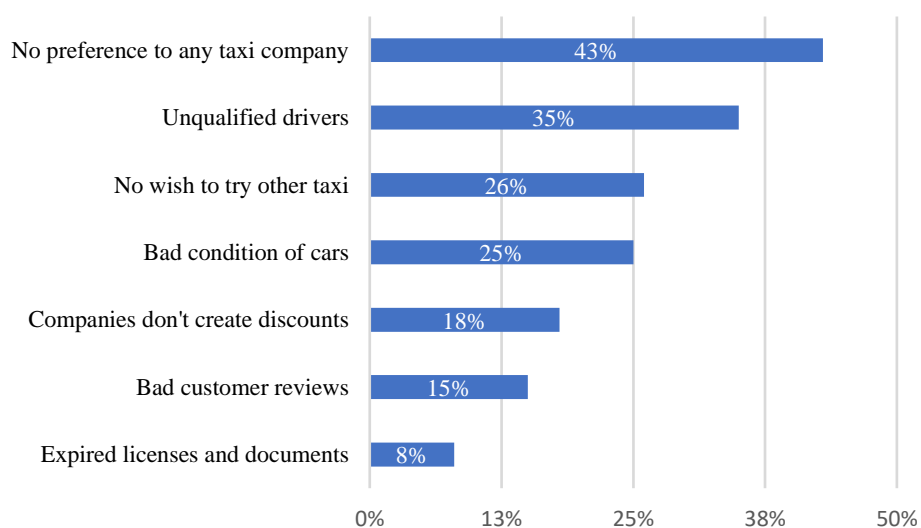
Based on this chart, it can be noted that 28% of respondents are men and 72% are women (fig.1). According to previous studies, women are 2 times more likely to use taxi services than men (FOM, 2013). The age of half of the respondents is from 19 to 25 years. The shares of respondents age 26-35 and 35-45 were distributed in equal parts, and the percentage of the most adult users of taxi services was the smallest. From the survey data it can be noted that most respondents rate their income level as average. From the proposal to evaluate its level on a scale from 1 to 7, the most frequent value in a series of data - mode - is 4. This also corresponds to the fact that half of the respondents in the sample are people under 25 years.

From the socio-demographic characteristics we can move on the analysis of taxi ride purchase reasons. From the graph (Fig. 2) the most popular reasons for a taxi ride are a trip to the airport / railway station, as well as returning home late, when public transport is unavailable (66 and 64 percent, respectively). The next popular reasons for using taxi are visiting friends and returning home, as well as the longevity of trip, or other public transport stops are too far. The top three most unpopular reasons were: trips by taxi for work, when a car is broken, and returning home with heavy bags after shopping.



*Fig. 2. Reasons of taxi consumption by respondents (n=310)
Source: created by the author according to survey*

In general, to determine preference specialties in the taxi market, it is needed to refer to the results of the answer to the question presented below (Fig. 3). From this chart, almost half of the respondents do not have a taxi company affinity. This is since the market has a fairly large number of players, each trying to capture a share in a growing market. Moreover, consumers just want a good service at the best price for them. In addition, they could have mobile applications of several companies, and they can easily choose an acceptable trip price. This suggests that the level of loyalty in the Moscow taxi market is likely to be low. Factors of service dissatisfaction can be also considered the reasons to switch to another taxi company: companies provide unqualified drivers (35%), cars are in bad condition (a quarter of respondents), companies do not create loyalty programs and discounts (18%). However, 26% of respondents are still loyal to one of the companies that provide taxi services and are not ready to use something else.



*Fig. 3. Main reasons for preferring one taxi company to another (n=310)
Source: created by the author according to survey*

According to the sample, a portrait of Moscow taxi service user is a client (in most cases a woman) with an average income under the age of 30, working full time, without children, who doesn't prefer one taxi company and mostly uses a taxi on the occasion — a trip to the airport to get to the house from the guests. However, it is better to consider the analysis based on the intensity of taxi services use. To do this, the entire sample will be divided into 3 groups: those who frequent use a taxi (almost every day and several times a week - 73 respondents), those with an average use intensity (several times a month - 129 respondents), and those who rarely use (several times a year - 95 respondents).

It is correct to prove the division of the obtained sample into subsamples by the intensity of taxi ride purchasing and to confirm the significance of differences with Chow test. Despite that it often checks the stability of a regression model parameters, the presence of structural shifts in

the sample, but in fact, the test checks the heterogeneity of the sample in the context of the regression model (Chow G., 1960). The null hypothesis of this test indicates the absence of differences between the residual variance of the sample and the subsamples: H_0 : the sample is homogeneous, the division into subsamples is not necessary. In this case the value of F statistics = 2.74. According to F-distribution, F critical = 1.53. Since the observed value is higher than critical, it can be concluded that with a probability of 10 % error the null hypothesis is rejected and it can be argued that the sample is heterogeneous and is reasonable to divide it into 3 subsamples that differ in the intensity of taxi use.

A regular taxi client is: a woman with university education, of a young age (up to 25 years old), single and without children, with an average income. As for the category that uses taxis moderately, the difference from the above group is the age (here it is shifted by an interval of 26-35 years), as well as in income (the share of respondents with average and low incomes is almost equal here). In group 3, the consumers differ from the previous more mature age (most of respondents are 36-45 years old), as well as marital status - are married) and the presence of children. Based on this, it can be concluded that the younger population of Moscow uses taxi services more often than married people with children of more mature age.

General satisfaction level evaluation

One of the problems of customer satisfaction analysis is that it cannot be obtained from financial statements or other company documents. This indicator is latent, since it cannot be quantitatively measured and obtained explicitly. One method of problem solving is applying various mathematical models based on observable (explicit) variables. These parameters can be evaluated using a survey of consumers, asking them the appropriate questions. To assess the level of satisfaction it is better to use consumer satisfaction index (CSI). In order to calculate CSI indicator, the answers to 3 questions were used, comparing the taxi service with a certain ideal, compliance with the requirements and expectations, and evaluating the overall level of pleasure gained from using a taxi. Based on this, the average indicators for each of the questions were taken in the weighted average. The results are in the table below.

Table 3 – Customer satisfaction index evaluation

CSI %	Frequent users	Regular users	Rarely users	Average
	72.57	72.43	69.5	70.35

Source: created by the author using survey data

Based on the CSI, we can conclude that, on average, customers are 70% satisfied with the services on the Moscow taxi market, even though there is a significant part of consumers who pointed to some problems.

In general, customers who use the services in Moscow are not completely satisfied with it, based on the two satisfaction estimates. In order to more fully identify the causes of dissatisfaction, it is necessary to analyze customers' attitudes to some of the parameters that were identified based on the literature review and adjusted to reflect the opinions of respondents. The next part of the paper includes modelling the factors of client satisfaction with the services of Moscow taxi.

Factor analysis and regression modelling

Estimation of the client satisfaction parameter is undoubtedly an important part of consumer research, but it is more significant to identify the factors that have the greatest positive and negative influence on observed characteristics. Companies need this to adjust product (service) qualities to increase the number of loyal and satisfied customers (Zaorik, Rust, 1993). There are many quantitative methods applied to this problem, and their selection is a difficult task (Vavra, 1997).

At the first stage, all factors have been transposed into components using factor analysis. For each of the selected consumer groups, the set of parameters in each factor turned out to be different. This is probably because the selected subsamples differ significantly in the consumption of taxi services. So, the following variables were taken for analysis⁴:

- X1 - Availability of a mobile application for taxi order
- X2 - Ability to communicate with the taxi driver
- X3 - Free order cancellation
- X4 - Multivariate tariff system
- X5 - The final price of the trip
- X6 - Timeliness of taxi arrival
- X7 - Cleanliness of a car (outside and inside)
- X8 - Clean driver look
- X9 - Pleasant music and conversation with the driver
- X10 - Compliance by the driver of traffic rules
- X11 - Driver rating
- X12 - Discounts, seasonal offers

As already described earlier, using factor analysis (principal component method), the initial 12 variables were combined into more aggregate factors - components. The results for each of the

⁴ These variables were obtained from survey questions with a Likert scale

subsamples are presented below in the tables 4-6. For convenience of perception, only the highest values of factors are left in the component matrix.

Table 4 – Component matrix for frequent users

Variable	Component				
	Technical support and security	Cost and quality service evaluation	Cleanliness	Comfort of taxi choice and trip	Discount
Availability of a mobile application for taxi order	0.59				
Ability to communicate with the taxi driver	0.65				
Free order cancellation	0.79				
Multivariate tariff system				0.66	
Price of the trip		0.59			
Timeliness of taxi arrival				0.58	
Cleanliness of a car (outside and inside)			0.73		
Clean driver look			0.54		
Pleasant music and conversation with the driver				0.46	
Compliance by the driver of traffic rules	0.75				
Driver rating		0.40			
Discounts, seasonal offers					0.88

Source: created by the author using survey data

From this table it can be seen that all the variables were distributed into 5 factors. The names of each component are presented at the top of the columns. The first factor combines the technical characteristics of taxi ordering, as well as compliance with traffic rules. The second factor aggregate characteristic consists of the trip price and the driver's rating. The third factor includes variables related to cleanliness of the car and the driver's look. The penultimate component combines the factors responsible for the comfort of the trip. Discounts are not included in any component, so they stand out as a separate category.

It should be noted that the distribution of the variables between the factors of the other two sub-samples is slightly different. This is probably due to the fact that consumers have different perceptions depending on the frequency of the taxi use.

Table 5 – Component matrix for regular users

Variable	Component				
	Trip atmosphere	Cleanliness	Cost and quality service evaluation	Mobile application	Order convenience
Availability of a mobile application for taxi order				0.84	
Ability to communicate with the taxi driver					0.77
Free order cancellation					0.56
Multivariate tariff system					0.86
Price of the trip			0.82		
Timeliness of taxi arrival	0.76				
Cleanliness of a car (outside and inside)		0.83			
Clean driver look		0.82			
Pleasant music and conversation with the driver	0.58				
Compliance by the driver of traffic rules	0.79				
Driver rating			0.73		
Discounts, seasonal offers					0.88

Source: created by the author using survey data

For the regular taxi users we observe rather different factor composition. The first factor contains the parameters that are responsible for the environment of the trip as a whole. The second aggregate factor is similar to the third factor from the previous model and reflects cleanliness of the car. In this model, there is also a factor component consisted of one variable only – a mobile application for taxi ordering. The last aggregate factor includes for the convenience of ordering a taxi.

Table 6 – Component matrix for rare users

Variable	Component				
	Technical support and security	Mobile application	Trip comfort	Order convenience	Price and discount
Availability of a mobile application for taxi order		0.84			
Ability to communicate with the taxi driver	0.72				
Free order cancellation				0.73	
Multivariate tariff system				0.85	
Price of the trip					0.83
Timeliness of taxi arrival	0.84				
Cleanliness of a car (outside and inside)			0.51		
Clean driver look			0.67		
Pleasant music and conversation with the driver			0.86		
Compliance by the driver of traffic rules	0.79				
Driver rating	0.78				
Discounts, seasonal offers					0.79

Source: created by the author using survey data

In the third subsample (rare taxi use), the variables were also divided into 5 factors. The first factor focuses on the technical support of the trip and the second includes only one variable - the mobile application. In the third, the variables responsible for the comfort of the trip were connected. The last two components combined the convenience of ordering and the price of a trip.

The customer satisfaction index is the depended variable by regression modelling. As a result, for each of three groups (by intensity of taxi usage). We developed a separate model for each customer group.

For frequent users:

$$CSI = 4.96 + 0.18 * X1 - 0.09 * X2 + 0.06 * X3 + 0.12 * X4 + 0.29 * X5$$

$$(0.01) \quad (0.05) \quad (0.49) \quad (0.62) \quad (0.31) \quad (0.21)$$

$$R^2 = 0.20 = 1.05$$

- X1 – Technical support
- X2 – Cost&Quality Service
- X3 – Cleanliness
- X4 - Comfort of taxi choice & trip
- X5 – Discount

For regular users:

$$CSI = 4.97 + 0.19 * X1 + 0.07 * X2 - 0.11 * X3 + 0.01 * X4 + 0.05 * X5$$

$$(0.02) \quad (0.09) \quad (0.28) \quad (0.11) \quad (0.01) \quad (0.31)$$

$$R^2 = 0.19 = 1.02$$

- X1 – Trip environment
- X2 – Cleanliness
- X3 – Cost & Quality service
- X4 – Mobile application
- X5 – Order convenience

For rare users:

$$CSI = 5.10 + 0.10 * X1 - 0.25 * X2 + 0.10 * X3 + 0.06 * X4 + 0.09 * X5$$

$$(0.09) \quad (0.08) \quad (0.18) \quad (0.51) \quad (0.90) \quad (0.23)$$

$$R^2 = 0.21 = 0.87$$

- X1 – Technical support & security
- X2 – Mobile application
- X3 – Trip Comfort
- X4 – Order convenience
- X5 – Price & Discount

As we can see, for regular users Technical Support, Cleanliness, Comfort and Discounts all have a positive impact on the Satisfaction level. Discount factor has the highest coefficient making the most impact on the dependent variable. It can be suggested that frequent users value discounts and bonuses provided by the Loyalty programs and also do not want to spend extra for numerous trips. Cost of a trip predictably has a negative impact on the overall customer satisfaction.

For normal users the results are quite different. Trip environment, Cleanliness, Mobile application and Order convenience influence positively the customer satisfaction level.

Meanwhile, for them the most important is trip environment, rather than other factors. As is the case with frequent users, the parameter Cost&Quality Service has a negative effect on the resulting variable. This may indicate that all aspects related to the price of the service are equally important for all consumer categories.

According to the rare users group it can be seen that all parameters, with the exception of Mobile application, have a positive effect on customer satisfaction. For rare users, parameters such as Trip comfort and Technical support & security are equally important, but at the same time, the variable Mobile application has negatively influenced CSI. This may be that such consumers often order a taxi by phone because it is convenient for them.

Discussion

According to the data provided in the previous section there are significant differences between the factor values and regression parameters for customer groups identified by the taxi use: frequent, regular or rare. It is evident that the groups identified employ quite a different set of variables to assess their taxi experience that is reflected in the factor composition.

One of the distinct features in the factor composition is the mobile app perception. Frequent users consider app as the main user interface for the taxi ride experience. They use it to manage the order and communicate with a driver. For the regular and rare users, a mobile app is a separate entity. These groups manage their ride directly with a driver.

Besides the overall ride/order control differences, customer groups exhibit quite different perception of the ride experience when it comes to the vehicle and driver's appearance. For frequent and regular users a separate factor 'Cleanliness' was identified that included variables measuring car cleanness and driver's tidiness. For rare users these variables are included into a larger factor with other variables like "pleasant music". The main reason for this difference to be suggested is that the first two groups consider overall cleanliness and hygiene to be a standard for taxi service, while rare users expect more variation similar to getting good music or having an interesting conversation with a driver.

Beside these factor composition differences, we observe certain variation in the regression analysis with the customer satisfaction score as the target variable. For the frequent and regular customer groups the cost/quality factor makes negative impact on satisfaction. It is natural, as they use taxi as a part of their regular commutes and extra expenses are not expected.

For the rare users, the only factor with a negative impact turned out to be the mobile app. Some extra research is required to explore this finding in-depth, although a certain explanation can be suggested. It is natural to assume that rare users do not have taxi app installed on their smartphones

and have little to no experience using it. Naturally, it causes certain stress to use it for ordering a taxi.

Conclusion and further research

The conducted research on the satisfaction problem of the taxi market has allowed to obtain interesting results. Approaches to satisfaction definition can be divided into two ways, as a process and as a result. The first type is characterized by comparing the consumed product with a certain ideal, the second is more associated with the emotional side of the consumption. There are many reasons why companies should measure customer satisfaction. Using the information received, it is possible not only to evaluate your current position in the market in relation to competitors and, accordingly, adjust the existing strategy, but also determine and analyze their expectations and needs, which will allow you to adapt products to customers.

A part of the study - a review of the scientific literature on similar topics - has revealed that many authors studied the significant factors of transport services, but to a greater degree they contain information about public transport. In addition, the last study that was conducted on the Moscow taxi market was published in 2013, and its results are very outdated. As already mentioned, in 5 years this market has undergone major changes. The key difference to the 2013 is a significant taxi market consolidation and introduction of the taxi aggregator platforms like Uber and Yandex Taxi. It enabled certain unification of the service standards allowing people to have much more consistent travel experience and also structure their expectations. Consequently, this research is scientifically novel and focuses on determining the distinctive features of the behavior and preferences of the taxi clients.

The conducted analysis provided several significant practical conclusions. First, consumers of Moscow taxi market vary greatly according to the intensity of taxi use. The first group includes those who use it several times a week, the second group - several times a month, and the third group - several times a year. Moreover, the main motives for using taxi are also different. Frequent users take a taxi to work and when they must urgently go on business, standard users - when a car is broken or to the airport, and rare users - to the airport or to visit friends and family. Secondly, the level of customer satisfaction of Moscow taxi services is at an average level (about 70% out of 100%), and for more frequent users it is higher than for rare users (72% versus 69%). This main reason consists of differences in motives - for regular clients the importance is to get quickly from point A to point B, so they are not very focused on additional parameters of the trip unlike rare users. Thirdly, the parameters that most strongly influence the satisfaction with a taxi ride also differ depending on the frequency of trips.

However, the problem of the study is that some of the obtained regression parameter estimates are not entirely logical, therefore additional studies are required to determine their actual effect on satisfaction. In addition, another possibility of future research is clustering taxi consumers with a more accurate and detailed description of the client profile. It will allow to adjust the value proposition of taxi companies, considering consumer preferences that differ according to trips intensity.

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