

## THE QUALITY OF THE TRANSPORT SERVICES PROVIDED BY THE OPERATORS OF THE TRI-CITY PUBLIC TRANSPORT

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**Purpose:** The purpose of the paper is to present the factors that shape the quality of the services provided by the operators of mass public transport in the Tri-City from the point of view of people using that transport.

**Design/methodology/approach:** The main method used for the research was Kano. Thanks to this method, factors shaping the quality of services provided by public transport entities were examined.

**Findings:** It was established that the main factors shaping the transport service are: factors directly oriented to the customer – adaptation of means of transport to the transport of disabled people, communication on changes in timetables, information on schedules, as well as environmental factors – adaptation of means of transport to sustainable energy sources, transport infrastructure.

**Research limitations/implications:** Research may be developed in the future with further factors adapted to the strategies of public entities after 2024.

**Practical implications:** The factors shaping the transport service are included in the development strategy of the company providing public transport. As a result of the research, it was proved that respondents actually pay attention to the same factors. Hence the conclusion for companies that these factors should continue to be strengthened and invested in modern means of transport.

**Originality/value:** The article examines the social feelings of factors partially included in the strategy of companies providing public transport. Factors focused on the customer, on the relationship between the employee and the customer, on environmental protection. The feelings of transport users as to the hierarchy of these factors and the importance of their occurrence were examined.

**Keywords:** Quality of service, public transport.

**Category of the paper:** Research paper.

## 1. Introduction

At every stage of their life, people need a sense of independence, and mobility is an important part of it. One of the prerequisites for a good quality of life is easy access to other people and the possibility to achieve a variety of goals, which in turn requires adequate means of transportation. It is therefore important to ensure that people are able to move to different places regardless of the reasons for their need for transportation as well as of the means of travel. This allows the public to maintain the possibility of mobility, resulting in a great sense of independence (Sipa, 2014, p. 190).

According to the Poland 2030 Strategy, transport in Poland by 2030 is expected to be friendly to its users, to improve the economic efficiency of production and distribution in spatial terms, and to improve the country's territorial accessibility. On the other hand, in terms of environmental protection, it will not reduce nature's ability to regenerate and, by controlling energy consumption and gas emissions, it will have less and less negative impact on living conditions (Przybyłowski, 2015, p. 333).

The purpose of the paper is to present the factors that shape the quality of the services provided by the operators of mass public transport in the Tri-City from the point of view of people using that transport.

## 2. The quality of service in the public transport market

Transportation needs arise from the need to travel at a certain point in time, from a starting point to a destination. The whole range of needs has a quantitative dimension that comprises the number and length of trips, a spatial dimension in the form of the vector of movements, and a temporal dimension defined by the date of travel, the duration of travel, and the time schedule of the trips. Mass public transport plays an important role in meeting the transportation needs of the society (Sipa, 2014, p. 190).

Mass public transport is a service characterised by:

- accessibility for all, whether traveling individually or in groups,
- public advertising,
- a fixed schedule and period of operation,
- fixed routes and stops, or specific places of departure and destination, or a specific territory of operation; and
- published fare tariffs (Gramza, 2011, p. 128).

According to the law, mass public transport is the responsibility of operators, organisers, and carriers.

The operation of mass public transport in a given area is ensured by either the minister in charge of transport or the relevant competent local government unit (Act of 2010, art. 4).

The operator of mass public transport is a budgetary entity of the local government and an entrepreneur who has been authorised to conduct business in the field of passenger transportation and entered into a contract with the organiser of mass public transport for the provision of mass public transport services on the transportation line specified in the contract (Act of 2010, art. 4).

A carrier is an entrepreneur authorised to conduct business in the field of passenger transport on the basis of a confirmation of notification of transportation (Act of 2010, art. 4).

The Metropolitan Transport Association of the Gulf of Gdansk (MZKZG), established in 2007, is an entity that deals with the problem of integration of public transport. The MZKZG was formed by: the City of Gdańsk, the City of Gdynia, the Kolbudy Commune, the Szemud Commune, the Kosakowo Commune, the Luzino Commune, the Pruszcz Gdański Municipality, the City of Pruszcz Gdański, the City of Reda, the City of Rumia, the City of Sopot, the Wejherowo Municipality, the city of Wejherowo, and the Żukowo Commune. The objective of the Association is to jointly develop a transport policy and manage local public transport in the territory of the communes and municipalities that are members of the Association (Hartenberger-Liszek, 2014. p. 42).

Within the MZKZG, in the territory of the Tri-City, public transport services are provided by public transport companies, which include two municipal organisers operating in the form of authorities, namely the Public Transport Authority of Gdańsk (ZTM) and the Public Transport Authority of Gdynia (ZKM), and the Fast Municipal Railway (SKM) and Municipal Transport Company in Wejherowo (MZK), which are organisers as well as carriers.

The Public Transport Authority of Gdynia introduces modern technical solutions that indirectly enable it to improve the quality of its services for passengers. The operators in Gdynia's public transportation organised by the ZKM of Gdynia are:

- Przedsiębiorstwo Komunikacji Autobusowej w Gdyni Sp. z o.o.
- Przedsiębiorstwo Komunikacji Miejskiej w Gdyni Sp. z o.o.
- Przedsiębiorstwo Komunikacji Trolejbusowej w Gdyni Sp. z o.o.
- EUROMATPOL Sp. z o.o.
- Przedsiębiorstwo Wielobranżowe 'BP Tour' Piotr Brewczak.
- IREX 3 Sp. z o. o.
- PKS Gdynia S.A.
- Pomorska Komunikacja Samochodowa Sp. z o.o.
- Przewozy Autobusowe 'Gryf' Marian Kotecki.

Transport services for the ZTM of Gdansk are provided by the following operators:

- Gdańskie Autobusy i Tramwaje Sp. z o.o.
- Przedsiębiorstwo Komunikacji Samochodowej Sp. z o.o. in Gdańsk.
- Przedsiębiorstwo Wielobranżowe ‘BP Tour’ Piotr Brewczak (Hartenberger-Liszek, 2014, p. 43).

Nowadays, human activity is strongly linked to the need to move people, cargo, and information. In urban areas, the implementation of the smart city concept is served, among other things, by modern and efficient mass public transport, which binds together large urban agglomerations. This transport should meet customer expectations in terms of quality.

Quality is treated as a characteristic that is collective, unmeasured and unmeasurable, but describable and quantifiable as the resulting intensity of the most significant factors that affect it.

The determination of the requirements for the quality of mass public transport is not easy, as the requirements are associated with various aspects of evaluation of the performance of the transport system from the point of view of its components. Other criteria for the evaluation of the quality of transport will be identified by the passenger, the municipal transportation company, and the person living in the vicinity of the transportation system. In addition, a set of criteria can be defined for the environmental impact of transport. It is not always possible to meet the quality requirements for public transport to the same extent due to social, environmental, technical, and economic factors. It can be said with a broad generalisation that the operation of an urban transport system is based on a certain trade-off between what needs to be done, what can be done, and what pays off (Gramza, 2011, p. 129).

### **3. The KANO method as an example of service quality research**

The Kano quality research method involves translating general customer expectations and opinions about a service or product into specialised language. This makes it possible to focus on the development of a product or service and promotes future rationalisation of resources. The respondent answers the questions included in a questionnaire, which are formulated in two versions (positive and negative): when a characteristic is present and fulfills its task correctly, when a characteristic cannot be extracted or possibly does not occur in a satisfactory manner (Janocha, Dubis, 2023, p. 163).

Each of the questions (whether positive or negative), has a list of five options, namely: *“I like it that way”* (like), *“It must be that way”* (must-be), *“I am neutral”* (neutral), *“I can live with it that way”* (live with), *“I dislike it that way”* (dislike). After the survey, the result is tallied and totaled to show how the majority of users/customers expressed their requirements, and this is categorized into 6 types of characteristics (Hussain, Mkpojiogu, 2016, p. 173).

The method distinguishes 6 types of characteristics that affect customer satisfaction:

- M – must-be characteristics – must be included as a standard in the product or service, because without them its function cannot be performed. Nor are they important to achieving satisfaction – their existence in the product is taken for granted, and their absence translates into loss of a customer.
- O – one-dimensional characteristics – have the greatest importance for customer satisfaction with a product or service, because they shape the quality. These are the characters sought by the customer; the more there are of them, the higher the chance of meeting the requirements. Their absence causes dissatisfaction to increase, but not as sharply as in the case of mandatory characteristics.
- A – attractive characteristics – are designed to attract the customer to a product or service, as they are supplementary to his or her requirements. When these features are absent, they might cause only a loss of interest in a product or service. On the other hand, when they are present, customers can be delighted by them. They are difficult to identify and even more difficult to define, and their popularity is very short-lived. Poorly designed attractive characteristics may go unnoticed by the customer.
- I – indifferent characteristics – are those whose existence the customer does not care about and is does not care whether they are present or not.
- Q – questionable, skeptical characteristics – are those whose importance to the customer is difficult to predict, especially with respect to the time when the importance emerges.
- R – reverse characteristics – are those which conflict starkly with what the customer feels is important. Their absence pleases the customer, while their presence arouses dissatisfaction (Malinowska, Wiśniewska, Grudowski, 2014, pp. 238-239).

The Kano method helps find the characteristics that are the most important in a particular service or product and that influence customer satisfaction. The order of importance of the characteristics is the following: M, O, A, and I.

#### **4. Mass public transportation in the Tri-city in the light of research**

An important issue in the shaping of transport services is the correct identification of customer expectations and service providers' capabilities. In order to achieve the adopted goal of the study, a survey was conducted with 67 respondents. The survey was addressed to the residents of the Tri-City urban agglomeration and its surrounding areas who are undergraduate and graduate students of the Faculty of Economics at the University of Gdańsk and use public transportation at least occasionally. Thirty-five first-cycle program (bachelor's degree) students and 32 second-cycle (master's degree) students participated in the survey. A large majority of the respondents, 41 people, were part-time students (41 people), while the number of full-time

students was 26. Sixty-one people were students of economics and 6 were students of health care technology (HCT).

The questions in the questionnaire were intended to gain information about mass public transport in the Tri-City. They concerned the following issues:

1. Frequent traffic delays in mass public transport.
2. Provision of a sufficient number of connections by public transport organisers.
3. Cleanliness of mass public transport vehicles.
4. Friendly and helpful staff operating mass public transport.
5. Ready availability of schedule and fare information and ease of reading them.
6. Facilities for people with disabilities in mass public transport.
7. Adequate facilities for passengers, such as places to carry strollers, prams, or bicycles.
8. Sufficient communication between public transport operators and passengers in case of schedule changes.
9. Public transport providers offering of a variety of ticket options that meet the needs of the passengers.
10. Amenities such as USB charge ports and free Wi-Fi access on means of transportation.
11. Possibility to file complaints concerning travel.
12. Public transport organisers taking measures to reduce greenhouse gas emissions and negative environmental impacts.
13. Adapting the means of transportation to sustainable energy sources, such as electricity or hydrogen.
14. Sufficient investment in the development of infrastructure (bike paths, bus lanes) for low-emission means of transportation, such as bicycles and electric buses.
15. Public transport operators informing passengers about the environmental impact of the means of transportation and encouraging informed choices by passengers.

#### 4.1. The survey results for all students of the Faculty of Economics

The survey results for all respondents are shown in Table 1. A total of 67 people answered the questions.

**Table 1.**

*The factors shaping the quality of service in Tri-City's mass public transport as identified by students of the Faculty of Economics*

Factor no.	Item	Number of votes cast for a given factor						Total number of votes	Assessment category
		M	O	A	I	Q	R		
6	Facilities for people with disabilities	33	20	4	10	-	-	67	M
11	Complaints concerning trips	27	20	5	15	-	-	67	M
8	Communication on schedule changes	26	22	3	16	-	-	67	M
5	Clear information about schedules	25	17	9	16	-	-	67	M
9	Various ticket options	15	36	13	3	-	-	67	O
1	Trip delays	22	34	5	2	3	1	67	O
2	Sufficient number of connections	23	31	9	4	-	-	67	O

Cont. table 1.

3	Cleanliness of the means of transport	25	28	7	7	-	-	67	O
13	Adaptations of the means of transport to energy sources	9	24	14	19	-	1	67	O
14	Investment in infrastructure	17	24	10	15	-	1	67	O
12	Reduction of gas emissions	17	22	6	22	-	-	67	O
4	Friendly staff	13	19	21	14	-	-	67	A
7	Possibility to carry strollers, prams, and bicycles	15	18	7	27	-	-	67	I
15	Information about the impact of the means of transport on the environment	8	19	12	27	-	1	67	I
10	USB charge ports and Wi-Fi	9	14	21	23	-	-	67	I

Note. Prepared by the author.

According to the survey, four characteristics are mandatory and must be included as a standard in the transportation services provided. The first is amenities for people with disabilities, which was indicated by 33 people. The next three characteristics are the possibility to file complaints regarding trips, efficient communication about schedule changes, and easy-to-read schedule and fare information. These characteristics are provided on most lines and stops in the Tri-City thanks to the information boards of the TRISTAR Traffic Management and Control Center and cell phone applications (Trojmiasto.pl and jakdojadę). In addition, during the ride, passengers are informed about where they currently are and what the next stop will be.

Another group of characteristics comprises those that are most important for customer satisfaction with the transportation service and that shape its quality. One of them is the various ticket options that meet the needs of the passengers. As many as 36 people indicated this characteristic. This is a very important issue in the Tri-City, where it is possible to purchase single-trip tickets, timed-limited tickets, and tickets combining different modes of transport (bus, tram, trolleybus, and Fast Urban Railway). Another feature is the lack of traffic delays and the number of connections. This feature was indicated as important by 34 of the respondents. In the past year, many bus lines have been closed in the Tri-City and others have been shortened or lengthened. The cleanliness of the means of transportation is also an important factor that affects the quality of the services provided. As it turns out, more and more passengers are also paying attention to features associated with environmental protection, because as many as 24 persons indicated the desirability of the adaptation of the means of transportation to sustainable energy sources, such as electricity or hydrogen, and of investments in infrastructure development for low-emission means of transportation, such as bicycles, bike paths, and electric buses. In the Tri-City, there is an increasing emphasis on the reconstruction of roads and construction of bus lanes. Measures are also taken to reduce greenhouse gas emissions and negative environmental impacts by public transport organisers (by introducing electric buses and buses that use natural gas as the fuel).

The only attractive characteristic identified by the respondents is friendly and helpful staff.

The indifferent characteristics that the customers using the service do not ask for are the carriage of strollers, prams, and bicycles (this is due to the fact that the spots for such purpose are commonly found on buses), information about the environmental impact of the means of transportation, and USB charge ports and Wi-Fi.

#### 4.2. The results of the survey for the group of first-cycle and second-cycle students

An analysis of the different groups of students makes it possible to notice small differences in the order of the characteristics depending on whether they are students of the first- or second-cycle programs and whether they are full-time or part-time students.

The results of the survey for students of full-time and part-time first-cycle programs are shown in Table 2.

**Table 2.**

*The factors shaping the quality of service in Tri-City's mass public transport as identified by first-cycle students*

Factor no.	Item	Number of votes cast for a given factor						Total number of votes	Assessment category
		M	O	A	I	Q	R		
6	Facilities for people with disabilities	19	11		3	-	-	35	M
8	Communication on schedule changes	14	13	3	5	-	-	35	M
11	Complaints concerning trips	14	11	2	8	-	-	35	M
2	Sufficient number of connections	13	13	7	2	-	-	35	M/O
5	Clear information about schedules	11	11	6	6	-	-	35	M/O
9	Various ticket options	8	21	5	1	-	-	35	O
1	Trip delays	12	17	4	-	1	1	35	O
3	Cleanliness of the means of transport	11	17	5	2	-	-	35	O
14	Investment in infrastructure	10	15	5	4	-	1	35	O
13	Adaptations of the means of transport to energy sources	5	12	6	11	-	1	35	O
4	Friendly staff	8	11	10	6	-	-	35	O
10	USB charge ports and Wi-Fi	6	8	13	8	-	-	35	A
7	Possibility to carry strollers, prams, and bicycles	6	10	4	15	-	-	35	I
15	Information about the impact of the means of transport on the environment	5	11	4	15	-	-	35	I
12	Reduction of gas emissions	8	11	3	13	-	-	35	I

Note. Prepared by the author.

Responses to the survey questions were provided by 35 first-cycle students. The partial results differ slightly for this group compared to the entire study group. The group of factors whose existence is taken for granted and whose absence could translate into a lack of customers continues to include amenities for people with disabilities, communication about schedule changes, and the ability to file complaints concerning trips.

The next two factors are both necessary and important to satisfaction, according to the respondents, and include clear information on schedules (11 people gave that response) and sufficient connections (11 people). This is a significant difference from the results for the entire study group.

The features sought by customers include: the availability of a variety of ticket options, lack of traffic delays, cleanliness of the means of transportation, investments in infrastructure, adaptations of the means of transportation to sustainable energy sources, and friendly staff (which was an attractive characteristic for all respondents).

The attractive characteristic is availability of USB charge ports and Wi-Fi on the means of transportation. The respondents were 22-23 years old and had an interest in technological innovation. The choice of this factor as an attractive factor was mainly voted for by full-time students. This answer was indicated by 13 people out of 35.

The indifferent characteristics indicated by the respondents were the ability to transport strollers, prams and bicycles, information about the environmental impact of the means of transportation, and the reduction of gas emissions from the means of transportation.

The results of the survey for students of full-time and part-time second-cycle programs are shown in Table 3.

**Table 3.**

*The factors shaping the quality of service in Tri-City's mass public transport as identified by second-cycle students*

Factor no.	Item	Number of votes cast for a given factor						Total number of votes	Assessment category
		M	O	A	I	Q	R		
3	Cleanliness of the means of transport	14	11	2	5	-	-	32	M
5	Clear information about schedules	14	6	3	9	-	-	32	M
6	Facilities for people with disabilities	14	9	2	7	-	-	32	M
11	Complaints concerning trips	13	9	3	7	-	-	32	M
8	Communication on schedule changes	12	9	-	11	-	-	32	M
2	Sufficient number of connections	10	18	2	2	-	-	32	O
1	Trip delays	10	17	1	2	2	-	32	O
9	Various ticket options	7	15	8	2	-	-	32	O
13	Adaptations of the means of transport to energy sources	4	12	8	8	-	-	32	O
12	Reduction of gas emissions	9	11	3	9	-	-	32	O
4	Friendly staff	5	8	11	8	-	-	32	A
10	USB charge ports and Wi-Fi	3	6	8	15	-	-	32	I
7	Possibility to carry strollers, prams, and bicycles	9	8	3	12	-	-	32	I
15	Information about the impact of the means of transport on the environment	3	8	8	12	-	1	32	I
14	Investment in infrastructure	7	9	5	11	-	-	32	I

Note. Prepared by the author.

Thirty-two second-cycle students participated in the survey. An analysis of the survey results for this group of respondents indicates that the situation is very similar to the overall results. The first difference is the indication of bus cleanliness as the first factor in the group of M factors (14 votes), i.e., the factors that are mandatory for the transportation service. The second difference is that the weight of the factor of investment in infrastructure was shifted from essential to indifferent.

### 4.3. The survey results for full-time and part-time students

An analysis of the results of the survey for full-time students, which are shown in Table 4, also indicates a similarity of the results to the overall results.

**Table 4.**

*The factors shaping the quality of service in Tri-City's mass public transport as identified by full-time students*

Factor no.	Item	Number of votes cast for a given factor						Total number of votes	Assessment category
		M	O	A	I	Q	R		
6	Facilities for people with disabilities	14	6	2	4	-	-	26	M
8	Communication on schedule changes	13	7	2	4	-	-	26	M
5	Clear information about schedules	9	5	5	7	-	-	26	M
1	Trip delays	7	15	3	-	-	1	26	O
9	Various ticket options	7	11	7	1	-	-	26	O
11	Complaints concerning trips	7	10	-	9	-	-	26	O
2	Sufficient number of connections	9	10	5	2	-	-	26	O
3	Cleanliness of the means of transport	9	10	5	2	-	-	26	O
14	Investment in infrastructure	4	10	2	9	-	1	26	O
4	Friendly staff	6	6	12	3	-	-	26	A
10	USB charge ports and Wi-Fi	3	6	9	8	-	-	26	A
15	Information about the impact of the means of transport on the environment	1	7	3	15	-	-	26	I
12	Reduction of gas emissions	7	3	3	13	-	-	26	I
13	Adaptations of the means of transport to energy sources	3	5	7	10	-	1	26	I
7	Possibility to carry strollers, prams, and bicycles	5	8	4	9	-	-	26	I

Note. Prepared by the author.

Among full-time students, minor changes can be seen in the order of the factors. A significant difference is the ability to file complaints, which was moved from the group of mandatory factors to the group of those that are the most important to the customers (as was indicated by 10 out of 26 respondents). This may be due to the fact that this group of respondents consists mainly of full-time first-cycle students, for whom public transportation is often the only means of transportation to travel between home and university or to work.

The second difference is that equipping the means of transportation with Wi-Fi and USB charge ports was qualified as an attractive factor (9 indications).

The final change is that the factors relating to the reduction of gas emissions by the means of transportation and their adaptation to sustainable energy sources were moved from the group of important factors to the group of neutral factors.

The results of the survey for part-time students are shown in Table 5.

**Table 5.**

*The factors shaping the quality of service in Tri-City's mass public transport as identified by part-time students*

Factor no.	Item	Number of votes cast for a given factor						Total number of votes	Assessment category
		M	O	A	I	Q	R		
11	Complaints concerning trips	20	10	5	7	-	-	41	M
6	Facilities for people with disabilities	19	14	2	6	-	-	41	M
5	Clear information about schedules	16	12	4	9	-	-	41	M
9	Various ticket options	8	25	6	2	-	-	41	O
2	Sufficient number of connections	14	21	4	2	-	-	41	O
1	Trip delays	15	19	2	2	3	-	41	O
12	Reduction of gas emissions	10	19	3	9	-	-	41	O
13	Adaptations of the means of transport to energy sources	6	19	7	9	-	-	41	O
3	Cleanliness of the means of transport	16	18	4	2	-	-	41	O
8	Communication on schedule changes	13	15	1	12	-	-	41	O
14	Investment in infrastructure	13	14	8	6	-	-	41	O
4	Friendly staff	8	13	9	8	-	-	41	O
15	Information about the impact of the means of transport on the environment	7	12	9	12	-	1	41	O
10	USB charge ports and Wi-Fi	6	8	12	15	-	-	41	I
7	Possibility to carry strollers, prams, and bicycles	10	10	3	14	-	-	41	I

Note. Prepared by the author.

It would seem that part-time students use mass public transportation more sporadically. However, there are no significant differences between part-time and full-time students in the factors indicated. This group included 41 respondents.

To the students in this group, no factor qualifies as 'attractive'. Friendly staff is a mandatory factor, as is communication on schedule changes.

On the other hand, one can see an increase in environmental awareness among the part-time students, as information about the environmental impact of the means of transportation is an important factor for them. Part-time students often use their own means of transportation to travel, so environmental aspects are important and relevant to them, not only in their decisions related to the purchase of their own cars, but also for the means of mass public transport.

## 5. Conclusion

Assessing the quality of urban public transport is a complex issue. The selection of the main criteria for evaluating quality in passenger transport is influenced by the passengers' preferences. It is essential to improve the quality of the services provided in order to convince people to abandon individual transportation in favor of mass public transport. It is therefore necessary to identify problems and needs in the organisation and management of public

transportation in order to facilitate and encourage as many people as possible to use public transportation.

As part of the Tri-City's sustainable development strategy, it is fundamental to strive for a reasonable range of services provided by the public transportation system. Success in this endeavour requires:

- adjusting the quantity and quality of public transportation services to the preferences and expectations of the passengers, including accessibility for people with disabilities;
- providing high-quality public transportation services that create a viable alternative to travel by privately-owned car;
- coordinating the local transportation development plan with regional and national transportation development plans and local spatial development plans;
- reducing the negative impact of transportation on the environment;
- economic and financial efficiency of specific solutions in shaping the transportation services and infrastructure (Plan..., 2021, p. 3).

The survey results show that students who use mass public transport think alike, as they indicated similar characteristics as important and relevant to the formation of the quality of transportation services. They emphasised the adaptation of the means of transportation for use by people with disabilities and the reduction of negative environmental impacts of the means of transportation. In addition, communication between transport operators and passengers about the possibility of filing complaints or informing about schedule changes were indicated as important factors.

Other factors indicated by the respondents were the courtesy of the staff and the cleanliness of the means of transportation, as well as equipping the latter with Wi-Fi and USB charge ports.

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