

Multidisciplinary
SCIENTIFIC JOURNAL OF
MARITIME RESEARCH



University of Rijeka
Faculty of Maritime
Studies Rijeka

Multidisciplinarni
znanstveni časopis
POMORSTVO

A Proposal of Measures Towards a Qualitative Enhancement of Bus Transport Services in the Primorsko-goranska County

Siniša Vilke, Tomislav Krljan, Borna Debelić

University of Rijeka, Faculty of Maritime Studies, Studentska 2, 51000 Rijeka, Croatia, e-mail: svilke@pfri.hr

ABSTRACT

The survey, which consisted of counting, polling and recording, has provided data on the existing volume of passenger flows in public bus stations/terminals within the Primorsko-goranska (Littoral-Mountainous) County (hereinafter: the PG County), the density rate of passengers on bus lines that operate on County connections and on bus lines connecting the PG County with other counties in Croatia. In addition to the quantitative parameters, the qualitative data were analyzed that had been obtained by polling passengers at the Rijeka bus terminal, whereupon detailed opinions of direct users of the service were elaborated with the aim of obtaining a picture of the current situation of the public bus transport in the PG County. The data collected were used in evaluating the quality of the passenger transport service provided and in determining measures to be taken in order to bring both the actual quality of transport and the satisfaction of passengers to a higher level.

ARTICLE INFO

Preliminary communication

Received 2 May 2018

Accepted 21 May 2018

Key words:

Passenger flows

Bus transport

Bus stations/terminals

Transport service quality

1 Introduction

Observation and analysis of passenger flows directly indicate the quality and distribution of the transport network and connectivity of every single region. With the intensive development of technology and the emergence of “modern society,” an increasing number of new needs of the population are manifested at ever greater geographical distances. Travel needs are becoming increasingly popular as much in terms of travel and tourism as in the context of business and various needs of the population. The development of activities which have been forced, due to the overcrowding of city centres, to relocate and concentrate in areas far more distant from cities and/or from their homes, has caused much of commuting that has resulted in increased demand for transport. The commuter traffic between urban areas within the PG County, as one of the counties that make part of the Northern Adriatic Functional Region, results from the demand for regular liner bus services.

The aim of this paper is to evaluate the existing quality level of the service by analyzing the quantitative and qualitative parameters obtained from the polled bus line commuters and passengers in the PG County and to suggest

the measures that need to be taken to bring the quality of transport and passenger satisfaction to a higher level.

2 Road Connections Between the Republic of Croatia and the PG County

The Republic of Croatia is situated in a particularly favourable geographical area of Central Europe. It is its position that has caused its connections with other states of Western, Central and South-Eastern Europe. Good linkage and construction of the necessary infrastructure and superstructure results in the development of the overall economic and social development of the country. Traffic connections with other parts of Europe are of great importance for the Republic of Croatia. One significant element in the integration of the Republic of Croatia with other countries of the European continent is the Mediterranean transport corridor linking the eastern and western European territories. The linkage of the Republic of Croatia is significantly enabled by Corridor V as an integral part of the Mediterranean Corridor. Traffic connections are realized through two branches of Corridor V passing across the territory of the Republic of Croatia, i.e. branches Vb and Vc.

The division of the Republic of Croatia into regions is significant in the analysis of their impacts. Functional regions are characterized by a high level traffic interaction [8]. It is important to note that functional regions do not necessarily coincide with the administrative regions or state borders. The Republic of Croatia is divided into the following functional regions:

- Eastern Croatia,
- Central Croatia,
- Northern Adriatic,
- Northern Dalmatia,
- Central Dalmatia,
- Southern Dalmatia.

The Northern Adriatic functional region is a significant region in the Republic of Croatia with regard to movements of goods and passengers within and between functional regions.

2.1 The Northern Adriatic Functional Region

The geographical position of the Northern Adriatic functional region is one of its main advantages compared to other regions of the Republic of Croatia. This functional region encompasses three areas: [8]

- the Istra County with the city of Pula; the area of Istria (Istra) is specific due to its historical development and a great influence of the proximity of Western Europe, that has greatly contributed to the development of the travel and tourism industry and tourist destinations in the area;
- the PG County with the port of Rijeka; the port of Rijeka is the largest port in the Republic of Croatia and the most important commercial and industrial centre. There are

- four large islands comprised within the Kvarner Bay that are important for the development of the travel and tourism industry: Krk, Cres, Rab and Mali Losinj.
- the Lika-Senj County covers a large part of the hilly area situated far from the sea, which is of lesser economic importance.

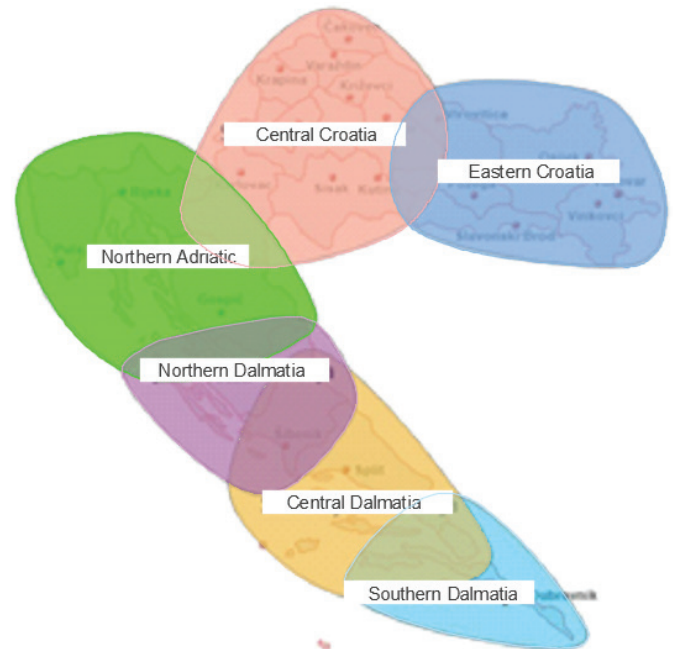


Figure 1 Functional regions within the territory of the Republic of Croatia

Source: Adapted by authors according to: The Transport Development Strategy of the Republic of Croatia (2017 – 2030), Ministry of the Sea, Transport and Infrastructure, Zagreb, August 2017, p. 35.



Figure 2 Cartographic display of significant and busiest roads in the PG County

Source: Adapted by authors according to http://www.zuc.hr/index_htm_files/index_htm_files/KARTA_4.jpg (15 April 2018)

2.2 Road Connections of the PG County with Other Regions of the Republic of Croatia

The most congested roads in the PG County are motorways A6 and A7, and motorways A8 and A9 in the area of Istria. State road D8, which used to be the main artery along the Croatian coast before the construction of the motorway, is also important for the region. The Rijeka road hub comprises the Rijeka ring-road from Matulji to Krizisce with all the pertaining nodes and connections to the port area and to the free and industrial zones. The two most important road junctions in the area of the node are: motorway A6 Bosiljevo – Rijeka and the Adriatic motorway A7 Rupa – Rijeka – Zuta Lokva. The Zagreb-Rijeka railway line is part of the international corridor and the most important one in the region. These roads are of particular importance by their flows of passengers coming from different parts of the Republic of Croatia and other countries.

In the railway transport, the backbone of the Rijeka node is made of railway lines of importance for the international traffic on the branch of the Pan European corridor Vb from the state border with Hungary and further in the direction of Botovo – Koprivnica – Zagreb – Rijeka – Sapjane. This railway line is important in connecting central Croatia, the mountainous region of Gorski Kotar and the northern littoral area.

In the air traffic, the dominant role concerns the Rijeka airport, while the airports of Mali Losinj, Unije and Grobnik are of local importance only. [7]

3 Analysis of Passenger Flows and of Nodes Within the Public Liner Transport of Passengers in the PG County

Passenger flows can be viewed from different points, among which it is important to mention the flows of passengers in dependence on the spatial (territorial) scope of travel, mode of transport, distribution of time, structure of passengers and many other factors. The internal road transport of passengers in the Republic of Croatia is categorized into several groups: [6]

- Public liner transport
- Special liner transport
- Shuttle transport
- Occasional transport of passengers
- Auto taxi transport.

Like any other system, the passenger transport system consists of several elements that are mutually connected in horizontal and vertical directions, thus being enabled to achieve undisturbed achievement of the intended purpose and therefore, in considering the public liner passenger transport system, there are three essential elements to be identified: transport service users, transport service providers, and passenger terminals. Their mutual interaction and synchronized performance of each of the elements are essential for the normal operation and unhindered flow. The analysis of the public liner transport, the flow of passengers and the observation of their habits represent

an important process in evaluating the transport links of individual functional regions. The survey of the liner passenger transport has been performed in the area of the PG County considered as their starting, destination, and transit point respectively. Movements of passengers within and outside the County was provided by the County and inter-County public buses.

3.1 Data Collection Process

The data on the movement of passengers and their habits were obtained on the basis of the conducted research that consisted of counting, polling and recording of any data relevant for the analysis of passenger flows. The survey was conducted in the period January – March 2018 on specific midweek days (Tuesday, Wednesday and Thursday). It was the selected days that contributed to the presentation of the current state of passenger flows and congestion of bus stations in the PG County.

The data collection process was carried out in the Northern Adriatic functional region and the whole analysis is based on the data collected in the PG County which is one of the most important counties that make up the functional region. There were 9 nodes and/or bus stations selected for the analysis: Vrbovsko, Delnice, Rijeka, Novi Vinodolski, Opatija, Krk, Cres, Mali Losinj, Rab. The data recorded at each station referred to the lines having their starting, destination or transit points at these stations respectively. At each of the stations/terminals, the respective bus lines callings were monitored over a period of three midweek days (Tuesdays, Wednesdays and Thursdays) in order for the data obtained to be as representative as possible, i.e. to provide a real picture of the number of bus lines, road loads and the volume of passengers on each of the lines. The survey results show that there are 411 public buses in the area of the PG County providing services to 7389 passengers altogether.

Table 1 Bus terminals and the number of bus lines per each terminal in the area of the PG County

Bus terminal	Number of bus lines
Rijeka	173
Vrbovsko	11
Delnice	28
Novi Vinodolski	60
Opatija	32
Krk	15
Cres	15
Mali Lošinj	20
Rab	57
Σ	411

Source: Prepared and adapted by authors according to collected statistics.

The data in Table 1 indicate that the Rijeka bus terminal compared to other bus stations significantly stands out by the number of 173 lines in total, which make a

42 % share in the total of the County and inter-county lines within the analyzed area. The remaining data on the number of lines refer to smaller-scale bus stations that are yet particularly important in connecting urban areas within the PG County.

3.2 Analysis of Public Passenger Lines in the City of Rijeka

In order to present the current state of the regular public liner transport in the City of Rijeka, it was necessary to systematically collect, statistically analyze and compare the interrelationships of individual observations and, on the basis thereof, to provide objective conclusions on the advantages and disadvantages of the Rijeka bus station. The Rijeka bus terminal "Zabica" is geographically located in the very heart of the city, thus representing the place of greatest concentration and flow of people during the day. Taking into consideration the limited area occupied by the station, the large number of lines and limited infrastructure and superstructure facilities, it is of essential importance to provide proper planning, organize and carry out the operations necessary to provide passenger transport services i.e. to connect the city and its surroundings with other regions within the country and beyond. The measurements carried out have provided information on County and inter-county lines having the Rijeka bus terminal for their departing, transit or terminal point, data on departures and arrivals at the bus terminal, the capacity of buses and their exploitation. Statistical data analyses were performed in dependence on the spatial distribution of bus lines and on the density of bus lines during peak loads as well as during the day and night hours.

Table 2 Statistics of general evaluation indicators of bus lines in the city of Rijeka

Bus Terminal "Rijeka"	
Total number of regular bus lines	173
Total number of passengers per day	3727
Average bus occupancy rate	41 %
Average bus unused capacity rate	59 %
Average number of empty bus seats	31.56
Average number of bus passengers per line	21.42
Average number of seats per bus	51.98

Source: Prepared and adapted by authors according to collected statistics.

As presented in Table 2, the Rijeka bus terminal is the most congested station in the PG County with 173 regular bus lines and 3727 transported passengers per day. The average occupancy rate of only 41 % directly indicates a poor coordination and organization of the regular liner transport. The unused capacity of 56 % buses is the result of reduced demand for liner transport, which may be the result of many factors such as:

- Longer running time,
- Lower frequency of bus lines,
- Price of fare ticket,
- Buses / terminals located far from the place of residence,
- Lower comfort, and
- Reduced offer of contents at bus stations / terminals.

The average bus occupancy is 21.42 passengers while, taking into account the average number of 51.98 seats per bus, the average number of empty seats per line results 30.56. The number of County lines having the Rijeka bus terminal as their departing / transit / final point results in 63, which makes 31.42% of the total number of lines linking together the important centres of the PG County. The busiest lines refer to Rijeka – Krk / Punat, Rijeka – Novi Vinodolski and Rijeka – Senj. The inter-county lines are extremely important both for the city of Rijeka and for other towns within the PG County because they represent their direct connections with other counties in the Republic of Croatia and with the rest of Europe. The number of inter-county lines amounts to 110 lines, which makes 63.58% of all bus lines calling at the city of Rijeka.

The increasing number of city dwellers results from the actual trend in the concentration of a large number of economic and non-economic activities in cities. In order for each urban area and its surroundings to achieve communication and to consistently carry out all the operations necessary for everyday needs, it is important to establish full coordination and organization of transport between individual centres of activities. The trend of population growth and in particular of city dwellers has not bypassed the city of Rijeka either. However, the growing population makes the number of vehicles increase proportionally, and the growing needs have to be met by the existing or newly built road connections. All the more hectic way of life poses the task before the urban transport to find the way toward reducing the congestion of city roads, in particular in the specific morning and afternoon peak hours.

Table 3 Statistics of general evaluation indicators of bus lines in peak hours in the city of Rijeka

Bus Terminal "Rijeka"		
Peak Hours	07:00 – 09:00	15:00 – 17:00
Total number of regular bus lines	24	27
Total number of passengers	444	612
Average bus occupancy rate	34 %	42 %
Average bus unused capacity rate	66 %	58 %
Average number of empty bus seats	36.62	29.02
Average number of bus passengers per line	18.46	21.88
Average number of seats per bus	55.08	50.90

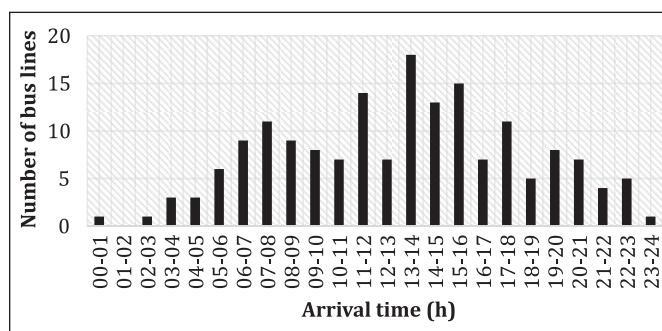
Source: Prepared and aligned by authors according to collected statistics.

According to the data in Table 3, bus lines and their parameters were analysed that are relevant for the specific time of departure and arrival at the Rijeka bus station. Since the peak congestion hours are extremely liable to changes, it is important to take into consideration the earliest and latest observation time of the occurrence. The peak hours typically occur in certain hours of the day.

The number of bus lines that add load to already overloaded road connections during the afternoon peak hours exceeds only by 12.5 % the number of bus lines that run during the morning road congestion hours. The number of passengers carried during peak hours compared with the total number of passengers carried as indicated in Table 2, results in the following conclusions: the total number of passengers transported by buses operating during morning congestions makes only 12 % of the total number of passengers carried during the day, while the number of passengers in the afternoon peak hours makes 16 % of the total number of passengers carried per day. The average bus occupancy in peak hours compared to the one in the afternoon is by 8 % lower and by analogy the average number of passengers in the morning is smaller than the number of passengers travelling during the afternoon peak hours.

It can be concluded based on the observed parameters that there are no significant deviations in the number of bus lines, the number of passengers and the bus occupancy coefficient during the morning and afternoon peak loads. However, since quantitative data do not show the high loads of roads caused by buses, it is important to consider the location of the bus station/terminal and its layout within the small area. The biggest problem that prevents unhindered traffic flow is seen in the simultaneous arrival of more buses at the station, which causes, due to the limited bus manoeuvring space, interruption of normal traffic flow on the main and most heavily loaded roads in the city of Rijeka. The problem is additionally aggravated by prohibited stops of private vehicles and taxi services on platforms intended for buses. The interruption of the regular traffic flow is particularly pronounced during the specific daytime peak hours.

The daily distribution of bus lines was analyzed in a way that bus lines were classified to those providing the day service and those providing the night service. Table 4 clearly shows that the average number of passengers carried during the night line service is 145.2, representing 3.9 % of the total number of passengers carried, while the remaining 96.1 % refers to the number of passengers transported by daytime line services. Proportional increase or decrease in the bus occupancy rate is directly related to the number of passengers carried and the average number of seats per bus. According to data indicating the occupancy of buses it is concluded that the number of passengers in the daytime liner bus service is by 34.95 % higher than the number of night service passengers. The distribution of lines by the time of their arrival at the platform is shown in the following graph.



Graph 1 Bus arrivals at bus terminal platforms shown by the arrival time

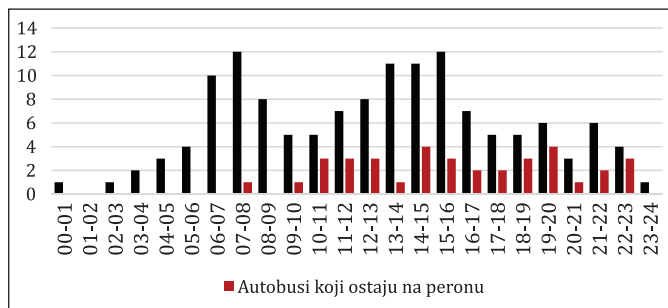
Source: Prepared and adapted by authors according to collected statistics.

According to Graph 1, it can be concluded that bus arrivals at the Rijeka terminal platforms are presented by the smallest number at night time, i.e. between 00:00 and 05:00 AM. The maximum number of buses running by the night schedule, i.e. 3, is recorded in the period between 03:00 and 05:00. The maximum number of buses running on a daily schedule is recorded between 13:00 and 14:00 and amounts to 18. The following graph shows the distribution of bus departures from the bus terminal.

Table 4 Statistics of general evaluation indicators of bus lines in the city of Rijeka shown by the line service time

Bus Terminal "Rijeka"		
Bus Lines	Night Lines	Day Lines
Total number of regular bus lines	9	164
Total number of passengers	145.2	3581.8
Average bus occupancy rate	30 %	42 %
Average bus unused capacity rate	70 %	58 %
Average number of empty bus seats	36.70	30.23
Average number of bus passengers per line	16.08	21.70
Average number of seats per bus	52.78	51.93

Source: Prepared and aligned by authors according to collected statistics.



Graph 2 Bus departures from bus terminal platforms shown by the departure time

Source: Prepared and adapted by authors according to collected statistics.

It can be seen in Graph 2 that the largest number of bus departures in the night hours was recorded between 04:00 and 05:00, i.e. 3. During the day, the largest number of buses departed from 06:00 to 07:00 and from 15:00 to 16:00 i.e. 12 of them. However, these parts of the day also recorded increased frequency of bus departures, i.e. 10 bus departures on the average in the period from 06:00 to 09:00 and 11.33 bus departures on the average in the period from 13:00 to 16:00.

3.3 The Rijeka Bus Terminal Compared to Other Bus Stations in The PG County

Apart from the Rijeka bus terminal, and in order to obtain a more accurate projection of bus connections between particular parts of the County and other areas of the Republic of Croatia, the analysis also comprised the other 8 bus stations/terminals within the PG County.

The results of the comparison of the Rijeka bus terminal and the other stations/terminals with regard to the

number of bus lines, the number of passengers and the average bus occupancy rate are shown in the following table.

Table 4 clearly shows that the Rijeka bus terminal records the largest number of lines, i.e. 42.09 % of all lines operating in the PG County. Likewise, the Rijeka bus terminal stands out in relation to the other ones by the number of passengers with 50.44 % of the total number of bus riders on County and inter-county lines per day. The next major bus station is in Novi Vinodolski. The number of bus lines calling at the station of Novi Vinodolski on a daily basis amounts to 60, thus allowing for the transport of a total of 963 passengers in the mentioned area. The lines with a large number of daily commuters are an indispensable element of their daily life serving their requirements related to work, school or college, food shopping or visits to the variety of facilities generally offered by larger urban areas.

4 Enhancement of the Rijeka Bus Terminal Efficiency and Transport Service Quality

The quality of transport services is the primary requirement that both the service provider and the service user tend towards. From the passenger’s point of view the quality of service is provided through the following requirements: frequency of transport, accuracy, regularity, speed, price, availability on specific days (Saturday, Sunday), and the time of the first and last bus departures.

Proper definition of transport user requirements as well as of the transport provider contributes to the timely response through actions that need to be taken to bring quality to the desired level. The quality of the service is the factor that will make the difference between the service provider and their numerous competitors in the market. Setting quality above the tolerance level will result in a positive outcome for the carrier, making the service

Table 4 Comparative display of data concerning bus terminals within the PG County

	Bus Terminal								
	Rijeka	Opatija	Delnice	Vrbovsko	Novi Vinodolski	Krk	Cres	Mali Lošinj	Rab
Total number of regular bus lines	173	32	28	11	60	15	15	20	57
Total number of passengers	3727	455	726	312	963	166	215	192	633
Average bus occupancy rate	41 %	27 %	50 %	54 %	32 %	22 %	32 %	18 %	23 %
Average bus unused capacity rate	59 %	73 %	50 %	46 %	68 %	78 %	68 %	82 %	77 %
Average number of empty bus seats	30.56	38.36	25.75	24.13	34.20	39.28	24.27	33.75	36.84
Average number of bus passengers per line	21.42	14.23	25.93	28.32	16.05	11.05	14.33	9.60	11.11
Average number of seats per bus	51.98	52.59	51.68	52.45	50.25	50.33	38.60	43.35	47.95

Source: Prepared and adapted by authors according to collected statistics.

users more satisfied with the service provided, thus contributing to higher bus occupancy rate and consequently to higher revenue. Owing to the increased quality of the service provided, service users i.e. passengers will become more loyal and will use the same service provider on a more frequent basis.

4.1 Analysis of Passenger Transport Service Quality

It is the task of the quality management system to achieve the above goals but also to analyze and evaluate the requirements that need to be met to ensure that both sides are satisfied. Logistics manages the collected materials and information, in addition to planning, organizing, controlling and managing the company resources in order to achieve the optimum operation process. On the basis of the existing situation at the Rijeka bus terminal, procedures may be carried out which would enhance the quality of the service, which would further result in greater satisfaction of users and hence in higher occupancy rate and use frequency rate concerning the public passenger transport service.

In order to propose measures to increase the quality, data on user/passenger opinions were collected. The data were collected using a survey conducted at the Rijeka bus terminal. A number of data were analyzed mainly related to user age, gender, occupation, station of departure/destination, reason for public transport selection, travel/commuting frequency, evaluation of the public transport service offer, and user motivation.

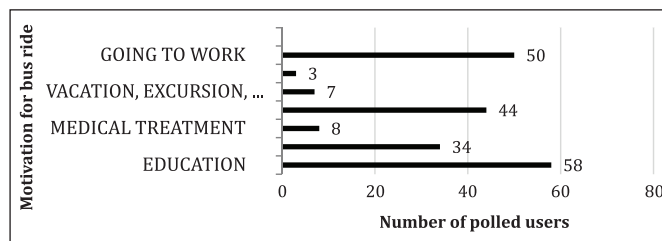
Table 5 Polled population by the age

Age of the polled	Number of the polled
15-20	66
21-25	59
26-30	17
31-35	8
36-40	9
41-45	11
46-50	8
51-55	9
56-60	5
61-65	7
66-70	1
>70	4

Source: Prepared and adapted by authors according to polling results.

According to Table 5, it is evident that the largest numbers of polled persons who are public transport users on a regular basis (commuters) fall between the age of 15 to 20 and 21 to 25 years respectively, representing 61.27 % of transport users. According to the age of respond-

ents, 56.86 % refers to school and university students, 32.35 % to employed persons and 10.79 % to the retired and unemployed.



Graph 3 Polled users breakdown by the motivation for bus ride

Source: Prepared and adapted by authors according to polling results.

According to data displayed in Graph 3, there were as many as 28.43 % of users who answered that they use public transport most commonly for educational purposes (school, university), 24.51 % of those surveyed were commuters for work, and the remaining 21.57 % were “going home”.

The data referring to the distribution of surveyed passengers by their station of destination showed that most passengers travel outside the area of PG County, i.e. 59.31 % of them are users of 31 inter-county lines, while the remaining 40.69 % of passengers travel the lines within the County. According to the aforementioned, it was noticed that these were relatively shorter or commutation rides for work, visiting a doctor or an educational institution, the city of Rijeka being the nearest area with the highest concentration of services and contents.

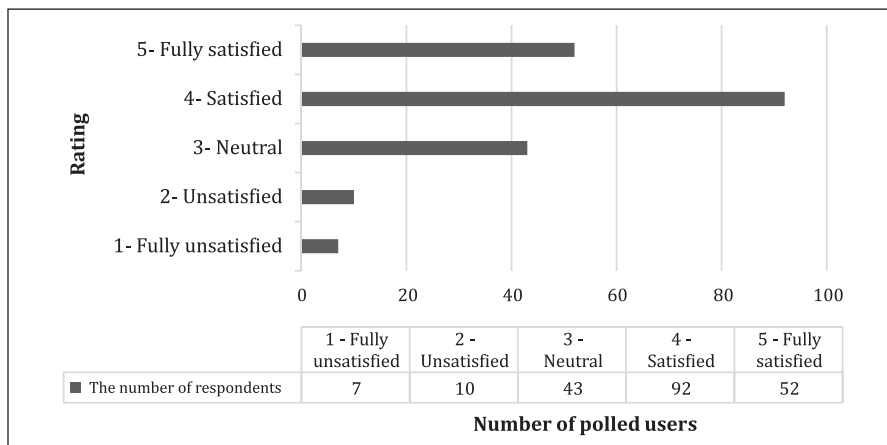
Graph 4 shows user satisfaction rating that represent an input determining whether the service provided generally requires to be completely transformed and significantly revised. It was recorded that as many as 25.49 % of passengers expressed their full satisfaction with the quality of the service provided, 45.10 % of passengers were satisfied with the service, while 21.08 % of them remained neutral in terms of service rating. It is important to note that only 5 % of respondents rated that they were dissatisfied with the service and 3 % of them were completely dissatisfied with the service.

Table 6 Reasons of polled users for selecting public passenger transport

Reason for selecting public transport	Polling population
Subsidies	18
Financial terms	26
The sole means available	151
Ecological awareness	9

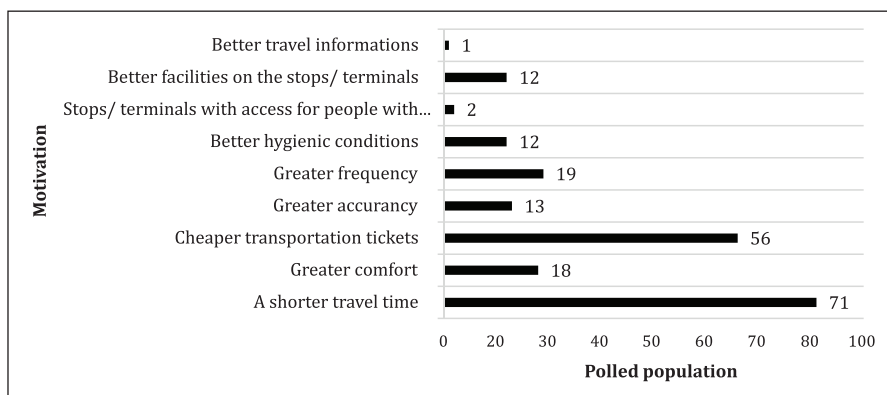
Source: Prepared and adapted by authors according to polling results.

As it clearly results from Table 6, the reason for choosing public transport as the sole means of transport was



Graph 4 Rating of polled users' dis(satisfaction) with the public transport offer

Source: Prepared and adapted by authors according to polling results.



Graph 5 Answers of polled users explaining their motivation for frequent use of public transport

Source: Prepared and adapted by authors according to polling results.

stated by 151 polled users, while subsidies, financial reasons and ecological awareness of the surveyed were recorded as answers to a significantly lesser extent.

One of the most important questions asked in respect of measures to be taken to increase the quality of the bus liner transport service is the issue of motivation that would increase the interest in public transport. By increasing the transport user interest, the number of passengers would also grow and consequently the bus occupancy coefficient would be increased.

As shown in Graph 5, shorter travel times and cheaper fare tickets were the most frequent answers from the polled. However, both these answers are today reversely proportional to the quality of service. The negative side of the bus liner transport system rests with the economic component which has become the main motive for business.

4.2 Measures for Enhancement of Bus Liner Transport Services Within the PG County

Based on the surveys conducted, the counting of traffic and the analysis of the data obtained it is possible to de-

cide what measures should be taken in order to increase the quality of transport services to a satisfactory level. Every decision needs to be based on certain conclusions in order to have the service personalized exactly to the requirements of service users on a most frequent basis. However, the service itself needs to be upgraded to other criteria as well, in order to make it attractive to potential future users.

In determining the actions that need to be taken to bring the quality of service to the desired level, the statistical data were used that had been obtained from passenger polling results and from counting the traffic. These data represent the starting point for hierarchical set-up of terms and conditions required by transport users of different age groups, different economic possibilities and different habits and travel needs.

According to the polling results concerning users' motivation for bus ride, it is important to emphasize that users' age is in direct relation to the most common answer regarding the motivation for bus ride. Thus, younger users of up to 25 years are predominantly commuters using public buses for going to or returning from school or col-

lege, those aged between 25 and 65 are commuters going to or returning from work, while motives of the retired population vary in nature.

One of the most important questions related to the criteria and priorities to be used in order to increase the quality of service is answered within the question of users' rating of their satisfaction with the service and the overall offer of the public passenger transport.

By increasing the number of passenger transport modes and properly organized bus lines, it is possible to relieve road connections and increase the quality of transport. Greater use of bus passenger transport lines also contributes to ecological awareness, whereby the negative environmental impacts are reduced that are caused by the highly congested traffic on roadways. By increasing the frequency and comfort of buses would greatly increase the passenger's satisfaction, hence the more frequent use of bus lines.

The monopoly imposes acceptance of conditions that are not suitable for other participants or companies attempting to compete on the market. Competition in the public transport market, in addition to reducing the fare price, will also contribute to increasing the quality of transport services.

5 Conclusion

The analysis of the data obtained by counting and polling has shown the actual trends of passenger flows through public bus stations/terminals in the PG County as well as the load rate of the lines connecting urban centres within the County and the city of Rijeka with other counties. In addition, qualitative data on bus riding motives, passenger satisfaction/ dissatisfaction have been elaborated in detail, reasons for choosing public transport of passengers and possible motivation for more frequent public bus riding.

The conducted survey may serve as the basis for further consideration and planning towards achieving higher quality of service, passenger satisfaction and greater efficiency of road connections with other counties.

The collected data have identified the Rijeka bus terminal as the centre of all activities within the city area as it represents a place that links together the local, County

and inter-county areas in the Republic of Croatia. Data processing shows the current situation that can be of help in future activities towards a more efficient organization of bus lines and enhanced quality of bus ride services.

With a view to enhancement of the quality of transport services, our proposal focuses on increased frequency of bus lines. By increasing the comfort, greater use of buses as a means of transport would be achieved, that would contribute to a lower rate of harmful emissions of exhaust gases from road vehicles. Competition in the public passenger transport market can contribute to reducing fare costs and to increasing the quality of transport services.

References

- [1] Bauer, Z.: Razvoj i planiranje prometa u gradovima, Informator, Zagreb, 1989.
- [2] Dugina, M., Bogdanović, T., Feletar, P.: Analiza putničkih (željezničkih i cestovnih) prometnih tokova na relaciji Križevci – Zagreb i Zagreb – Križevci, *Cris*, Historical Society of Križevci, Year XIV, No. 1/2012, pp. 374-381.
- [3] Gibbs, D., Krueger, R., MacLeod, G.: "Planning smart city – regions in an age of market – driven – urbanism", 2013.
- [4] Malić, A.: Prijevozna potražnja u međumjesnom cestovnom putničkom linijskom prometu, Editorial House Dr. Feletar, Zagreb, 1999.
- [5] Pađen, J.: Osnove prometnog planiranja, Informator, Zagreb, 1999.
- [6] Road Transport Act, Narodne novine 82/13.
- [7] Spatial and Integrated Transport Studies of the PG County and the City of Rijeka – County Institute for Sustainable Development and Spatial Planning, 2011.
- [8] The Transport Development Strategy of the Republic of Croatia (2017–2030), Ministry of the Sea, Transport and Infrastructure, Zagreb, 2017.
- [9] Štefančić, G.: Tehnologija gradskog prometa I, Faculty of Transport and Traffic Sciences, Zagreb, 2008.
- [10] Vičević, D., Hess, S.: Analiza potražnje za javnim linijskim prijevozom u Republici Hrvatskoj, *Journal of Maritime and Transportation Sciences*, Association for Research and Development of Maritime Industries in the Republic of Croatia, Rijeka, 2013, 47-48, pp. 159-168.
- [11] Urban Mobility Package, EU, Bruxelles, 2013.
- [12] http://www.zuc.hr/index_htm_files/index_htm_files/KAR-TA_4.jpg (15.04.2018)