

# D.4.1.2 ANALYSIS ON MARKET POTENTIAL RESEARCH – WITH RAILWAY THROUGH ISTRIA: ROUTE BUZET–PULA

## Document Control Sheet

Project Number:	10249002
Project Acronym	MIMOSA
Project Title	Maritime and Multimodal Sustainable passenger transport solutions and services
Start Date	01/01/2020
End Date	31/12/2022
Duration	36 months
Related Activity:	Work Package 4 A 4.1 Analysis of new intermodality solutions D.4.1.2 No. 1 Analysis of market potential research – through Istria by rail: Buzet–Pula route. Market potential investigation, including possible connections towards SLO and IT.
Deliverable Name:	
Type of Deliverable	Study
Language	English
Work Package Title	Analysing and piloting new sustainable mobility solutions
Work Package Number	4
Work Package Leader	PP3 (Institute for Transport and Logistics Foundation)
Status	Final version
Author(s)	PP12
Version	1
Deliverable Due Date	November 2020
Delivery Date	10/11/2020

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## 1. Action overview

PP12 makes research activity for investigating market potential, with accent on urban and suburban rail transport, with possible cross-border connections, on two specific lines:

- I. (D.4.1.2) No. 1 Analysis on market potential research – with railway through Istria: route Buzet–Pula. Market potential investigation, including possible connections towards SLO and IT. Resp. PP12 (M10)
- II. (D.4.1.3) No. 1 Analysis on market potential research – with railway through Istria: route Rijeka–Šapjane. Market potential investigation, including possible connections towards SLO and IT. Resp. PP12 (M18)

The purpose for this research was to retrieve information on passengers' habits and population needs as well as mobility needs of Istrian visitors. Survey responses will serve for better project activity planning and project priorities. With this survey answers regarding selection of transportation mean, reason for travelling, ticket purchase, sustainable transportation, usage of railway transport, disadvantages of railway transport, travelling to Italy were retrieved. This was on field data collection on railway hub in Pula and also in trains operating on route Pula-Buzet -State border in region Istria. Survey was conducted among 111 passengers. However, another research was done online with survey and is comprising answers from whole Istria county in total of 128 analysed surveys.

The main role of transport is to connect spatially separated areas for the household and business sectors, for both person and commodity movements. Transport has a great impact on the territorial balance. Investment in infrastructure in the form of efficient transport and communication is required in order to reduce geographical disparities and make peripheral areas attractive locations for people and businesses.

The Transport Development Strategy observes the citizen mobility in the sense of the use of public transport (rail, tram, bus, waterborne, etc...), as well as individual mobility (transport by car or bicycle and walking). The emphasis is put on public passenger transport and zero emission modes for the purpose of daily migrations.

### 1.1. History

The Istrian Region includes a large part of Istria - the largest Adriatic peninsula. Istria County, consisting of 41 local self-government units: 10 towns and 31 municipalities. Situated in the north-west of the Adriatic Sea, Istria is surrounded by the sea from three sides, while the northern border towards the continent is made up by a line between the Miljski Bay (Muggia) in the direct vicinity of

Trieste and the Preluk Bay, right next to Rijeka. Such favourable geographic position, Istria has always represented a bridge connecting the Middle European continental area with the Mediterranean. The Istrian peninsula covers the surface of 3.476 square kilometres. The area is shared by three countries: Croatia, Slovenia, and Italy.

Railways, in Istria began to be designed when the Vienna-Trieste railway was built, launched in 1857. For Austria and then for the Austro-Hungarian Monarchy, in addition to Trieste, two other points on the Adriatic were important: Rijeka and Pula. Rijeka received two railways in 1873, because the Hungarian part of the Monarchy encouraged the development of its port in Rijeka, and the Austrian did not want to miss the possibility of using the port, even though it had its own in Trieste.

The right of priority for the construction of the railway to Rijeka was the Southern Railways Society. In 1869, the State released the Company of its previous obligations and the conditions for the construction of the railway to Rijeka were acquired. The Railway Saint Peter (Pivka)–Rijeka was launched in 1873. At the same time, the army campaigned to connect with the Pula railway network, where Arsenal and the war port had already developed, and did not have a secure land supply. Trieste wanted a direct connection with Pula, and the Istrians suggested a connection to Rijeka. The interests of the military, which has advocated for a mid-peninsula route, have prevailed for safety from attacks from the sea. Law on construction of the Istrian State Railway, i.e. The railways of Divača–Pula, with the detachment Kanfanar–Rovinj, were adopted on 22.IV.1873, and the railway was launched on 20.IX.1876. Two years later it was extended to Arsenal and the shipyard on the island of Uljanik. The Istrian railway gained an immediate connection with Trieste 5.VII.1887, when the Railway Hrpelje-Kozina-Trieste was launched because of the state's interest in leading another railway in Trieste, thus reducing the monopoly of the Southern Railways Company.

All the railways in Istria missed the towns on the west coast of Istria. This problem was mitigated in 1902 by the opening of Parenzane, the narrow-lane track of Trieste-Poreč, with an extension plan to Kanfanar, and the route linking Koper, Izolu, Piran, Buje, Motovun, Poreč and others was weak and costly and had great losses; and was abolished in 1935. Due to the large coal reserves in Rasko coal mines in 1948, the decision was made to build the Raska railway on the direction of Lupoglav-Štalija. It was built by Croatian and Slovenian construction companies together with voluntary labor brigades, it was released on 30.XII.1951. The next plan was to break through the railway tunnel through Učka and connect to Rijeka, but although work around the tunnel was to begin, it was not built. The development of the Koper Port, founded in 1959, required a railway link with Koper, and on 16.XI.1967. the Koparska railway. The connection between the freight and passenger station Koper was established in 25.V.1979, and these are the last kilometres of desired railways built in Istria. However, increasing competition between road traffic and new relations on the Istrian peninsula caused the abolition of the railways Hrpelje–Kozina–Trieste in 1959 and Kanfanar–Rovinj in 1966.

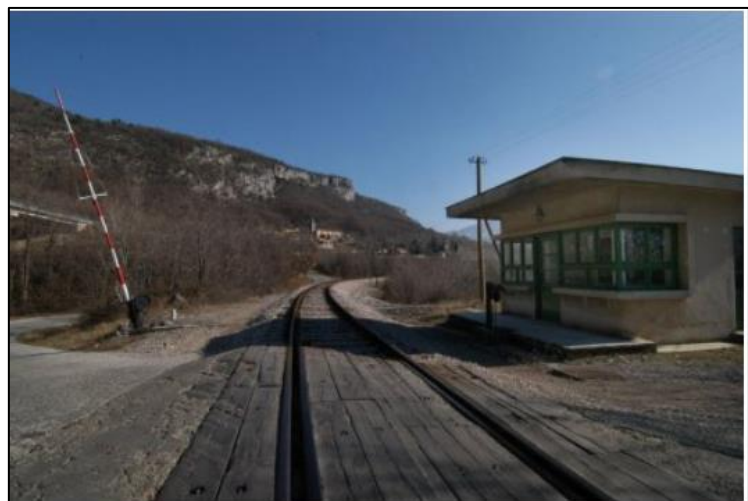
The connection of railroad between Rijeka and Zagreb was also planned, but it was never realised. Istrian railroads, Pula's and Raša's railroad, were thoroughly renovated in the mid-1980s. The beginning of the 1990s witnessed significant changes in the role of the Istrian railroads, when they were taken over by the Croatian Railways in the Croatian part of Istria. With the total length of 152,5 km, including the 2,7 km of industrial gauges, railroads were practically "cut off" from Croatian railroads (except for the indirect connection through Slovenian railroads) and they became railroads with local significance. Passenger traffic and cargo traffic are minor in relation to the existing capacities and possibilities, and thus unprofitable. The future of the Istrian railroads, their survival and development, are conditioned by a direct connection with the Croatian railroads and their inclusion in the Slovenian, Italian and the European railway systems. All railway tracks are of normal width, 1.435 mm wide, except the narrow-gauge track Trieste-Poreč, with a width of 760 mm.

Railway track (route)	Length (km)	Opened	Closed
Pivka (SLO) - Rijeka (CRO)	55,4	25 Jun 1873	
Divača (SLO) - Pula (CRO)	122,2	20 Sep 1876	
Kanfanar - Rovinj (CRO)	21,0	20 Sep 1876	20 Oct 1966
Hrpelje.Kozina (SLO) – Trst (IT)	19,6	5 Jul 1887	1 Jan 1935
Trst (IT) – Poreč (CRO)	123,1	15 Dec 1902	31 Mar 1935
Lupoglav – Štalije (CRO)	52,7	30 Dec 1951	
Prešnica – Kopar (SLO)	31,4	16 Nov 1967	

Table 1. Railway tracks through history



Picture 1. Pula – Divača connection



Picture 2. Old rail track

## 1.2. Statistical data

The functional region covers three territories, the Istrian peninsula with the City of Pula, the Kvarner Bay with the port in Rijeka, Croatia's third largest city, and the hinterland territory. The Istrian peninsula, with Pula as its centre and the largest city in Istria County, is a metropolitan area of 90,000 people. The city itself has 57,460 residents (census 2011), while the metropolitan area includes Barbana (2,802 residents), Fažana (3,050 residents), Ližnjan (2,945 residents), Marčana (3,903 residents), Medulin (6,004 residents), Svetvinčenat (2,218 residents) and Vodnjan (5,651 residents). Its population density is 1,093.27 inhabitants per square kilometre (2,831.6/sq mi), ranking Pula fifth in Croatia.

Number of inhabitants	2011 census
<i>Buzet</i>	6.133
<i>Lupoglav</i>	924
<i>Pazin</i>	8.638
<i>Poreč - Parenzo</i>	16.696
<i>Pula - Pola</i>	57.460
<i>Rovinj - Rovigno</i>	14.294
<i>Umag - Umago</i>	13.467

Table 2. Population in major cities of Istria - 2011 CENSUS (Source: CBS)





Picture 3. Istria region



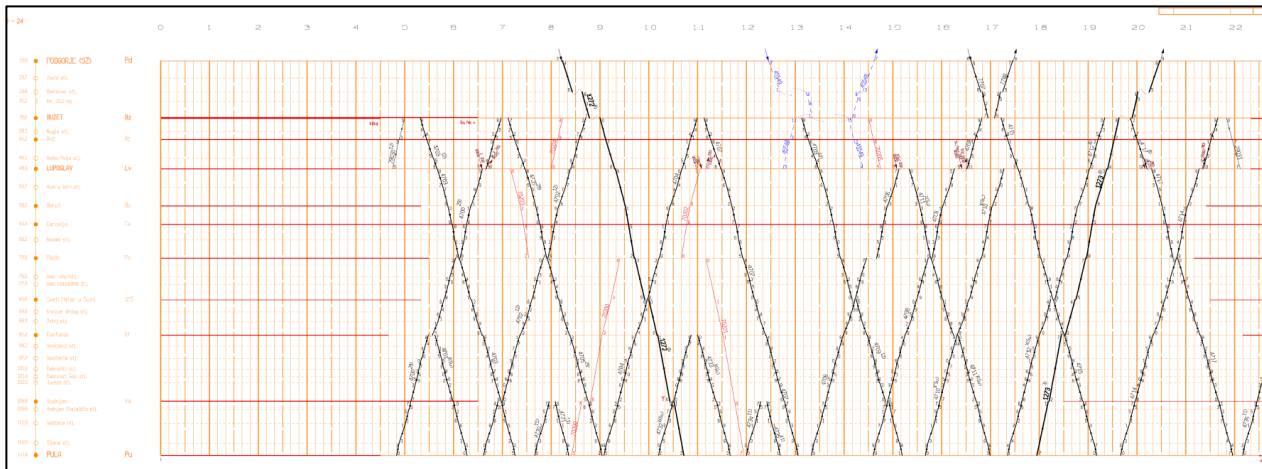
Picture 4. Railway network in Istria (Source: [www.hzinfra.hr](http://www.hzinfra.hr))

In the County of Istria, the highest number of passengers are at the stations in Pazin, Rovinj, Umag, Poreč and Buje. In the city of Pula, in public transport, the highest number of passengers is at the points Zagrebačka street, Giardini and Istarska street. The most loaded departures are those from 7 to 8 h and from 11 to 12 h. The busiest city line in Pula is Line 1 (Bus Station – Stoja), and the busiest departure is the one at 7:30 am. There are 2441 passengers on this route daily. The urban passenger transport system has been established in the city of Pula with 8 city lines and 5 suburban lines. About 670 passengers travel by rail, with the largest number recorded in Pula, Kanfanar, Pazin and Lupoglav.



Stations	No of passengers 2019
Pula	108.389
Šijana	2.044
Galižana	3.867
Vodnjan station	16.250
Vodnjan	3.204
Juršići	8.620
Čabrunići Selo	6.271
Čabrunići	1.830
Savičenta	4.154
Smoljanci	4.962
Kanfana	22.099
Žminj	2.644
Krajar Brijeg	1.478
Sv.Petar u Šumi	20.543
Heki station	2.950
Heki cargo terminal	3.862
Pazin	71.292
Novaki	1.934
Cerovlje	11.728
Borut	11.397
Hum u Istri	1.374
Lupoglav	36.342
Ročko Polje	1.015
Roč	1.693
Nugla	1.035
Buzet	5.221

*Table 3. Official data recordings for year 2019 - Railway track M304 (Rakitovec) – State Border - Buzet – Pula (Source: HŽPP database)*



Picture 5. Graphic timetable design (Source: HŽPP database)

No of passengers	2018	2019
<b>Total</b>		
Passengers carried, '000	85.020	84.096
Passenger-kilometres, mln	7.037	7.417
<b>Railway transport</b>		
Passengers carried, '000	20.271	19.854
Passenger-kilometres, mln	756	734
<b>Road transport</b>		
Passengers carried, '000	47.704	46.831
Passenger-kilometres, mln	3.843	4.022
<b>Seawater and coastal transport</b>		
Passengers carried, '000	14.821	15.142
Passenger-kilometres, mln	725	873
<b>Air transport</b>		
Passengers carried, '000	2.224	2.270
Passenger-kilometres, mln	1.713	1.788

Table 4. Total number of passengers (Source: CBS)

Opposite to HŽPP data collections regarding passenger number, statistical data provided by Croatian Bureau of Statistics shows how small part has Istrian peninsula in whole transport picture.

The guidance on minimising movements in Croatia was reflected in the total number of passengers transported in the first quarter of 2020, when nearly 16.5 million passengers were transported, compared with the first quarter of 2019, a 14 percent drop. Although passenger transport was

reinstated in the second quarter, all branches of passenger transport suffered a decline. In the second quarter of 2020, only 6.2 million passengers were transported, compared with the same period in 2019, a 71.4 percent drop. The railroad, according to provisional data, transported 1.7 million passengers, or 66.6 percent less than in the second quarter last year.

Data on transport are collected through weekly, monthly and quarterly statistical surveys. The purpose of the surveys was to collect data on the transport of passengers and goods and calculate the performance indicators on transport expressed in tonne-kilometres and passenger-kilometres. Passenger-kilometre is a unit of measure representing a transport of one person over a distance of one kilometre. The calculation of passenger-kilometres for rail transport takes into account only a distance travelled on the territory of the Republic of Croatia. Data on the railway transport of passengers also include passengers in transit through the Republic of Croatia and refer to the territory of the Republic of Croatia.

No of carried passengers	Unit of measure	2018	2019
<i>Passengers carried, total</i>	'000	20.271	19.854
<i>Out of total in international transport and transit</i>	'000	328	329

*Table 5. Total number of carried passengers (Source: CBS)*





### 1.3. Passenger transport in Istria region

The number of trains was steadily decreasing on Istrian region, and in 2010 passenger cross-border traffic was completely abolished: December 10th, 2010 was a sad day for train passengers and rail enthusiasts. For the first time in its history, Istrian railways have remained isolated from the European railway system. With the introduction of the timetable, Croatian Railways abolished the Buzet-Rakitovec connection and trains on both sides of the border only drove to the border stations. This lasted until December 15th, 2013, when a symbolic connection was established on one afternoon train. This connection was weak, because the ride from Ljubljana to Pula takes 4 hours and 40 minutes and also includes transfers from one train to another in Divača and Buzet.

Croatian railways have organized combined train/bus traffic for passengers to Rijeka and Zagreb with transfers in Lupoglav and Rijeka, but this is a very long and arduous journey. A slightly better situation is in the tourist season because Slovenian railways in cooperation with HŽPP managed to maintain one direct train from Ljubljana to Pula, thus making it easier for foreign tourists to get to Istria by train. It is difficult for foreigners to understand that the connections between Istria and the EU are as they are. The fleet of passenger trains is outdated and cannot provide quality services, which is the cause of few passengers taking the train.

Rail infrastructure is not on the satisfactory level. It's important to highlight that the railway network is not connected - the problem of the railway connection of the territory of Istria with the rest of the Republic of Croatia is due to fact that tracks are situated across the territory of the Republic of Slovenia.





**Valid from 15. 12. 2019. to 12. 12. 2020.**

KOLODVOR / stajalište	Broj vlaka									
	4701	4703	4705	1272	4707	4733	4709	4711	4715	4717
Maribor (SŽ)	-----	-----	-----	7 03:20	-----	-----	-----	-----	11:45	-----
Ljubljana (SŽ)	-----	-----	-----	7 06:12	-----	-----	-----	-----	14:35	-----
Divača (SŽ)	-----	-----	-----	↓07:52	-----	-----	-----	-----	16:12	-----
Hrpelje Kozina (SŽ)	-----	-----	-----	↓08:04	-----	-----	-----	-----	16:25	-----
BUZET dol.	-----	-----	-----	7 08:47	-----	-----	-----	-----	16:57	-----
BUZET odl.	-----	2 05:19	3 07:07	↓09:00	11:08	-----	2 13:08	3 15:40	17:13	6 19:52
Nugla	-----	↓05:24	↓07:12	↓-----	11:13	-----	↓13:13	-----	17:18	↓19:57
ROČ	-----	↓05:27	↓07:15	↓-----	11:16	-----	↓13:16	↓15:48	17:21	↓20:00
Ročko Polje	-----	↓05:35	↓07:23	↓-----	11:24	-----	↓13:24	↓15:56	17:29	↓20:08
LUPOGLAV	-----	↓05:39	↓07:27	↓09:18	11:28	-----	↓13:28	↓16:00	17:33	↓20:12
Zagreb odl. → 	-----	-----	-----	-----	-----	-----	-----	08:08	-----	13:12
Rijeka dol. → 	-----	-----	-----	-----	-----	-----	-----	12:42	-----	18:18
Rijeka odl. → 	-----	-----	4 05:55	-----	10:25	-----	-----	1 14:25	5 15:45	19:30
Lupoglav dol. → 	-----	-----	4 06:35	-----	11:05	-----	-----	1 15:05	5 16:25	20:10
LUPOGLAV	-----	05:40	3 07:28	7 09:19	11:29	-----	2 13:29	1 15:20	17:34	20:18
Hum u Istri	-----	05:47	↓07:35	↓-----	11:36	-----	↓13:36	↓15:27	17:41	20:25
BORUT	-----	05:53	↓07:41	↓-----	11:42	-----	↓13:42	↓15:33	17:48	20:31
CEROVLJE	-----	05:58	↓07:46	↓-----	11:47	-----	↓13:47	↓15:38	17:53	20:36
Novaki	-----	06:01	↓07:49	↓-----	11:50	-----	↓13:50	↓15:41	17:56	20:39
PAZIN dol.	-----	06:06	↓07:54	↓09:42	11:55	-----	↓13:55	↓15:46	18:01	20:44
PAZIN odl.	-----	06:07	↓07:55	↓09:43	11:56	-----	↓13:56	↓15:47	18:02	20:50
Heki tovarište	-----	06:14	↓08:02	↓-----	12:03	-----	↓14:03	↓15:54	18:09	20:57
Heki stajalište	-----	06:16	↓08:04	↓-----	12:05	-----	↓14:05	↓15:56	18:11	20:59
SV. PETAR U ŠUMI	-----	06:22	↓08:09	↓10:00	12:10	-----	↓14:15	↓16:01	18:17	21:04
Krajcar Brijeg	-----	06:26	↓08:13	↓-----	12:14	-----	↓14:19	↓16:05	18:21	21:08
Žminj	-----	06:29	↓08:16	↓-----	12:17	-----	↓14:22	↓16:08	18:24	21:11
KANFANAR	1 05:37	06:36	↓08:23	↓10:11	12:24	1 11:00	↓14:28	↓16:20	18:31	21:18
Smoljanci	↓05:41	06:40	↓08:27	↓-----	12:28	↓11:04	↓14:32	↓16:24	18:35	21:22
Savičenta	↓05:45	06:44	↓08:31	↓-----	12:32	↓11:08	↓14:36	↓16:28	18:39	21:26
Čabruniči stajalište	↓05:48	06:47	↓08:34	↓-----	12:35	↓11:11	↓14:39	↓16:31	18:42	21:29
Čabruniči Selo	↓05:50	06:49	↓08:36	↓-----	12:37	↓11:13	↓14:41	↓16:33	18:44	21:31
Juršići	↓05:52	06:51	↓08:38	↓-----	12:39	↓11:15	↓14:43	↓16:35	18:46	21:33
VODNJAN	↓06:00	06:59	↓08:46	↓10:31	12:47	↓11:23	↓14:55	↓16:43	18:54	21:41
Vodnjan stajalište	↓06:02	07:01	↓08:48	↓-----	12:49	↓11:22	↓14:57	↓16:45	18:56	21:43
Galižana	↓06:06	07:05	↓08:52	↓-----	12:53	↓11:29	↓15:01	↓16:49	19:00	21:47
Šijana	↓06:13	07:12	↓08:59	↓-----	13:00	↓11:36	↓15:08	↓16:56	19:07	21:54
PULA	↓06:16	07:15	↓09:02	↓10:43	13:03	↓11:39	↓15:11	↓16:59	19:10	21:57

Picture 6. Timetable Maribor (SLO)– Pula (CRO) 2019-2020 (Source: HŽPP)



Valid from **15. 12. 2019.** to **12. 12. 2020.**

KOLODVOR / stajalište	Broj vlaka									
	4700	4702	4704	4732	4706	4708	4710	4712	1273	4714
<b>PULA</b>	<b>2 04:50</b>	<b>4 06:37</b>	<b>09:05</b>	<b>1 10:12</b>	<b>13:20</b>	<b>14:36</b>	<b>1 15:40</b>	<b>1 17:21</b>	<b>7 17:57</b>	<b>19:40</b>
Šijana	↓04:53	↓06:40	08:08	↓10:15	13:23	14:39	↓15:43	↓17:24	↓-----	19:43
Galižana	↓05:01	↓06:48	09:16	↓10:23	13:31	14:47	↓15:51	↓17:32	↓-----	19:51
Vodnjan stajalište	↓05:05	↓06:52	09:20	↓10:27	13:35	14:51	↓15:55	↓17:36	↓-----	19:55
<b>VODNJAN</b>	<b>↓05:07</b>	<b>↓07:00</b>	<b>09:22</b>	<b>↓10:30</b>	<b>13:37</b>	<b>14:53</b>	<b>↓15:57</b>	<b>↓17:38</b>	<b>↓18:12</b>	<b>19:58</b>
Juršići	↓05:13	↓07:06	09:28	↓10:36	13:43	14:59	↓16:03	↓17:44	↓-----	20:04
Čabruniči Selo	↓05:15	↓07:08	09:30	↓10:38	13:45	15:01	↓16:05	↓17:46	↓-----	20:06
Čabruniči stajalište	↓05:17	↓07:10	09:32	↓10:40	13:47	15:03	↓16:07	↓17:48	↓-----	20:08
Savičenta	↓05:20	↓07:13	09:35	↓10:43	13:50	15:06	↓16:10	↓17:51	↓-----	20:11
Smoljanci	↓05:24	↓07:17	09:39	↓10:47	13:54	15:10	↓16:14	↓17:55	↓-----	20:15
<b>KANFANAR</b>	<b>↓05:34</b>	<b>↓07:22</b>	<b>09:44</b>	<b>↓10:51</b>	<b>13:59</b>	<b>15:15</b>	<b>↓16:19</b>	<b>↓18:00</b>	<b>↓18:32</b>	<b>20:20</b>
Žminj	↓05:41	↓07:29	09:51	-----	14:06	15:22	↓16:26	↓18:07	↓-----	20:27
Krajcar Brijeg	↓05:44	↓07:32	09:54	-----	14:09	15:25	↓16:29	↓18:10	↓-----	20:30
<b>SV. PETAR U ŠUMI</b>	<b>↓05:48</b>	<b>↓07:36</b>	<b>09:58</b>	-----	<b>14:13</b>	<b>15:29</b>	<b>↓16:34</b>	<b>↓18:19</b>	<b>↓18:45</b>	<b>20:34</b>
Heki stajalište	↓05:53	↓07:41	10:03	-----	14:18	15:34	↓16:39	↓18:24	↓-----	20:39
Heki tovarište	↓05:55	↓07:43	10:05	-----	14:20	15:36	↓16:41	↓18:26	↓-----	20:41
<b>PAZIN dol.</b>	<b>↓06:02</b>	<b>↓07:50</b>	<b>10:12</b>	-----	<b>14:27</b>	<b>15:43</b>	<b>↓16:48</b>	<b>↓18:33</b>	<b>↓18:57</b>	<b>20:48</b>
<b>PAZIN odl.</b>	<b>↓06:08</b>	<b>↓07:56</b>	<b>10:13</b>	-----	<b>14:40</b>	<b>15:48</b>	<b>↓16:49</b>	<b>↓18:34</b>	<b>↓18:58</b>	<b>20:49</b>
Novaki	↓06:13	↓08:01	10:18	-----	14:45	15:53	↓16:54	↓18:39	↓-----	20:54
<b>CEROVLJE</b>	<b>↓06:16</b>	<b>↓08:04</b>	<b>10:21</b>	-----	<b>14:48</b>	<b>15:56</b>	<b>↓16:57</b>	<b>↓18:42</b>	<b>↓-----</b>	<b>20:57</b>
<b>BORUT</b>	<b>↓06:21</b>	<b>↓08:09</b>	<b>10:26</b>	-----	<b>14:53</b>	<b>16:01</b>	<b>↓17:02</b>	<b>↓18:47</b>	<b>↓-----</b>	<b>21:02</b>
Hum u Istri	↓06:29	↓08:17	10:34	-----	15:01	16:09	↓17:10	↓18:55	↓-----	21:10
<b>LUPOGLAV dol.</b>	<b>↓06:35</b>	<b>↓08:23</b>	<b>10:40</b>	-----	<b>15:07</b>	<b>16:15</b>	<b>↓17:16</b>	<b>1 19:01</b>	<b>↓19:23</b>	<b>21:16</b>
Lupoglav odl. → 	<b>3 06:39</b>	-----	11:10	-----	-----	16:30	-----	-----	-----	21:20
Rijeka dol. → 	<b>3 07:19</b>	-----	11:50	-----	-----	17:10	-----	-----	-----	22:00
Rijeka odl. → 	07:35	-----	13:58	-----	-----	-----	-----	-----	-----	-----
Zagreb dol. → 	12:43	-----	18:27	-----	-----	-----	-----	-----	-----	-----
<b>LUPOGLAV odl.</b>	<b>2 06:40</b>	<b>4 08:24</b>	<b>10:41</b>	-----	<b>6 15:12</b>	<b>16:31</b>	-----	<b>5 19:02</b>	<b>↓19:24</b>	<b>21:21</b>
Ročko Polje	↓06:44	↓08:28	10:45	-----	↓15:16	16:35	-----	↓19:06	↓-----	21:25
<b>ROČ</b>	<b>↓06:50</b>	<b>↓08:34</b>	<b>10:51</b>	-----	<b>↓15:22</b>	<b>16:41</b>	-----	<b>↓19:12</b>	<b>↓-----</b>	<b>21:31</b>
Nugla	↓06:53	↓08:37	10:54	-----	-----	16:44	-----	↓19:15	↓-----	21:34
<b>BUZET dol.</b>	<b>↓06:58</b>	<b>↓08:42</b>	<b>10:59</b>	-----	<b>↓15:29</b>	<b>16:49</b>	-----	<b>↓19:20</b>	<b>↓19:38</b>	<b>21:39</b>
<b>BUZET odl.</b>	-----	-----	-----	-----	-----	<b>17:05</b>	-----	-----	<b>↓19:55</b>	-----
Hrpele Kozina (SŽ)	-----	-----	-----	-----	-----	17:37	-----	-----	<b>↓20:38</b>	-----
Divača (SŽ)	-----	-----	-----	-----	-----	17:51	-----	-----	<b>↓20:54</b>	-----
Ljubljana(SŽ)	-----	-----	-----	-----	-----	<b>19:39</b>	-----	-----	<b>7 22:34</b>	-----
Maribor(SŽ)	-----	-----	-----	-----	-----	<b>22:10</b>	-----	-----	<b>7 01:21</b>	-----

Picture 7. Timetable Pula (CRO) – Maribor (SLO) 2019-2020 (Source: HŽPP)

In the organization of HŽ Passenger transport the bus is provided between Lupoglav and Rijeka with the possibility of continuing the journey by train. The rail transport ticket is unique to the train and bus and complies to tariff provisions of HŽ Passenger Transport Ltd.

Exceptions for this timetable are:

- 1 - Do not drive on Sat, Sun and holidays
- 2 - Do not drive on Saturdays, Sundays and holidays, nor in the period from 23/12/2019 from 10/4 to 17/4, and from 18/6 to 4/9/2020
- 3 - Train 4705 does not run on Sun and Mon from 28/9/2020, drives daily from 18/4 to 27/9/2020
- 4 - On the route Rijeka - Lupoglav, the BUS HŽ does not run on Sun and holidays
- 5 - On the route Rijeka - Lupoglav, BUS HŽ runs on Sat, Sun and holidays
- 6 - Train 4717 on the route Buzet-Lupoglav runs daily from 18/4 to 27/9/2020
- 7 - High speed train 1272 Maribor-Ljubljana-Hrpeleje Kozina-Pula runs daily from 18/4 to 27/9/2020
- 8 - On the route Buzet - Lupoglav BUS HŽ runs on weekdays from Mon to Fri except holidays until 19/6 and from 7/9/2020.

#### Connection with Slovenia - distance:

Kanfanar – Divača route from Croatian side			
No of train	Departure	Arrival	Km
4703	Buzet	Buzet (Border)	4
	Nugla	Buzet (Border)	8
	Roč	Buzet (Border)	10
	Ročko Polje	Buzet (Border)	15
	Lupoglav	Buzet (Border)	18
	Hum u Istri	Buzet (Border)	23
	Borut	Buzet (Border)	28
	Cerovlje	Buzet (Border)	32
	Novaki	Buzet (Border)	35
	Pazin	Buzet (Border)	39
	Heki Tovarište	Buzet (Border)	45
	Heki	Buzet (Border)	46
	Sv.Petar u šumi	Buzet (Border)	50
	Kanfanar	Buzet (Border)	60

Table 6. Timetable on Kanfanar – Divača route (Source: HŽPP database)



<b>Buzet (Border) - Divača route from Slovenian side</b>			
<b>No of train</b>	<b>Departure</b>	<b>Arrival</b>	<b>Km</b>
4708	Buzet (Border)	Rakitovec	2
	Buzet (Border)	Zazid	6
	Buzet (Border)	Podgorje	12
	Buzet (Border)	Prešnica	16
	Buzet (Border)	Hrpelje-Kozina	20
	Buzet (Border)	Rodik	24
	Buzet (Border)	Divača	32

*Table 7. Timetable on Buzet – Divača route (Source: HŽPP database)*

Within this particular border crossing during the last two years there is only one train operating. Due to infrastructure work, this particular train is substituted by bus for very few passengers from Slovenian part. Within October 2020, situation has stabilized, and train operates again. To sustain transit at this particular border crossing during the recent years, tariffs from operators and prices were additionally reduced and special offers provided. According to reduced prices, Slovenian railways introduced additional routes such as Maribor/Celje-Pula at price of 24 EUR for one direction and 39 EUR for return trip. Besides this till now price offer on route Ljubljana-Pula was 19 EUR for one direction and 29 EUR for return trip. Despite low prices, operators can't comply to passenger needs and be competitive to bus operators due to lack of service level, punctuality, speed and accuracy. From September 8th, 2020 on the routes Rijeka – Lupoglav – Rijeka and Buzet – Lupoglav – Buzet, additional bus lines were introduced to encourage tourism and seasonal passengers.

The plan for this region is to produce project and study documentation that would create assumptions for the reconstruction of the existing railway network and the connection to the Mediterranean Corridor towards Rijeka. This is an extremely large project that requires a certain period of time, so it is estimated that it would take two to three years to produce the conditions for securing European funds for works.

The City of Pula has defined throughout its recently developed and approved sustainable urban mobility plan (SUMP) it's aiming to implement ITS that should improve mobility in the City assuring that appropriate information is collected and timely shared with all transport participants in the City of Pula and surrounding areas. Overall, ITS should help all parties that travel throughout Pula to do it in the most efficient way, combining different means of transport (car, bicycles, train, ...) and doing it in the most efficient way.

Passenger departures	2018	2019
Pula	74.228	72.160

Table 8. Passenger departures (Source: CBS)

Demand for mobility is expected to grow over the next decades. City and region must therefore be able to respond to the increasing mobility needs of people and goods to stay competitive, while answering to the emission reduction challenge in the transport sector.

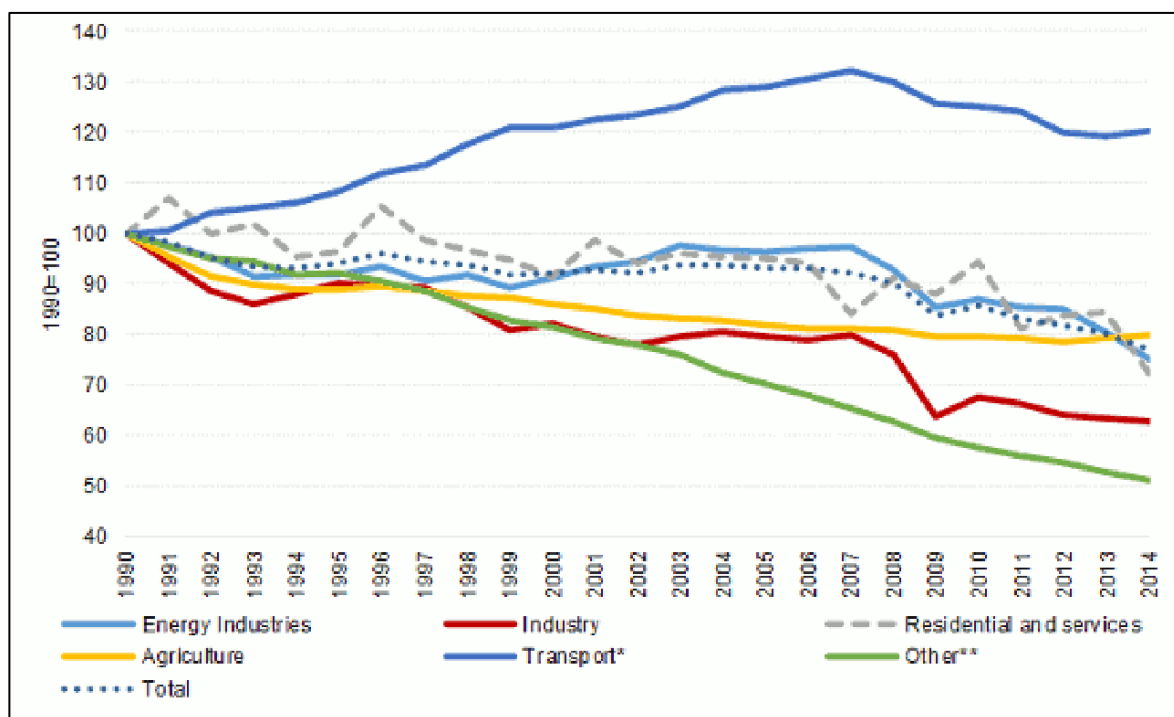


Figure 1. GHG Emission by sector over time (Source: EEA)

On March 11, 2020, the World Health Organization (WHO) has declared COVID-19 a global pandemic. Many countries have closed their borders and imposed curfews – resulting in sharp reductions in transport demand also on regional and continental level. It is highly likely that the corona virus outbreak will have longer-term impacts to our individual behaviour and lifestyle, the way we work, consume and travel. Public transport but also shared mobility services are on the one hand vectors for distribution of the virus. On the other hand, they are severely impacted by travel bans and individual concerns in order to avoid public gatherings leading to reduced travel and transport demand.

In order to ensure a systematically coordinated response and effective implementation of measures by public transport companies and authorities, contagious virus or pandemic response plans shall form the basis for action and measure implementation. In addition, all measures taken by governmental agencies and public transport companies in order to ensure safety of staff and passengers as well as countering a further spread of COVID-19 shall be based on comprehensive impact assessments. Social, environmental and climate as well as economic impacts of measures shall be taken into account. Not only transport sector will be affected by new measures and reductions, it has big impact of tourism, major economy branch in Istria region. Tourist activity in the GDP of the county has a share of about 25% (representation of accommodation the capacity of hotels and tourist resorts is 36%, and camps and private accommodation are represented by 64%). This county is traditionally the most visited tourist region in Croatia, where about 25-30% of tourist arrivals or overnight stays in the country. There are about 250,000 registered tourist beds and about 100,000 more beds are located in houses or apartments for occasional use.

Tourists	2018			2019		
	Tourist arrivals			Tourist nights		
	Total	Domestic	Foreign	Total	Domestic	Foreign
<i>Buzet</i>	17.834	3.077	14.757	59.047	6.761	52.286
<i>Lupoglav</i>	1.538	64	1.474	10.351	218	10.133
<i>Pazin</i>	11.736	3.471	8.265	61.284	7.911	53.373
<i>Poreč</i>	570.970	44.926	526.044	3.188.578	12.794	3.064.784
<i>Pula</i>	439.541	47.557	391.984	2.067.041	124.563	1.942.478
<i>Rovinj</i>	711.061	64.731	646.330	3.873.649	177.829	3.695.820
<i>Umag</i>	488.851	27.206	461.645	2.414.810	83.897	2.330.913

Table 9. Number of tourist arrivals and nights in major cities of Istria (Source: CBS)

The COVID-19 virus pandemic has hit the world at a scale, pace and intensity like few events in living memory. Industries and governments have all been hit in one way or another, mostly for worse not better. One of the most dramatic changes has been in the transport section, with an almost overnight, unprecedented reduction in travel. At present, most countries are in some form of lockdown, with journeys severely restricted and reduced to essential trips only.

## 2. Data collection

For proper investigation among public transport users, HŽPP created and disseminated a survey about passenger transport habits. Collecting data was done in person among railway and bus users during two-week period (last week in August and first week in September), and also online (published during last week in August and maintained and monitored during two more weeks in September) via different institutions in Istrian region. Charts within text shows differences and preferences among users. HŽPP employees from Sales and marketing department, spread and handed surveys among railway users on the trains operating via Istria. Starting point was Pula railway station as well as other stations in Pazin, Buzet and Kanfanar. Collecting data was also organized on bus station in Pula where is the largest number of interchanges and passengers exchange.

### 2.1. Means of transport

During collecting data from passengers, the highest number of examinees, 54% of them, use train as main transport solution, 18% of them car while 12% of them uses bus or walk. Some respondents gave multiple answers.

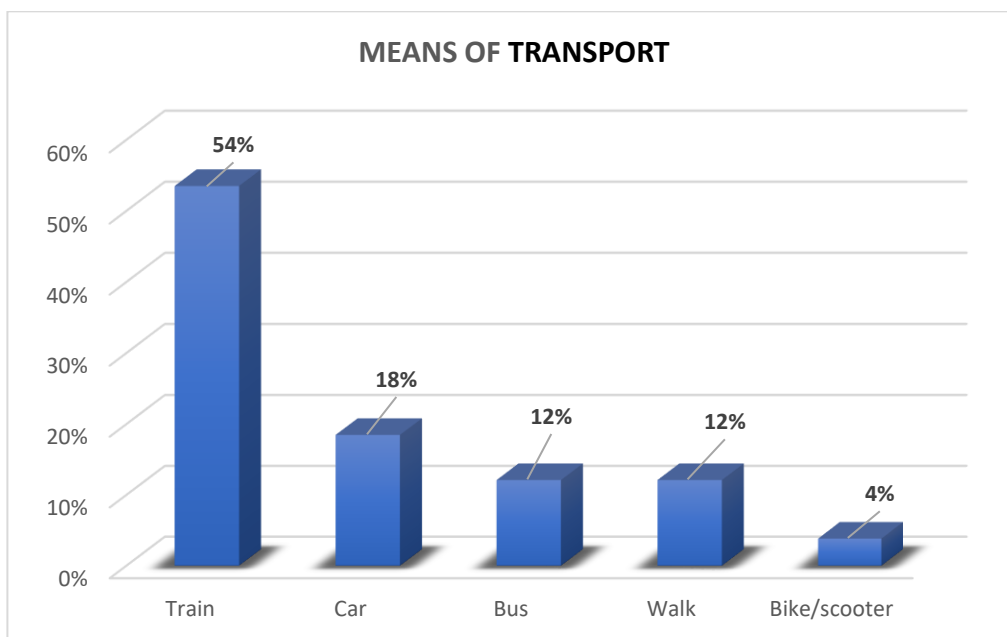


Figure 2. Data collected from railway hubs (Source: HŽPP)

Online data collecting gave slightly different results, however train remains primary transportation mean for everyday transport.

Generally speaking, for the entire Croatian area, railway is not well represented. Railway is far behind passenger car and bus transport. The reason is very obvious, railway tracks are not represented in all country regions.

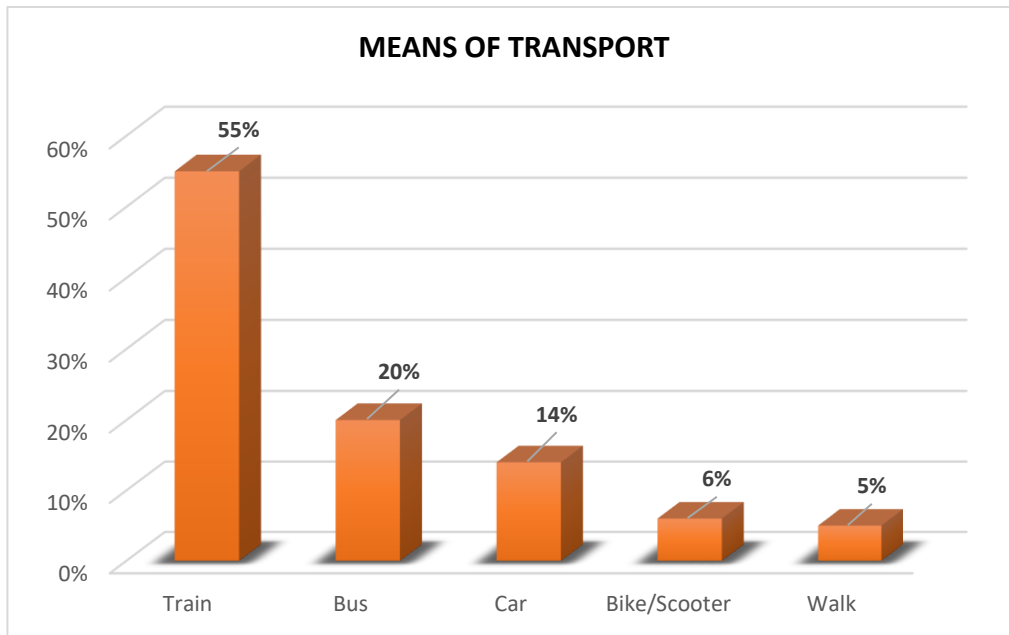


Figure 3. Online collected data (Source: HŽPP)

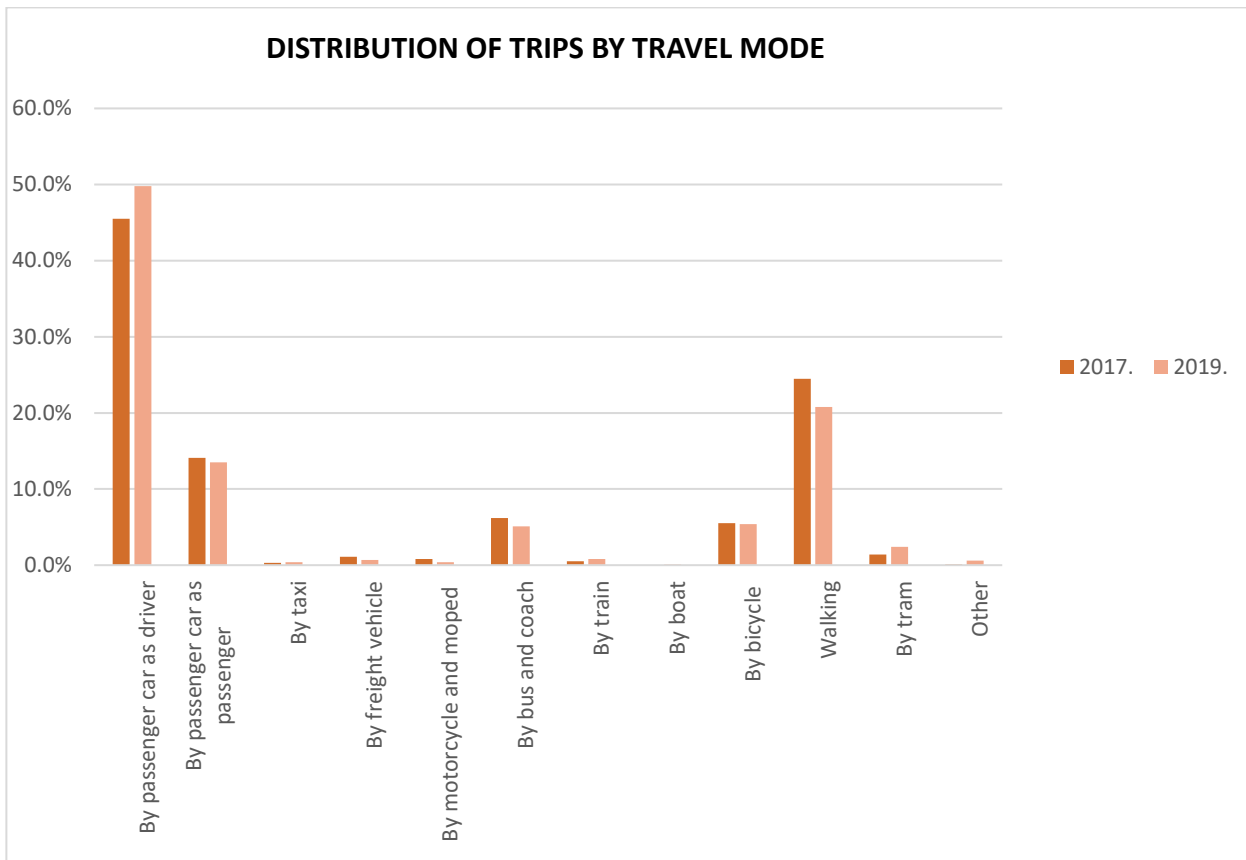


Figure 4. Distribution of trips by travel mode (Source: CBS)

## 2.2. Reason for travel

Most frequent reasons for travelling according to HŽPP survey are business trips with 56%, then leisure time and free activities 27% and going to school or University 16%. Online survey gave us slightly different results but still commuter traveling for work purposes remain with highest percentage. Comparing survey results with national data, similar results are obtained.



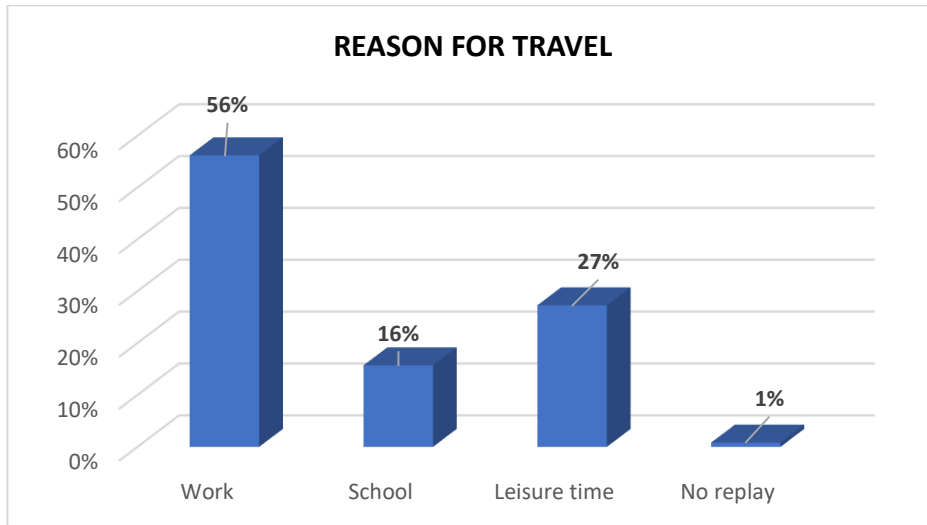


Figure 5. Data collected from railway hubs (Source: HŽPP)

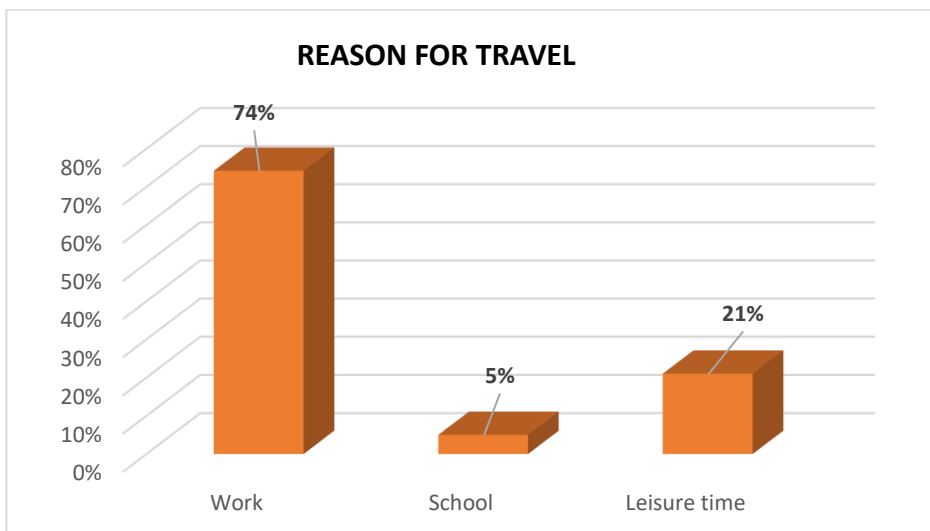


Figure 6. Online collected data (Source: HŽPP)

<b>Average daily number of trips per person, by travel purpose In 2019</b>	<b>Total mobility &lt;300 km Unit of measure - km</b>
<b>Total</b>	<b>1,8422</b>
Work	0,6354
Education	0,0766
Shopping	0,3128
Personal business	0,1926
Professional	0,0137
Leisure	0,5513
Escorting	0,0598
Other	-

Table 10. Average daily number of trips per person, by travel purpose (Source: CBS)

<b>Distribution of trips by travel mode</b>	<b>2017</b>	<b>2019</b>
By passenger car as driver	45,5%	49,8%
By passenger car as passenger	14,1%	13,5%
By taxi	0,3%	0,4%
By freight vehicle	1,1%	0,7%
By motorcycle and moped	0,8%	0,4%
By bus and coach	6,2%	5,1%
By train	0,5%	0,8%
By boat	0,0%	0,1%
By bicycle	5,5%	5,4%
Walking	24,5%	20,8%
By tram	1,4%	2,4%
Other	0,1%	0,6%

Table 11. Distribution of trips by travel mode (Source: CBS)

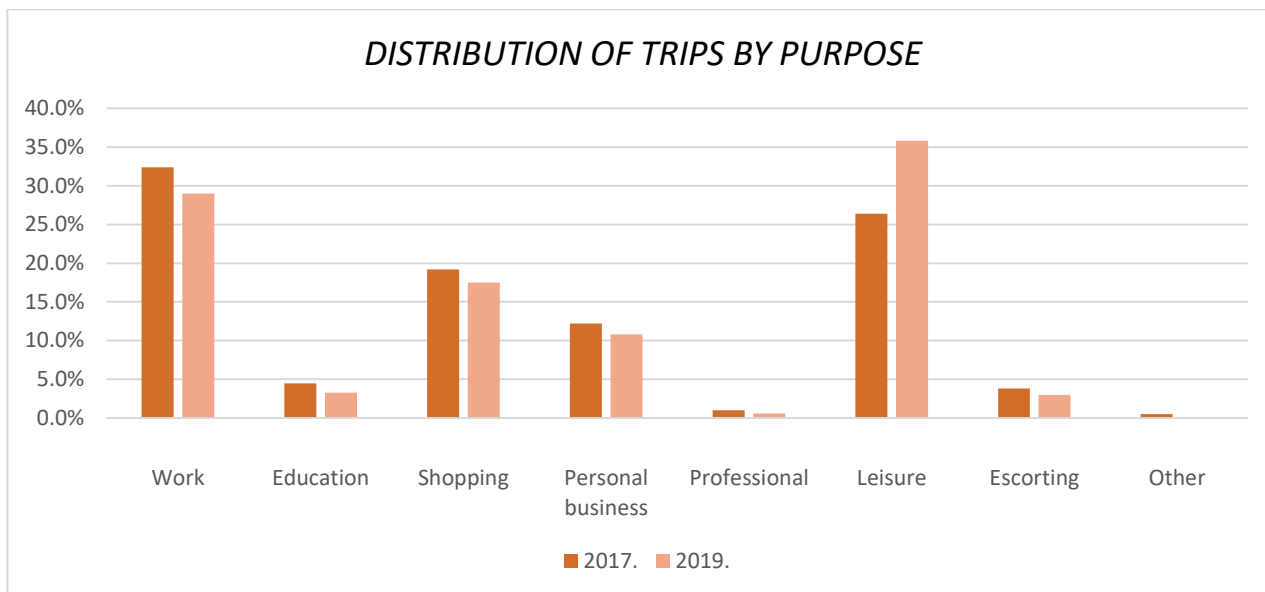


Figure 7. Distribution of trips by purpose (Source: CBS)

Daily number of trips, by means of transportation	Travel purpose							
	Total	Work	Education	Shopping	Personal Business	Professional	Leisure	Escorting
<b>Total</b>	7.877.818	2.280.894	259.601	1.378.480	849.958	49.735	2.824.258	234.892
<i>By passenger car – total</i>	4.987.834	1.658.533	66.723	727.649	590.250	39.251	1.692.458	212.970
<i>By passenger car as driver</i>	3.924.766	1.430.548	40.206	571.815	432.676	36.467	1.215.152	197.902
<i>By passenger car as passenger</i>	1.063.068	227.984	26.517	155.834	157.574	2.785	477.306	15.068
<i>By taxi</i>	28.158	5.660	-	-	5.834	-	16.663	-
<i>By freight vehicle</i>	58.168	36.456	-	1.296	3.863	487	15.154	912
<i>By motorcycle and moped</i>	28.334	6.011	-	9.060	2.299	-	10.964	-
<i>By bus and coach</i>	405.129	128.149	89.648	30.017	41.567	-	115.747	-
<i>By train</i>	62.191	22.242	8.848	1.434	4.444	-	25.223	-
<i>By boat</i>	6.902	751	-	691	3.591	-	1.869	-
<i>By bicycle</i>	420.152	116.175	7.001	134.584	33.019	-	128.458	915
<i>Walking</i>	1.641.829	203.311	52.958	457.642	147.882	7.852	752.089	20.095

<i>By tram</i>	189.486	65.614	34.424	14.193	17.208	-	58.047	-
<i>Other</i>	49.636	37.992	-					

*Table 12. Daily number of trips, by means of transportation (Source: CBS)*

If we exclude work and professional purpose for travel, high numbers are population traveling for leisure time. This is first and foremost due to tourist destinations that Istrian region can offer. Istrian tourism is getting better and better year after year, and these better results mean a steady increase in the number of those who, mostly in the summer months but more and more in the rest of the year, come and go from the Peninsula. By the end of this year, this figure will, only when it comes to the tourism sector, climb to the number of almost 4.5 million passengers who are most often by road or air links, and in many cases a combination of both, to some of the destinations in Istria that they have chosen for their holiday. When considering there are various businessmen who travel daily for economic reasons and the usual daily or occasional migration of the local population, it is clear that on a relatively small area of Istria county an extremely large number of people travel on average, which is why transport connections and infrastructure, as well as traffic development strategy, are an indispensable topic in any story about the future of this region.

The problem of the availability of a tourist destination is mainly related to the main state and/or interstate transport infrastructure, which must meet the high traffic requirements. This is a basic principle, because a more accessible destination will have better capacity utilization.

When, however, talking about the availability of a tourist destination is not only a shorter or longer travel time, but also about the cost of travel, and most about the comfort of travel. Therefore, the journey to the tourist destination is intended to turn into a tourist experience, which means creating an attractive offer that tourists use during their journey to a selected destination and which significantly exceeds their primary needs during the trip. Such is the special offer of accompanying service buildings along the roads, at airports and other passenger terminals in means of transport.

The role of transport in the development of mass tourism is undoubtedly confirmed by some development thresholds of tourism that coincide with the development thresholds of certain transport means – railways, personal cars, aircraft. In economic terms, tourism is one of the most dynamic sectors of human activity and affects all population, all age groups and all regions.

### 2.3. Ticket purchase channel choice

Most of passengers buy tickets at official sales offices, 37% of them buy tickets in bus or in train while 19% of them use online sales channels. Online survey results show almost same choices. This certainly doesn't undermine the fact that new IT solutions are required in order to boost public transport and offer users seamless door to door service with one unique transportation document (ticket).

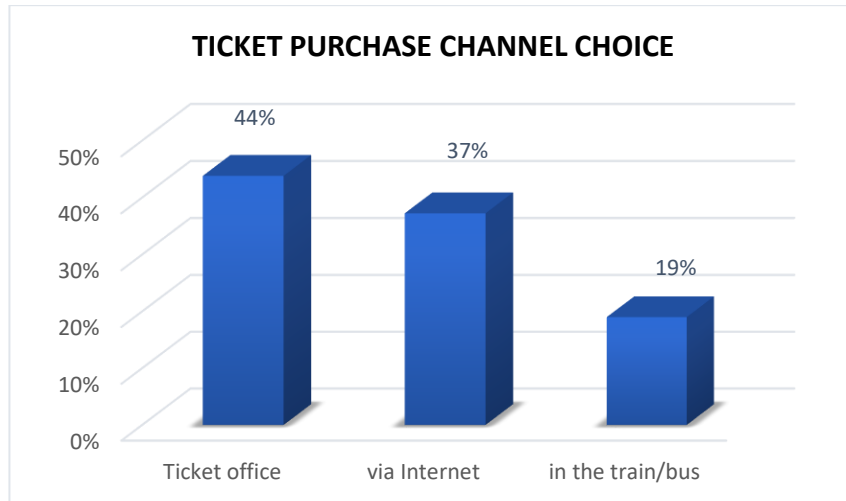


Figure 8. Data collected from railway hubs (Source: HŽPP)

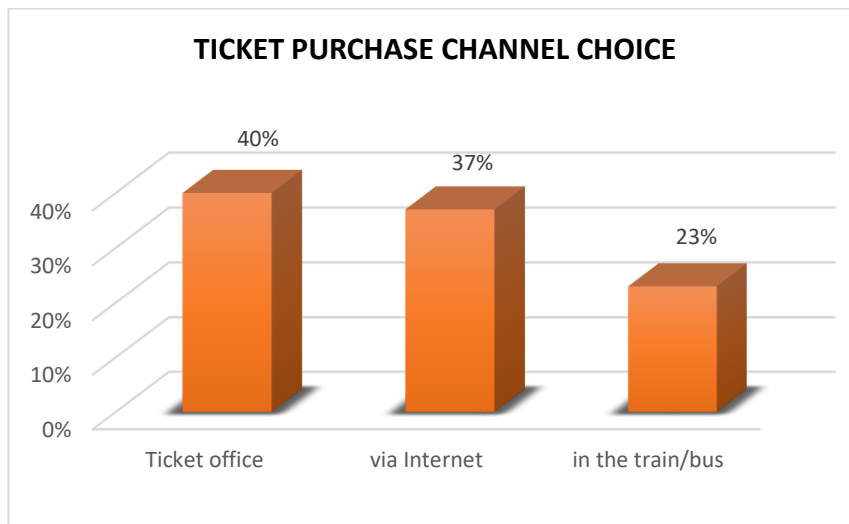


Figure 9. Online collected data (Source: HŽPP)

## 2.4. Familiarity with the concept of sustainable transport

EU transport policy is based on sustainable urban transport plans implemented in most European Countries. A sustainable transport system seeks to minimize the use of personal cars, encouraging users to hike, use bicycles for less distances and means of mass transport or integrated transport.

For the purpose of this research and project outputs as well, respondents were asked about sustainable transport. 52% of respondents are familiar with term of sustainable transport, however 46% of them have never heard about it. Online survey shows ratio of 67% knowing about sustainable transport and 33% doesn't. This only proves that general population does need additional education and that transport operators should work more on marketing measures in order to provide population with travelling possibilities on eco-friendly basis.

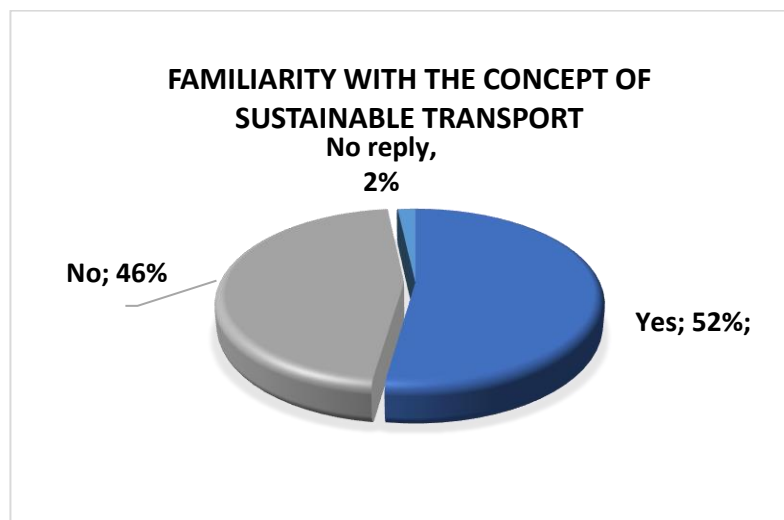


Figure 10. Data collected from railway hubs (Source: HŽPP)



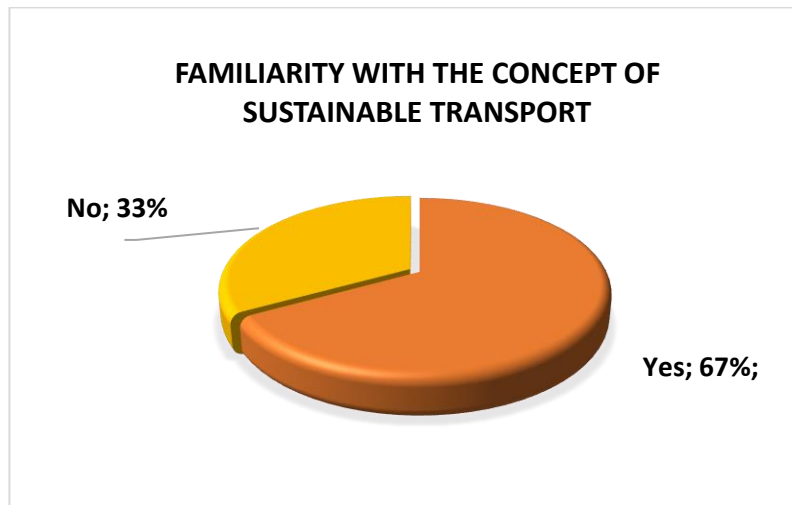


Figure 11. Online collected data (Source: HŽPP)

The development of transport enables the availability of travelling to every part of the Earth without great risk and adventure, so the number of international tourist trips is constantly increasing. For tourist travel, state-of-the-art transport means are mostly used, but equally interesting means of transport from closer or further past that serve as a first-rate tourist attraction in some destinations. The accelerate development of transport, as a result of tourist travel, operators are handling with a number of different problems that are primarily related to the growth, development and sizing of traffic capacities, but also the organization of traffic and traffic safety. Traffic growth also deals with other problems such as the usurpation of space, "visual pollution" of the landscape, negative impact on the environment and more. Therefore, the last fifteen years have been frequently discussed on the so-called sustainable development of tourism, which should minimize or at least mitigate the negative consequences of tourism growth.

Decision-makers at all levels of government in Croatia should be familiar with the concept and principles of sustainable development, in order to identify sustainable development and environmental protection. They should also be familiar with the new global Sustainable Development Goals to incorporate them into their strategies, programs and development plans, whether they are general development or sector-specific development. Investment in the infrastructure of a sustainable urban transport system, with a focus on economic and equal access for all, is essential for achieving sustainable and empowering communities, as this increases their productivity, incomes and improvements in health and educational outcomes that will be visible. Sustainable urban transport system attempts to de-eliminate the use of passenger cars, encourage population to hike, use of bicycles and means of mass transport, i.e. integrated transport. Transport planning is under the responsibility of transport sciences and the profession cannot be based more on meeting traffic demand, but must control traffic, and target it by modelling the desired demand-inducing options.

## 2.5. Railway transport recommendation and continued use

99% (online 88%) of railway users will continue to use trains for everyday commute. This was expected percentage regarding place and surround area where survey was conducted. However, this is a remarkable figure for future planning, for railway operator.

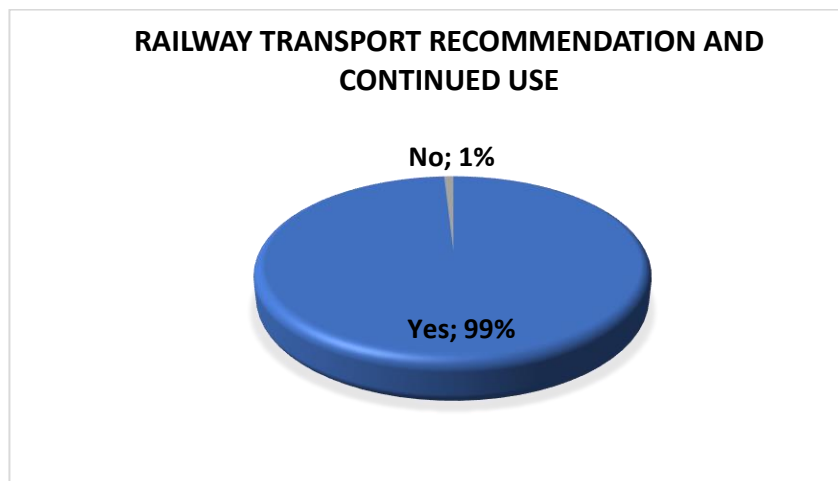


Figure 12. Data collected from railway hubs (Source: HŽPP)

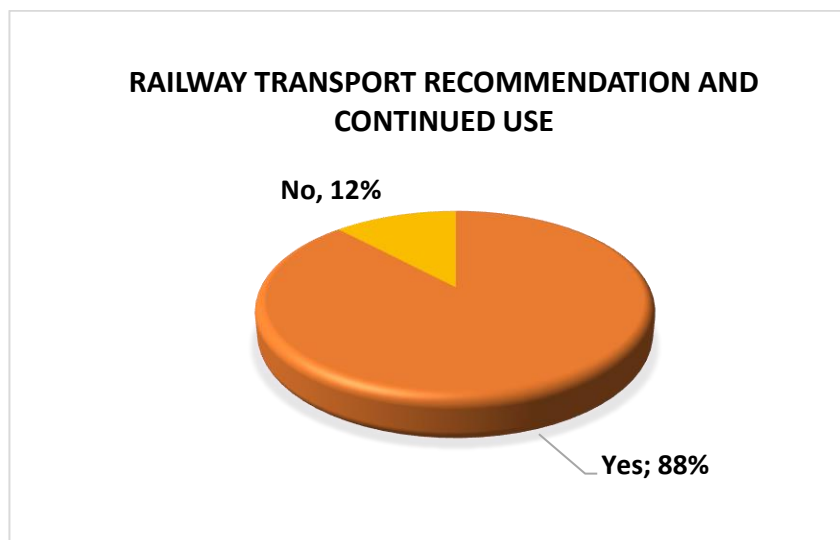


Figure 13. Online collected data (Source: HŽPP)

Specific numbers are retrieved from city of Pazin and surrounding area. About 2,750 children and students travel daily in the city of Pazin and the surrounding municipalities, and the city's goal is to ensure quality transportation of students or arrival and departure of children from school institutions. Using rail passenger transport, about 200 children travel daily, of which 19 children travel to Elementary School in Pazin and Lupoglav, 65 students to the Pazin Gymnasium. Train is their only connection on the way home from school. It is also important to emphasize the importance of the Line Pula - Lupoglav - Rijeka because of the students studying in Rijeka.

## 2.6. Disadvantages of railway transport in Istria

Like every mean of transport, railway also have disadvantages and bottlenecks on which operator needs to work and continue to improve. The highest number of respondents (51% or 24%) are stating that the old trains i.e. dated rolling stocks are major problem in Istria region. Next disadvantage is timetable (21% or 24%) characterised as not properly regulated and travelling time (21% and 17%) which is too long. Respondents were able to state their opinion and add additional explanations which showed other railway disadvantages such as:

- Newer and modern trains are needed
- Improve trains and their schedule
- Shorter traveling times, better transport conditions
- Timetable coordination's due to often timetable changes
- Dated tracks and bad infrastructure conditions
- Insufficient connections between Istria and another Croatian rail/road network
- Often train malfunctions
- Waiting rooms decor
- Not enough passenger information
- Underinvestment in rail system in general
- Long distances between city centres and train stations
- Connections to other transport means

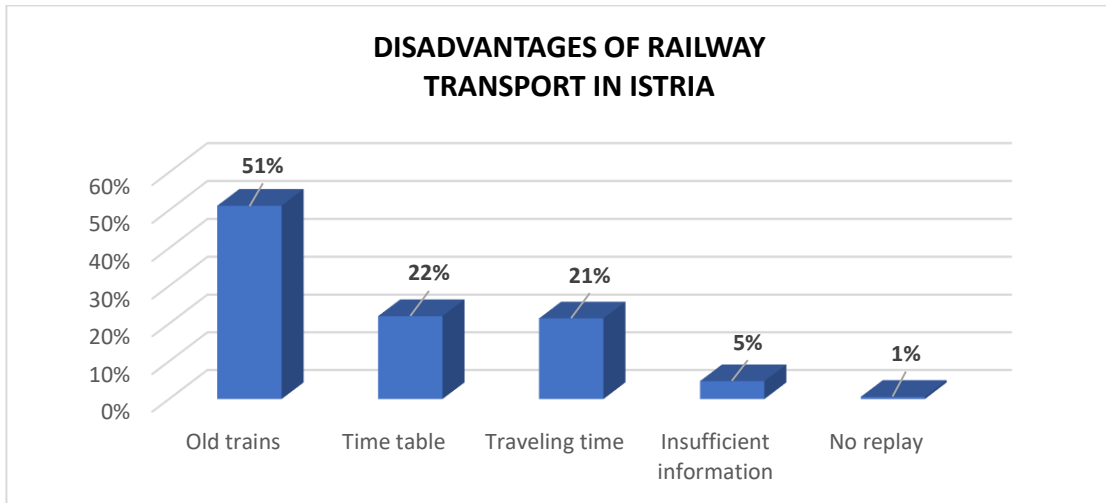


Figure 14. Data collected from railway hubs (Source: HŽPP)

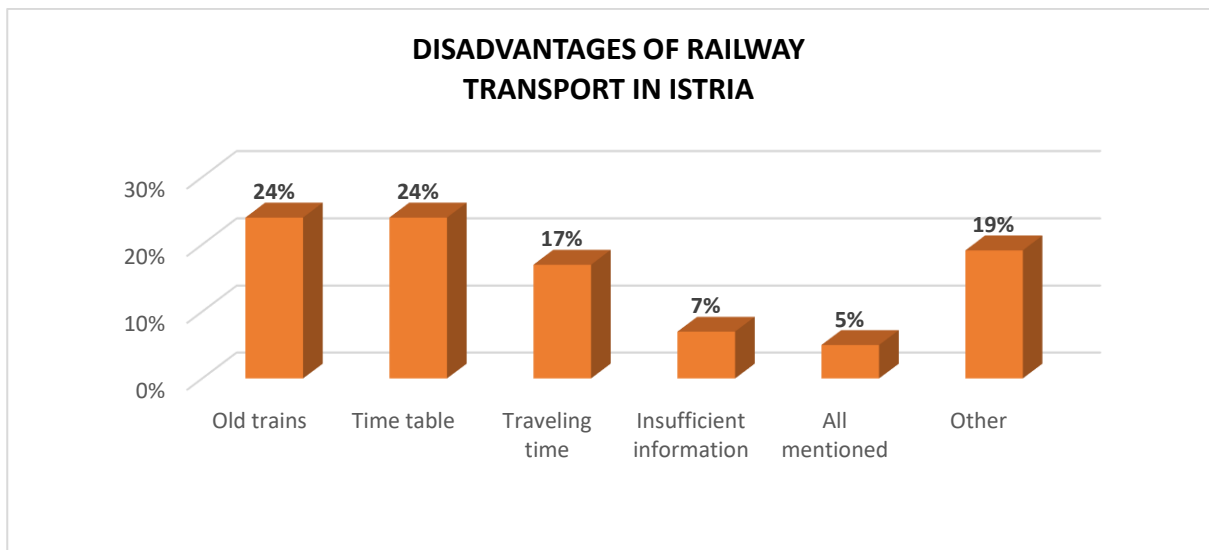


Figure 15. Online collected data (Source: HŽPP)

## 2.7. Necessary changes/improvements in Istria's transport system

Question number 7 gave the respondents possibility to give their own opinion on necessary changes within Istria region. In total it was received 213 suggestions on improvements classified in categories. Respondents were able to provide answers on question regarding necessary changes and improvements. Replies are numerous and closely connect to disadvantages:

- Better timetable, better connections, shorter traveling time
- Purchase of vehicles, new rolling stock for passengers
- Coordinate timetable with EU network and other parts of Croatia
- Better connections towards Slovenia and Rijeka particularly better connections to Zagreb and Ljubljana
- Hiring younger workers, conductors, traffic controllers
- Introducing train on route Zagreb-Pula
- More lines in Istria region
- More investments in railway infrastructure
- Train punctuality and cleanliness

Those answers gave us clear picture on indications for crucial changes and it can be concluded that there is strong need for better transport connections between Istria and the rest of Croatia as to all EU countries. Also timetable of trains is must have on the list of priorities as well as purchase of new modern trains.



Figure 16. Mobility needs and gaps in Istria region (Source: IDA Ltd.)

## 2.8. Trip to Italy & Slovenia

The purpose of this research was also to investigate does people from Istrian region travel to Slovenia and Italy at least once per year or more often. For those who are travelling to Italy and Slovenia, are current transport connections satisfying their needs? Survey showed that people from Istria region very often travel to Italy for various reasons and that their only connection is to travel by car as fastest and most convenient mean of transportation. This is by far the one of the most important reason for introducing connections to neighbouring countries and also to work with different transport operators in order to provide passengers with frequent and safe connection.

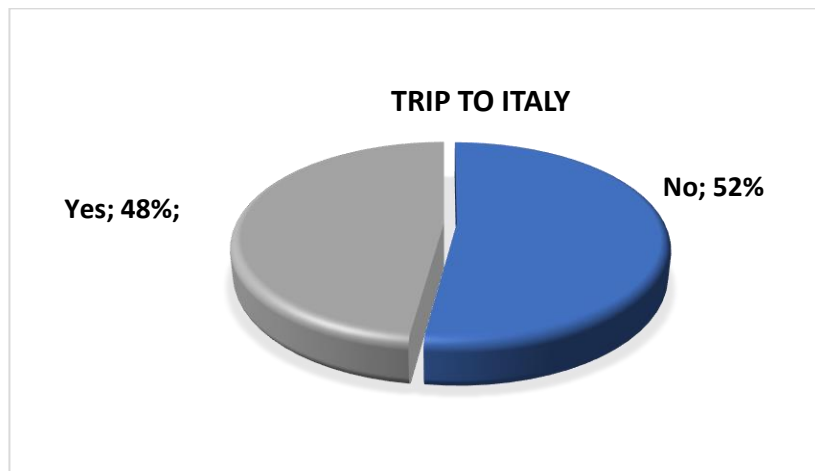


Figure 17. Data collected from railway hubs (Source: HŽPP)

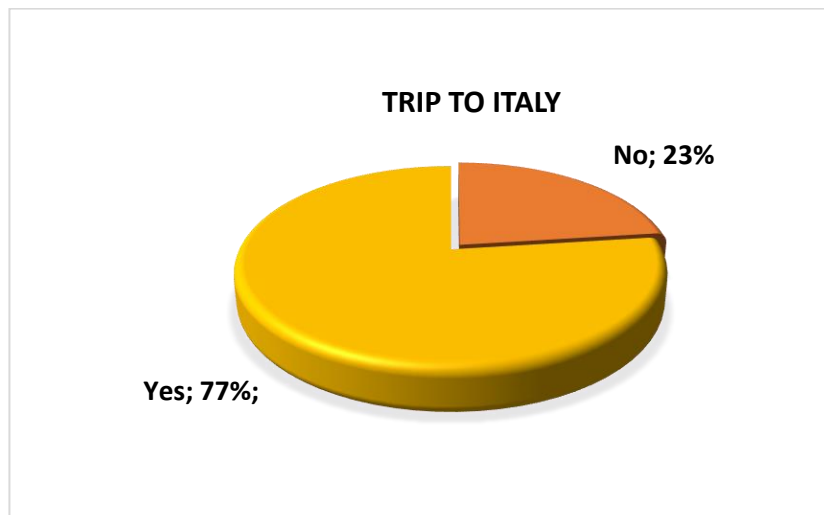


Figure 18. Online collected data (Source: HŽPP)



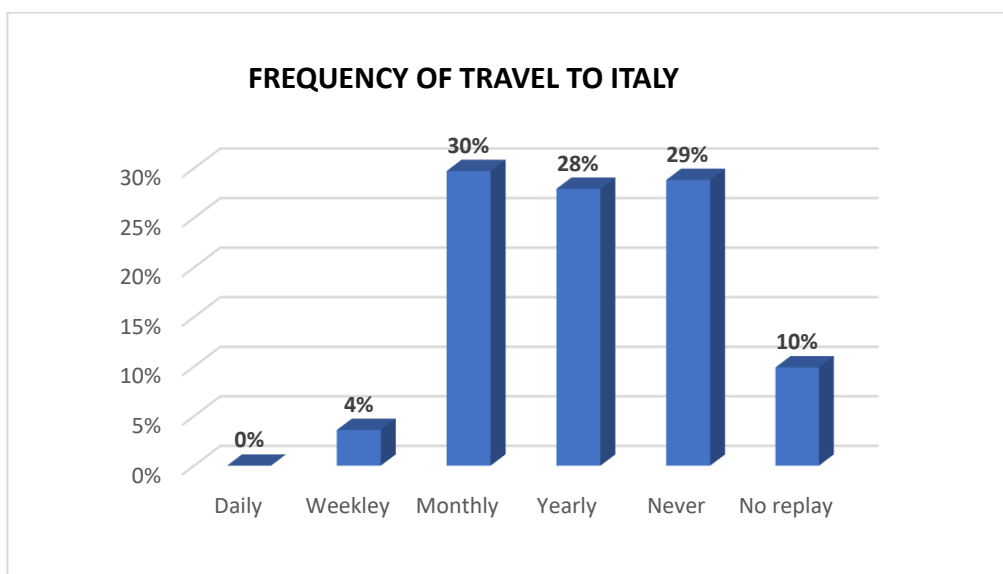
Transport of passengers comprises passengers carried in domestic and international transport.

<i>Country of disembarkation</i>	<b>2018</b>	<b>2019</b>
<b>Total</b>	135.796	135.029
<i>Italy</i>	-	79
<i>Slovenia</i>	51.101	48.628

*Table 13. International railway transport of passengers, by country of disembarkation, departure (Source: CBS)*

## 2.9. Frequency of travel to Italy

Considering that most of travels to Italy are on monthly basis, timetable can be adjusted, and trial period introduced. However, with presumption that numerous inhabitants in Istria region are working across border in Italy and vice versa, providing them with sustainable transport daily connections is topic which needs greater elaboration.



*Figure 19. Data collected from railway hubs (Source: HŽPP)*

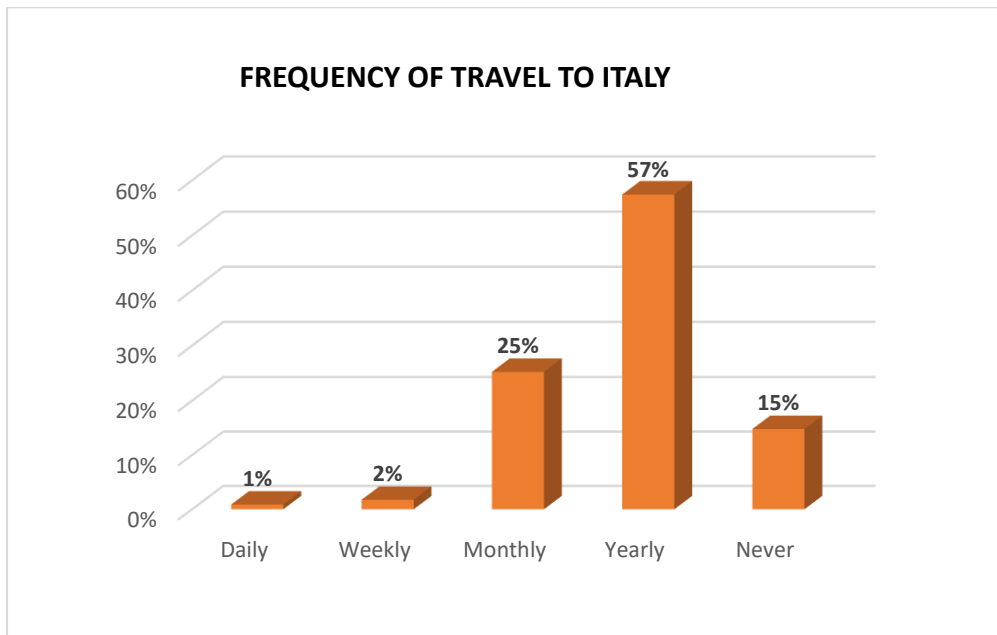


Figure 20. Online collected data (Source: HŽPP)

### 2.10. Selection of means of transport for travel to Italy

Among all people travelling to Italy and conducting this particular survey, they were able to select multiple choices, but their first travelling choice was to use personal car. This clearly indicates issue with public transportation i.e. lacking connections between Croatia and Italy. This obvious problem concerns all transport operators and needs additional addressing in a manner that operators should create connections and offer services.

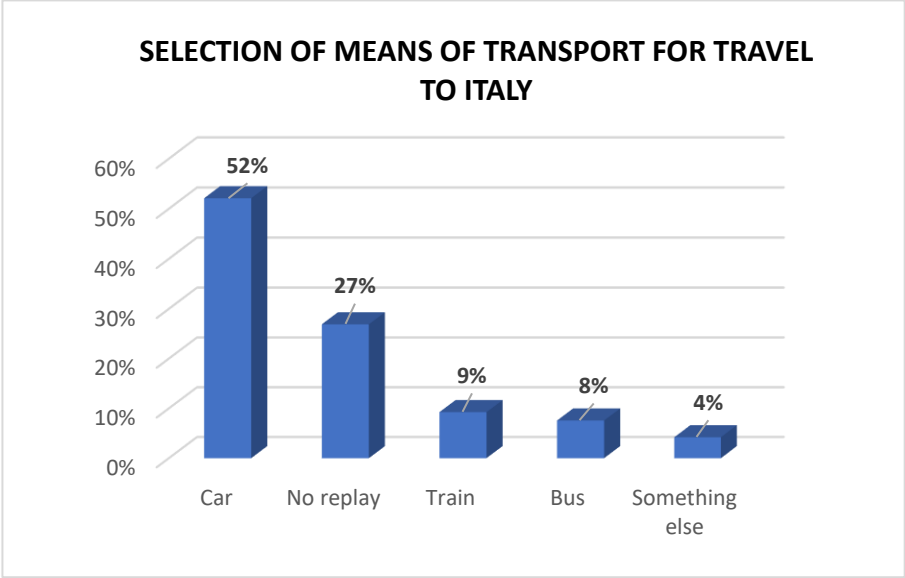


Figure 21. Data collected from railway hubs (Source: HŽPP)

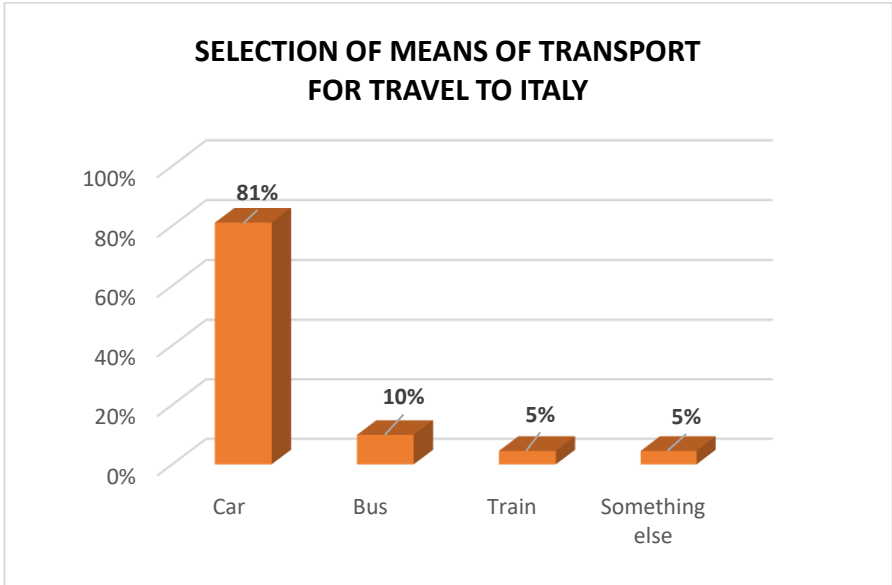


Figure 22. Online collected data (Source: HŽPP)

### 2.11. Reasons for travel to Italy

By analysing reasons for travel to Italy the highest percentage is leisure time. This is population going to Italy for private reasons such as shopping, field trips, sightseeing etc. However, transport operators should focus on working population, people crossing border for business operations and purposes. Their preferable mean of transport is car because of possibility of reaching destination in very short time and comfort that personal car offers.

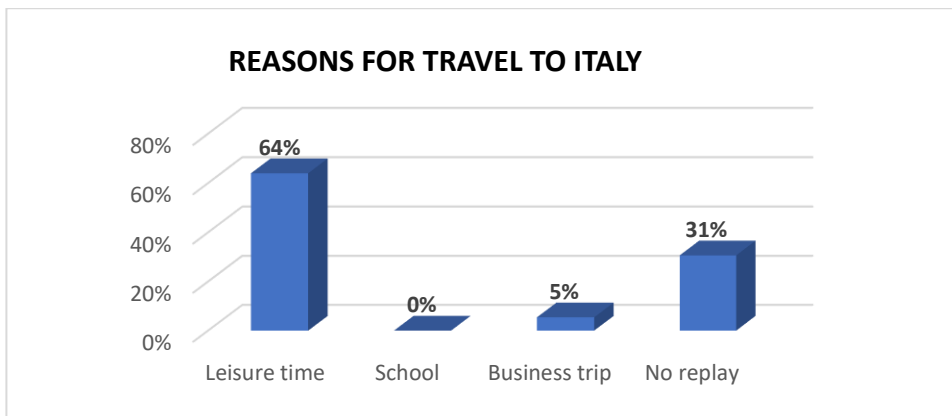


Figure 23. Data collected from railway hubs (Source: HŽPP)

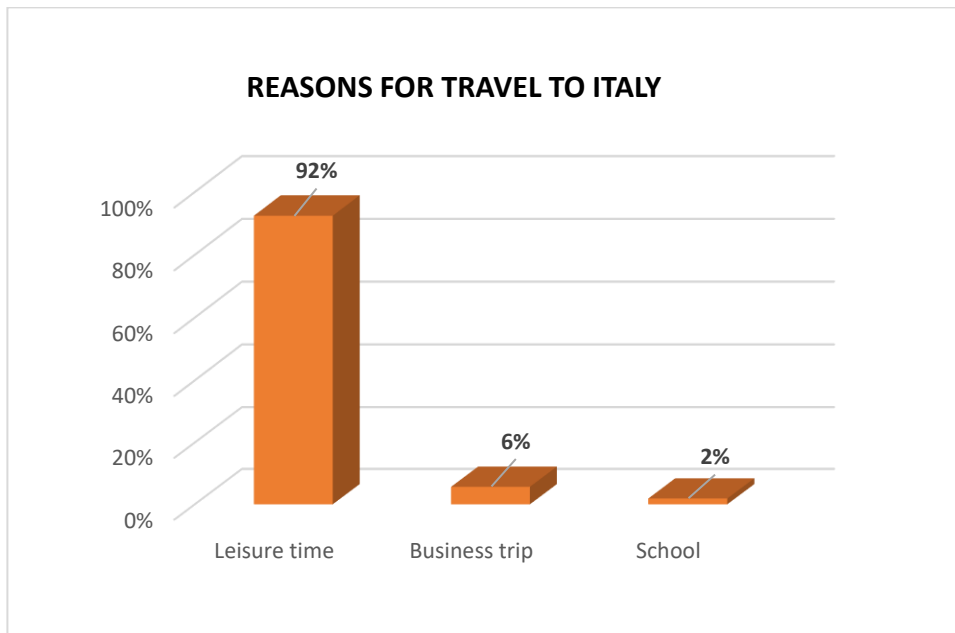
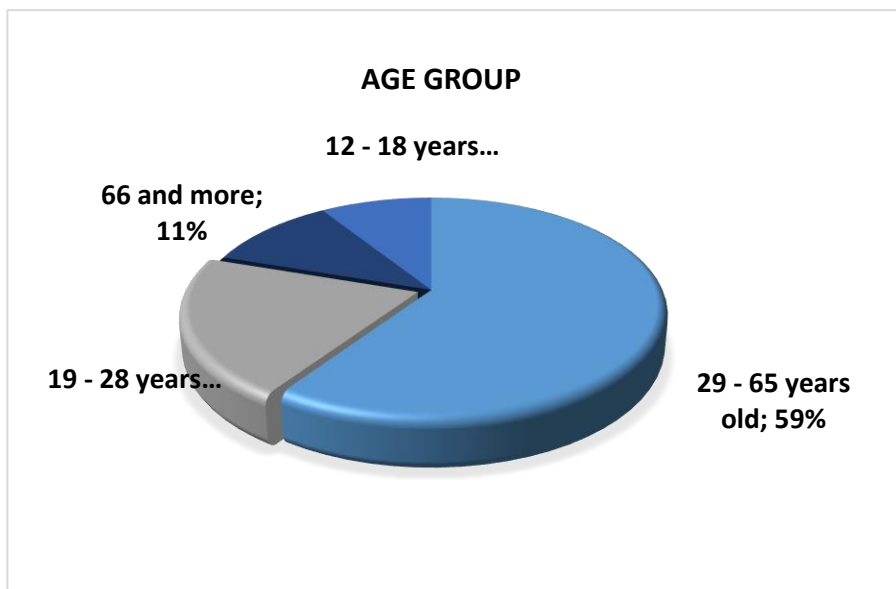


Figure 24. Online collected data (Source: HŽPP)

## 2.12. Age group and work status

Like every research, responders were asked to state their age group in order to provide us with data and classifications. As presumed, surveys were filled mainly by working population and everyday commuters. Their opinion on public transport should be vital and provide guidance on how to proceed with further modernization of transport system. Second on the list are young people travelling to schools and universities. Their everyday obligations should also be satisfied with different means of transport to provide them future in schooling they deserve. Most of marketing campaigns and trends should be focused on younger generations because changing their travelling habits and state of mind will influence on future steps towards sustainable transport.



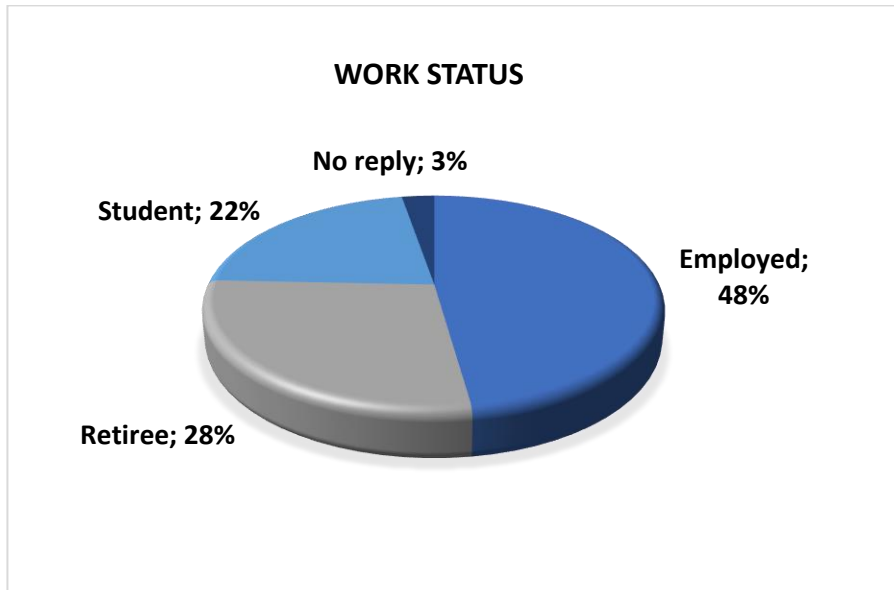
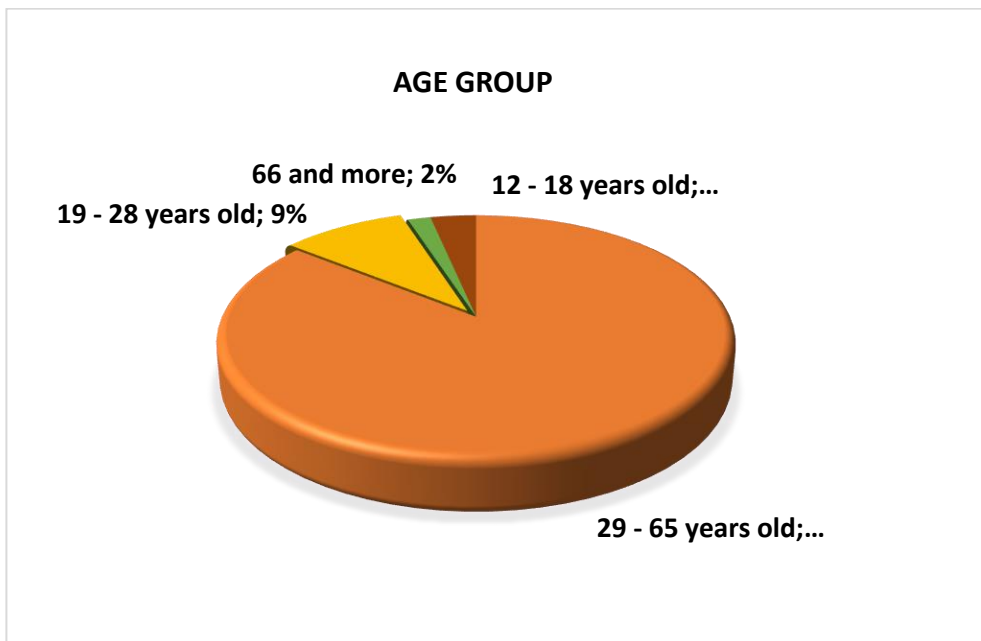


Figure 25. Data collected from railway hubs (Source: HŽPP)





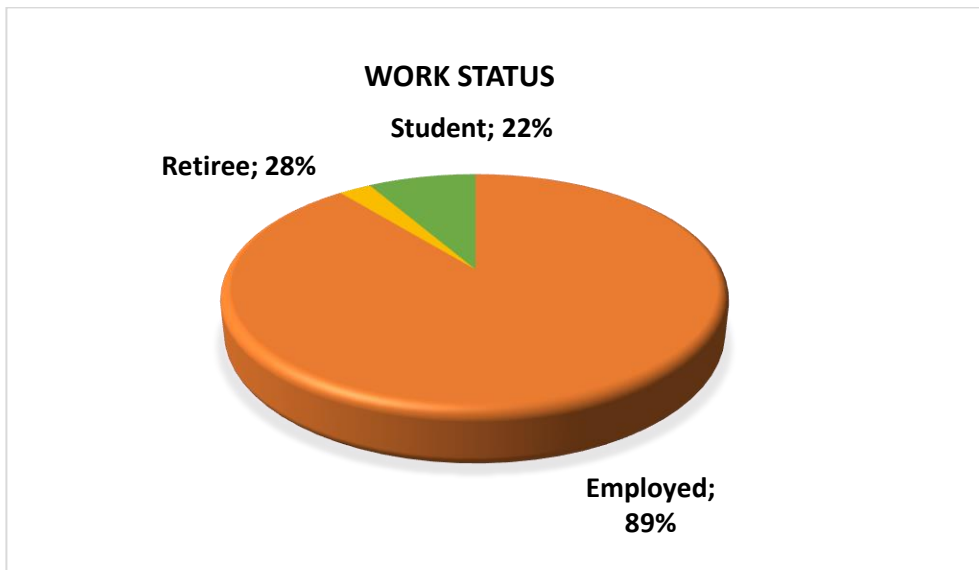


Figure 26. Online collected data (Source: HŽPP)

Daily number of trips, by employment status	Total
<b>Total</b>	7.877.818
<i>Employed</i>	4.577.968
<i>Unemployed</i>	764.841
<i>Pensioners</i>	1.725.074
<i>Pupils, students</i>	568.961
<i>Housewives</i>	181.861
<i>Other</i>	59.112

Table 14. Daily number of trips, by sex and employment status (Source: CBS)

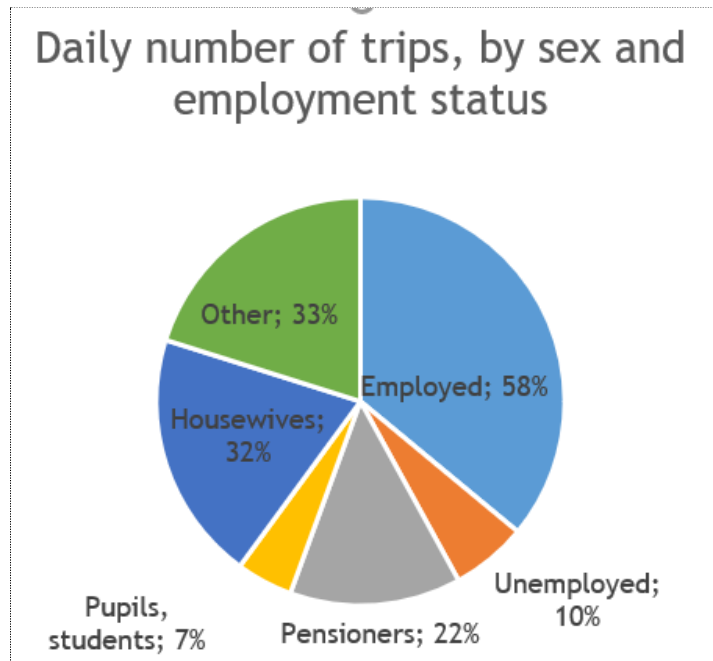


Figure 27. Daily number of trips, by sex and employment status (Source: CBS)

### 3. Conclusion

While conducting the survey we became aware of the number of respondents that are using train as main mean of transport, however personal car is still highly represented on everyday bases while very few people is using buses or bicycles. For that reason, transport operators should be aware of situation and should work on improvements regarding satisfying passenger's needs.

Istrian region, famous for tourism activities, for their international community and a fast development of economy, affect the need for a quality traffic infrastructure. For this reason, big efforts are being invested in interregional connection within Croatia as well as in its connection with a wider European area. With this regard, road traffic is witnessing the largest development. It quite well covers the domestic needs and it contributes to a more balanced development of the coastal area and the Istrian interior. In the last few years, there have been increasing investments in the maintenance and the construction of port infrastructure, which contributes to an increase in maritime traffic and its safety. Air traffic also has all the necessary preconditions for a more significant share in the total traffic balance, especially in the field of passengers' transportation. However, railway remains unexploited territory despite all advantages it can offer.

The Istrian Region pays lots of attention to the construction of the traffic system as long-term process, and to the safety of traffic, simultaneously taking care of environmental protection and the implementation of the principle of feasible development. As the Istrian region is working hard on development of IT sector but also on the digitalization process, sharing mobility represents an answer on connecting mobility, digitalization, and entrepreneurship. Public transport will not be able to accommodate the need for mobility and flexibility of modern users. So, even though private vehicles are still widely used, next to public transportations there is a new wave of mobility modes growing and they belong to the sharing mobility, a socio-economic phenomenon that affects the transport sector both on the demand and the supply side. On the demand side, sharing mobility demonstrates a transformation of individuals' behaviour, as they tend to prefer temporary access to mobility services rather than using their own means of transport. On the supply side, this phenomenon consists in the affirmation and diffusion of mobility services that use digital technologies to facilitate the sharing of vehicles and/or journeys, creating scalable, interactive and more efficient services.

However, there are also areas of low passengers' demand where regular bus or train services are not considered financially viable, such as the rural or peri-urban areas. These areas can today be reached by the so-called demand-responsive transport (DRT), a form of transport where vehicles alter their routes based on particular transport demand rather than using a fixed route or timetable. In the area of urban transport, the emphasis is placed on the problem of traffic jams on the roads in the centres of major cities and tourist destinations and on parking. Upgrading the network and

increasing capacity should be accompanied by improvements to the public passenger transport (PPP) system, pedestrian and bicycle path systems, etc.



*Picture 8. Interchange node in Kanfanar (bike/train connection from hinterland to coast)*

The support to public transport and soft modes, operators should start at the policy level, by committing to prioritise these modes, at the same time limiting/restricting private cars usage especially in the city centres. An appropriate set of passengers' rights has to accompany the wider use of collective modes.

### 3.1. Recommendations by transport experts

Concept of spatial development of Istria is a research of five content circuits: transport, tourism, agriculture, economy and protected areas. Document on spatial landscaping of the territory – the interior and coast of Istria was made by expert groups formed and obliged through organised meetings within the framework of the exchange the results obtained and agreed on a methodical approach. An important segment of the strategic development of Istria is the traffic potential. There are particularly interesting more developed cities in Istria: Koper, Buzet and certainly Pula, as well as other development centres located on the peninsula. Essential segment of strategic development is linking tourism and agriculture and networking them with auxiliary Activities. The basic starting point of the study should be particularly emphasised, which is that the results of the study development of the common concept of spatial development of Istria, comes through detailed analyses of the available spatial planning documents on the territory of the Republic of Croatia.

The Adriatic-Ionian Corridor leads from Trieste to Rijeka and Split to Dubrovnik and further to Tirana and Kalamata in Greece. This transport corridor initially contains only roads, but above-mentioned railway lines and certain sea waterway will make complete transport structure. From the railway's point of view, the Adriatic-Ionian Corridor i.e. Adriatic-Ionian railway, partially coincides with the new track Trieste – Rijeka (Istrian railways) and dalmatian stripes. On a large part of the corridor railway line has yet to be built and existing lines need to be thoroughly reconstructed. The new track Trieste – Rijeka will be an integral part of the Adriatic-Ionian Corridor. In doing so, it expands its gravitational area in the direction of the southeast Bosnia and Herzegovina, Montenegro, Albania and Greece, which will have a favourable impact on the scope of the transport, in particular in the section relating to tourism and transit freight transport.

Italy sees economic growth prospects in penetration into Central and Eastern Europe. The development plans of Italian railways states indicate direct competition to this route and desire for direct connection between Rijeka and Trieste via Istria. This also means that at EU level, appropriate action needs to be taken, activities that will indicate the comparative advantages of this and which will result in the inclusion of a new Trieste – Koper – Rijeka route in the basic TEN-T network.

The new concept of railway connecting Rijeka and Trieste, research and proof of the optimal rail system connection between Rijeka and Trieste was carried out in different Studies and assisted by the integral approach method, which in addition to scientific methods of analysis, comparison and synthesis and numerous other scientific and professional procedures. It also means that to find the optimal traffic solutions it is a necessary to make combination of systematic and structural research, which require good knowledge and relevant phenomena therein, i.e. complete economic and social issues in predefined environment. It is also necessary to have a vision of the future solutions that will effectively meet all traffic and the spatial needs of the wider gravitational field. The new concept of railway connection between Rijeka and Trieste is foreseen with a build of new high-efficiency two-level railways over the area of Istria and partly through the territory of the Republic of Slovenia. In fact, the construction of new railway is foreseen on the route Rijeka – Jurdani – Divača, while the Divača – Trieste reconstruction and modernisation are under the investment Mediterranean corridor programme. The construction of the railway according to the new concept meets all three criteria: completing the Mediterranean Corridor on the area of Croatia, connecting the North Adriatic ports with the Danube and the Black Sea and the direct Istrian railways, which needs to be modernised.

Some major and important rail projects for Europe, which are expensive and have a weak return on the funds invested, but have a visible trans-European added value, the European union will co-finance (by non-refundable means) up to 80 per cent of total costs.

Rail traffic in Istria County is in a major crisis. For decades, passenger transport is minimised. For half a century it has been out of traffic on route Kanfanar - Rovinj and several decades on route

Lupoglav - port Bršica. The corridors of these lines should be used for other types of traffic. In Istria County in 2013 there were 91 km of regional railway lines (Pula-Pazin-Buzet-Slovenia) and 53 km of local railways (port of Bršica-Lupoglav), or a total of 144 km of railways. The only connection between the Istrian County and the Croatian and EU rail network is via Slovenia with a track of poor traffic and transport characteristics (payload, possible speeds, track geometry). Analyses and research within the Concept of spatial development plan in Istria region indicate that without the construction of a new connecting route and tunnel for existing railway lines, railway in Istria county do not have a survival perspective.

The European interest in rail transport is within the interconnection of state centres, interstate economy and the modernisation of existing railway lines fit to the highest standards of service in corridors and/or sections that economically justify it. Exploring the possibilities of restoring traffic on the railway line from port of Bršica to Lupoglav as well as justification of the service improvement of the Kanfanar-Rovinj railway line is one of the priorities of railway network development in Istria.

According to Concept of spatial development plan in Istria region, on the route Lupoglav - Buzet – Slovenia is planned a corridor of high efficiency as an integral part of the corridor (Trieste - Koper) – Divača - Lupoglav - Rijeka - Zagreb. It is recommended to use the route of the existing railway line in the direction of Lupoglav – Buzet – Slovenia. This corridor, a high-pass-through and high-speed rail line, would allow direct railway connection of the Istrian County with Croatia and Europe. Furthermore, the planned railway route would connect three significant north-Adriatic ports (Trieste – Koper - Rijeka).

The Spatial planning documentation consider the restoration of traffic on the Lupoglav – Raša line, ports of Bršica and Štalija (the railway has so far only been used for freight transport, it should be modernised and the tunnel through Čičarija would fit into the Croatian railway network) and also reconstruction is planned on the Kanfanar-Rovinj railway line (new location of the railway station in Rovinj) and reconstruction of the local transport railway.

The reconstruction of the Kanfanar-Rovinj railway line is probably not a rational project. In the times when across the EU, many unpromising lines are being abolished, such reflection has no basis in economic opportunities of Istria and Croatia. For freight transport, this line is not required and also, passenger traffic on it cannot be achieved on economic grounds. Therefore, suggestion is that railway corridor is used for recreational traffic such as bicycles, horse riding, carriages and various passenger vehicles.

The aim of the transport study i.e. Spatial planning documentation for Slovenian part of Istria which is also part of Concept of spatial development plan in Istria region is to determine what is the situation regarding certain types of traffic, its development, transport infrastructure and transport policies. Attention is directed towards potential deficiencies for propose of improvements that can



contribute to the development of Slovenian part of Istria and the entire cross-border cooperation with the Croatian and Italian parts of Istria. Free movement of people, goods, capital and services is one of the four fundamental freedoms in the internal European Union (EU) and one of the principles of the 1957 Rome Treaty. To ensure these principles, in addition to the loosening of border controls (The Schengen Area), transport infrastructure is a key (planning, construction and maintenance).

Traffic conditions in Slovenia's Istria were affected or are affected by the following factors:

- a) frequent changes in transport policy holders and the flow of national borders
- b) socio-economic factors and the pattern of settlement
- c) demanding topographical conditions
- d) attractiveness of the area for logistical activities related to maritime freight transport
- e) the tourist attractiveness of the area and
- f) characteristics of the economy, agriculture and restrictions due to protected (natural and cultural heritage).

The study has analysed the current situation and planned transport infrastructure and the current volume of transport for the following transport systems: road transport, bus transport, rail transport, Park and ride system, urban railways, stationary traffic and the "Park and drive" system, bike paths and other infrastructure solutions for cyclists and pedestrians and maritime and air transport.

The main findings and problems related to transport in Slovenian part of Istria connected to railway infrastructure are:

- Projects are big and difficult to finance.
- Travel time is not competitive, and timetables are uncoordinated.
- The existing infrastructure is highly used, which undermines its reliability.
- The coastal towns are unrelated.

Goals and strategic solutions:

- follow the principle of a sustainable transport system that will meet the economic, social and environmental needs of society, while at the same time reducing negative effects of transport on the economy, society and the environment.

Ensure the integration of the whole area and improve accessibility in terms of population needs and possible multimodal connections access. It should be strengthened, and a unified system of traffic planning and a single ticket system established.

Possible plan solutions:

- Establishing the backbone of public passenger transport, which should be a light rail Trst-Koper-Umag (-Pula) and which could be connected, if necessary, by circular bus lines (Ankaran, Koper, Izola, Strunjan, Piran, Portorož, Savudrija).
- The merger of bus lines, cycling systems, pedestrian zones and funiculars via local loops to the light rail.
- Ensuring adequate rail capacity for inland transport, which should be redeployment of cargo transport to the road network, i.e. its outflow to competing ports (second railway track or corresponding alternative with project speed 80–100 km/h).

### 3.2. Policy level measures and objectives

Transport Development Strategy of the Republic of Croatia for the period 2017 to 2030 will assess and define future measures (infrastructure, work and organisations) in the transport sector related to international and internal transport in all transport independent of funding sources. The Strategy provides a framework for the development of interventions and strategies or assessments (Functional Regions Concept, main plans, sectoral strategy, etc.). All valid data on the organisation, functioning and infrastructure of the existing transport were collected and adequately presented in the strategic analysis.

The Strategy is based on a detailed analysis of the transport sector, as well as the main development of transport in the Republic of Croatia (main findings). From previous assessments on the strategic level, a number of hypotheses have been identified which, in the event of data or analysis, can be converted into the main findings. The main findings have been converted into objectives, resulting in investments measures, work and organisation.

Legislation and guidelines for planning must support the development of the best practice and European rules, particularly in the fields of security, interoperability, sustainability and environmental protection. The overall legal framework should be harmonised and implementation of major infrastructure projects, individual procedures should be simplified while definitions are harmonised in all legal Acts.

Transport Development Strategy of the Republic of Croatia provides with several measures that are crucial for future transport organization. It is difficult to prioritize them, however each and every one is supporting passenger needs:

- I. Improvement of safety in transport system.

As safety is one of the main objectives of the TDS it is necessary to improve it in all modes of transport system. To increase the level of safety of the railway system specific measures such as removal of level crossings (if justified by the traffic flows). If there is justification to denivelation or elimination of a rail-road crossing, it is necessary to assure it with adequate safety devices. In order to increase safety at level crossings it is necessary to develop and implement educational marketing campaigns in order to raise awareness of drivers of road vehicles. Safety and security in urban areas should be improved at least on two different levels: Identifying and eliminating black spots such as rail-road crossings, signalling pedestrian crossings, providing additional protection to pedestrians and cyclists by constructing new pedestrian footpaths and bike paths where needed, constructing pedestrian islands to minimize crossing distances, extending curbs where necessary and even construction of new pedestrian sidewalks / footpaths to improve the accessibility to the main public transport stations and terminals. The rolling stock and vehicles for public transport shall be modernized. Procurement of new public transport vehicles that comply with the highest safety and quality standards is a priority. These vehicles are to incorporate the latest advances in safety and control and surveillance devices (e.g. video cameras). The infrastructure and stations should also be modernized with the necessary adaptations to increase safety and accessibility to the public transport and with the installation of surveillance and control devices to improve the security.

## II. Improvement of passenger intermodality and development of intermodal passenger hubs.

To ensure the sustainability of the transport sector as a whole, it is important to increase the interoperability to be able to use the potential of each transport mode. A network of intermodal terminals should be established to allow the passengers to easily interchange between transport modes. A well-conceived, balanced, intermodal network is key to maximizing the efficiency of the overall system, minimising nuisances to users. Location and modes of each terminal should be determined according to a specific area study (e.g. Masterplan). In the road sector it is important to ensure the proper accessibility to demand generation/attraction nodes (such as ports, airports, railway stations, working areas, commercial zones, etc.). An increase in the number of parking spaces linked to public transport systems, port and airports will help to increase the modal shift in favour of public transport and consequently reduce the congestion on the roads.

## III. Improve energy efficiency in transport system.

Promoting the efficient and sustainable use of the infrastructure is one of the priorities for infrastructure development according to the guidelines for development of the Trans-European transport network. In this sense, it is necessary to improve energy efficiency and prioritise low carbon energy sources and propulsion systems.

## IV. Improvement of the public perception of the transport system in Croatia.

Promoting and creating a positive image of the public transport system as a reliable, safe and environmentally friendly mean of transport is important for encouraging the demand, and consequently the investments. For better promotion, it is necessary to have complete and up to date information and knowledge of the infrastructure, possibilities and development plans. The need to constantly revise and update the information technologies and channels is very relevant for the improvement of the transport sector. It is important as well to increase the involvement of the media as a crucial partner for the transmission of the information. It is necessary to continuously modernize and integrate IT platforms to ensure reliable and comprehensive data and information for all users. It is also necessary to establish network services of e-business for all users of public services, to establish a unique information system in order to improve business processes and raising the competitiveness of operators, to develop ICT solutions for operation with emergencies.

#### V. Station development

A proper analysis of the existing situation and expected developments of the Transport System and socio-economic context in urban and regional areas, in a perspective of Sustainable Mobility/Integrated Public Transport Plans, will identify the needs of rehabilitating/upgrading existing stations or of creating new ones where mobility levels will justify it. On the other side, this might also mean to dismiss or functionally downgrade some existing stations where expected mobility levels become non-relevant. Station development should be primarily focused on improving passenger accessibility, especially for persons with reduced mobility, assuring safety and security of the passenger movements and introducing information and PA systems.

#### VI. Separation of modes -prioritization to PT, removal of bottlenecks.

Public transport (buses and trains, mainly) has to coexist with the private car since the available space in cities is always limited. At the same time, more importance should be given to public transport and recovering part of the urban space for the use of the citizens. In this sense and in order to increase the efficiency of public transport, the level of separation of private traffic and public transport can be increased by building reserved lanes for public transport and/or dedicated public transport corridors (for tram and buses), and by implementing measures to increase the prioritisation of public transport by means of traffic management, such as traffic lights preferentiality. Additionally, detected obstacles and bottlenecks that impede the efficient operation of public transport will be removed. These obstacles and bottlenecks often cause delays on public transport and can even compromise road safety (e.g. rail-road crossings).

#### VII. Introduction of on demand PT services

Taking into account that some parts of Croatian territory do not have enough demand to justify the introduction of regular public transport lines (e.g. rural or disperse areas), the introduction of on-

demand public transport services could provide the opportunity to also offer public transport services to these areas.

#### VIII. Traffic reorganization

Offering competitive alternatives to the use of the private cars is important to achieve the objectives of the TDS and to ensure the sustainability of the transport system. The different transport modes' hierarchy can be rethought, and traffic can be reorganized and integrated seeking prioritization of public transport against private car. At the same time, more pedestrian areas in urban centres should be constructed, bike paths for daily commuters built, public bicycle systems implemented, and traffic schemes planned to adapt the traffic to seasonal requirements.

#### IX. Support of non-profit groups in the transport area

The role of non-profit groups that promote the use of alternatives to the private car has proven to be very successful in numerous cities across Europe. Among others, there are groups that promote daily bike use, groups that watch out for passenger rights, for the maintenance of pedestrian areas or even for traffic surveillance. These groups (neighbourhood associations or common interest groups, non-governmental organisations, etc.) can help the local administrations and transport authorities in their duties and help to promote the use of the public transport. The participation of such associations, local groups and non-governmental organizations in the transport planning decisions should be promoted and considered.