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To improve mobility and multimodality: rail, road and air transport

Transport study for the Danube Region

Study of intermodal transport users' needs in the Danube Region

Final version

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INTRODUCTION

Danube Region Transport Study - Study of Intermodal Transport's Users Needs in Danube Region has been undertaken in order to meet the requirements of Danube Region Strategy (EUSDR), Priority area 1b. The goal of the Study was to define guidelines and recommendations based on users' needs thus adequate decision making system could be established regarding intermodal transport (IT) development. The study consists of five parts.

First part deals with identification of micro – regions (MRs) within the Danube Region (DR), based on existing documentation and situation concerning IT. In this section basic characteristics of countries and percentage of use of IT, characteristics of network of terminals (network density and terminal status and connections among them) and overview of national and transnational strategic documents for development are given as well as analysis of Logistics Performance Index (LPI).

Second part of the Study deals with the problems of IT. Analysis of existing documents identified and gave a description of groups of problems with the focus on financial and nonfinancial ones. Overview of problems on national level gave a space for analyzing them among MRs defined in the first section of the Study.

Third part deals with the research of IT quality. In order to determine real state of IT in DR, project foreseen research involving questionnaires filled in by users and providers in intermodal transport chains. Project team defined two groups of respondents (users and providers) in order to establish the needs and problems, wishful state of functioning of the IT system and thus the quality of it. Project assignment defined a minimum regarding research sample (70 users and 70 providers with a minimum of two companies from each of 14 countries) and after forming the lists of providers and users, research has been set off. Due to huge obstacle connected to responses on questionnaires, research has been prolonged and closed on 20. of April 2018. with the results of 147 filled in questionnaires. In this section of the Study, results of statistical analysis of obtained responses has been provided and shown in detail. Results of the research have been analyzed on following levels: national, MR and DR level.

Forth part of the Study gives expert assessment of the IT quality. Comparative analysis showed differences between users' and providers' responses. By analyzing certain parameters of the quality of service, assessment of the quality of IT service has been done and by analyzing rankings of system elements, ranking of quality of IT system has been obtained. Those rankings with previously undertaken studies (parts 1 i 2) gave an opportunity to define final expert evaluation of IT quality in DR countries. Since the results of the conducted research and expert evaluation does not fully coincide with the results of analysis of the state of the intermodal transport in the Danube region on the basis of known documents and facts, there was a new division of the micro regions.

In the fifth part of the Study gave an overview of measures and recommendations for IT development. Actions have been structured in two groups: those meant for IT system development and those determined for improvement of the IT service. Defined intervention for service improvement are divided as following: institutional – organizational (IO) and designing & planning (PP), technical – structural (T) and financial (F). For each of the measures, an assessment of the significance has been done per micro regions defined on the basis of an expert evaluation of intermodal transport system.

1 IDENTIFICATION OF THE MICRO REGION

Danube Region (DR) is made up of fourteen different countries and some regions (in Germany those are Baden – Viremberg and Bayern; in Ukraine Chernivtsi and Odessa, Ivano-Frankivsk and Zakarpatskaya oblast). Those are different in level of development and social and economy characteristics, EU and non EU (European Union) and in others. In order to compare them, they are grouped into micro – regions (MRs). Intensity of interactions among countries and their similarity within one MR is greater than interactions of that countries with countries from other MR.

Grouping is done by analyzing the basic characteristics of countries (presented in chapter 1.1), the intensity of intermodal transport (chapter 1.2), the existing intermodal network density and terminal status (chapter 1.3), the treatment of this area in the national strategic documents (chapter 1.4) and the Logistics Performance Index – LPI (chapter 1.5).

1.1 Basic characteristics of Danube Region countries

Among the basic characteristics of countries are GDP (Gross Domain Product) and population, GDP per capita and surface area. The data are presented in Tables 1.1 and 1.2, 1.3 and 1.4.

Table 1.1 GDP by country (region) [x10^6 evra]

	Country (Region) / Year	2012	2013	2014	2015	2016
	EU (28)	13,463,405.2	13,577,271.0	14,044,690.5	14,797,443.8	14,907,852.2
1	Bulgaria	41,949.2	41,988.6	42,764.9	45,289.3	48,124.6
2	Czech Republic	161,534.1	157,897.1	156,681.8	168,451.9	176,576.9
3	Germany	2,758,260.0	2,826,240.0	2,932,470.0	3,043,650.0	3,144,050.0
	Germany-Baden Wurttemberg	413,221.0	420,819.0	440,057.0	461,740.0	476,600.0
	Germany-Bayern	489,861.0	504,282.0	524,064.0	550,446.0	567,970.0
	Germany (DR)	903,082.0	925,101.0	964,121.0	1,012,186.0	1,044,570.0
4	Croatia	44,006.2	43,741.5	43,406.5	44,553.9	46,413.1
5	Hungary	99,553.7	101,912.5	105,621.6	110,795.4	113,755.3
6	Austria	318,653.0	323,910.2	333,062.6	344,493.2	353,296.9
7	Romania	133,660.2	144,334.0	150,371.3	160,346.1	169,765.0
8	Slovenia	36,076.1	36,239.2	37,614.9	38,836.6	40,418.1
9	Slovakia	72,703.5	74,169.9	76,087.8	78,896.4	81,154.0
10	Montenegro	3,181.5	3,362.5	3,457.9	3,624.7	3,771.7
11	Serbia	31,683.1	34,262.9	33,318.6	33,491.0	34,616.6
12	Bosnia & Herzegovina	13,407.5	13,691.8	13,988.3	14,615.7	15,287.2
13	Moldova	5,663.9	6,017.9	6,014.5	5,867.1	6,100.9
14	Ukraine	136,758.7	138,064.7	100,505.7	82,040.8	84,300.9
	Ukraine-Chernivtsi Oblast	1,281.8	1,296.3	953.1	763.5	784.5
	Ukraine-Ivano-Frankivska oblast	3,143.4	3,128.0	2,384.1	1,891.8	1,943.9
	Ukraine-Odessa oblast	2,083.9	2,016.5	1,527.6	1,194.5	1,227.4
	Ukraine-Zakarpattia Oblast	6,303.4	6,573.4	4,745.9	4,115.8	4,229.2
	Ukraine-(DR)	11,530.6	11,718.0	8,657.6	7,202.1	7,400.5

Source: Eurostat, World Bank, Own research

Table 1.2 Population by country (region)

	Country (Region) / Year	2012	2013	2014	2015	2016
	EU (28)	504,041,384	505,143,171	506,973,868	508,504,320	510,278,701
1	Bulgaria	7,327,224	7,284,552	7,245,677	7,202,198	7,153,784
2	Czech Republic	10,505,445	10,516,125	10,512,419	10,538,275	10,553,843
3	Germany	80,327,900	80,523,746	80,767,463	81,197,537	82,175,684
	Germany-Baden Wurttemberg	10,512,441	10,569,111	10,631,278	10,716,644	10,879,618
	Germany-Bayern	12,443,372	12,519,571	12,604,244	12,691,568	12,843,514
	Germany (DR)	22,955,813	23,088,682	23,235,522	23,408,212	23,723,132
4	Croatia	4,275,984	4,262,140	4,246,809	4,225,316	4,190,669
5	Hungary	9,931,925	9,908,798	9,877,365	9,855,571	9,830,485
6	Austria	8,408,121	8,451,860	8,506,889	8,576,261	8,690,076
7	Romania	20,095,996	20,020,074	19,947,311	19,870,647	19,760,314
8	Slovenia	2,055,496	2,058,821	2,061,085	2,062,874	2,064,188
9	Slovakia	5,404,322	5,410,836	5,415,949	5,421,349	5,426,252
10	Montenegro	620,308	620,893	621,521	622,099	622,218
11	Serbia	7,216,649	7,181,505	7,146,759	7,114,393	7,076,372
12	Bosnia & Herzegovina	3,839,265	3,531,159	3,492,961	3,463,535	3,444,782
13	Moldova	3,559,541	3,559,497	3,557,634	3,555,159	3,552,000
14	Ukraine	45,453,282	45,372,692	45,245,894	42,759,661	42,590,879
	Ukraine-Chernivtsi Oblast	906,214	908,545	909,237	909,929	909,007
	Ukraine-Ivano-Frankivska oblast	1,380,958	1,382,362	1,382,324	1,382,452	1,381,134
	Ukraine-Odessa oblast	2,391,728	2,396,266	2,396,497	2,393,366	2,388,402
	Ukraine-Zakarpattia Oblast	1,252,576	1,256,908	1,258,210	1,259,364	1,258,967
	Ukraine-(DR)	5,931,476	5,944,081	5,946,268	5,945,111	5,937,510

Source: Eurostat, World Bank, Own research

Table 1.3 GDP per capita by country (region) [evro]

	Country (Region) / Year	2012	2013	2014	2015	2016
1	Bulgaria	5,725.1	5,764.1	5,902.1	6,288.3	6,727.1
2	Czech Republic	15,376.2	15,014.8	14,904.5	15,984.8	16,731.0
3	Germany	34,337.5	35,098.2	36,307.6	37,484.5	38,260.1
	Germany-Baden Wurttemberg	39,307.8	39,815.9	41,392.7	43,086.2	43,806.7
	Germany-Bayern	39,367.2	40,279.5	41,578.4	43,371.0	44,222.3
	Germany (DR)	39,340.0	40,067.3	41,493.4	43,240.6	44,031.7
4	Croatia	10,291.5	10,262.8	10,221.0	10,544.5	11,075.3
5	Hungary	10,023.6	10,285.1	10,693.3	11,241.9	11,571.7
6	Austria	37,898.2	38,324.1	39,152.1	40,168.2	40,655.2
7	Romania	6,651.1	7,209.5	7,538.4	8,069.5	8,591.2
8	Slovenia	17,551.0	17,601.9	18,250.0	18,826.5	19,580.6
9	Slovakia	13,452.8	13,707.7	14,048.8	14,552.9	14,955.8
10	Montenegro	5,128.9	5,415.6	5,563.6	5,826.6	6,061.7
11	Serbia	4,390.3	4,771.0	4,662.1	4,707.5	4,891.9
12	Bosnia & Herzegovina	3,492.2	3,877.4	4,004.7	4,219.9	4,437.8
13	Moldova	1,591.2	1,690.7	1,690.6	1,650.3	1,717.6
14	Ukraine	3,008.8	3,042.9	2,221.3	1,918.6	1,979.3
	Ukraine-Chernivtsi Oblast	1,414.5	1,426.8	1,048.3	839.1	863.1
	Ukraine-Ivano-Frankivska oblast	2,276.2	2,262.8	1,724.7	1,368.4	1,407.5
	Ukraine-Odessa oblast	871.3	841.5	637.4	499.1	513.9
	Ukraine-Zakarpattia Oblast	5,032.3	5,229.9	3,771.9	3,268.2	3,359.3
	Ukraine-(DR)	1,944.0	1,971.4	1,456.0	1,211.4	1,246.4

Source: Eurostat, World Bank, Own research

Table 1.4 Surface area by country (region) [km2]

	Country (Region) / Year	2012	2013	2014	2015	2016
1	Bulgaria	110,370	110,370	110,370	110,370	110,370
2	Czech Republic	78,868	78,868	78,868	78,868	78,868
3	Germany	357,376	357,376	357,376	357,376	357,376
	Germany-Baden Wurttemberg	35,751	35,751	35,751	35,751	35,751
	Germany-Bayern	70,550	70,550	70,550	70,550	70,550
	Germany (DR)	106,301	106,301	106,301	106,301	106,301
4	Croatia	56,594	56,594	56,594	56,594	56,594
5	Hungary	93,011	93,011	93,011	93,011	93,011
6	Austria	83,879	83,879	83,879	83,879	83,879
7	Romania	238,397	238,397	238,397	238,397	238,397
8	Slovenia	20,273	20,273	20,273	20,273	20,273
9	Slovakia	49,035	49,035	49,035	49,035	49,035
10	Montenegro	13,812	13,812	13,812	13,812	13,812
11	Serbia	88,361	88,361	88,361	88,361	88,361
12	Bosnia & Herzegovina	51,197	51,197	51,197	51,197	51,197
13	Moldova	33,846	33,846	33,846	33,846	33,846
14	Ukraine	603,628	603,628	603,628	603,628	603,628
	Ukraine-Chernivtsi Oblast	8,097	8,097	8,097	8,097	8,097
	Ukraine-Ivano-Frankivska oblast	13,900	13,900	13,900	13,900	13,900
	Ukraine-Odessa oblast	33,310	33,310	33,310	33,310	33,310
	Ukraine-Zakarpattia Oblast	12,777	12,777	12,777	12,777	12,777
	Ukraine-(DR)	68,084	68,084	68,084	68,084	68,084

Source: Eurostat, World Bank, Own research

1.2. Intermodal Transport Intensity

Intensity of IT is the percentage of IT in total transport in a country, be it in international or domestic flows. Data is often collected in number of TEUs (Twenty-foot Equivalent Unit) even this is not the only one intermodal unit. Besides containers, there are swap bodies (European Intermodal Transportation Unit – EITU), accompanied and unaccompanied truck trailers, bimodal technology and other combination of transport means in railway and road, inland and maritime areas.

Data on IT intensity is not available. Explanation lies in its complexity (participation of many different actors in only one intermodal chain, from different transportation modes) thus it is given in number of TEUs in certain modes or as total number of TEUs. Certain sources give data in other units.

Estimation of IT intensity is obtained by usage of intermodal unites in different modes (Table 1.5) and percentage of modes (Table 1.6). In DR countries this varies

from 0,05%[1] - 4% to above 15% in more developed countries (Table 1.7). By multiplying the previous data and their summing up, IT intensity is obtained.

Table 1.5 Transported intermodal units by modes

Country	Percentage of containers, swap bodies, Technology A and B and other		
	By railway	By road	By inland waterways
Germany	39	12,9	10,2
Austria	29,9	2,7	n/a
Czech Republic	16,5	5,8	n/a
Romania	4,1	4,6	0
Hungary	14,6	2,8	n/a
Ukraine			n/a
Slovakia	6,1	3	n/a
Bulgaria	5,2	4,5	n/a
Croatia	8,3	0,4	n/a
Slovenia	28,5	4,4	n/a
Serbia			n/a
Bosnia & Herzegovina			n/a
Montenegro			n/a

Source: Eurostat

Table 1.6 Percentage of use of different modes by country

Country	Transport mode (%)		
	Railway	Road	Inland waterways
Germany	24	64,7	11,3
Austria	43,6	52,5	3,9
Czech Republic	21,1	78,9	0
Romania	20,8	59,2	20
Hungary	19,9	76,4	3,6
Ukraine			n/a
Slovakia	19,8	78,5	1,7
Bulgaria	8,8	77,7	13,5
Croatia	16,2	77,3	6,5
Slovenia	18,9	81,1	0
Serbia			n/a
Bosnia & Herzegovina			n/a
Montenegro			n/a
Moldavija			n/a

Source: Eurostat

[1] Data from strategic document

Table 1.7 Evaluation of intermodal use in percentages by country

Country	Use of intermodal transport by mode (2015) in %			Sum (%)
	By rail	By road	By inland waterways	
Germany	9	8	1	18,86
Austria	13	1	0	14,45
Czech Republic	3	5	0	8,06
Romania	1	3	0	3,58
Hungary	3	2	0	5,04
Ukraine	0	0	0	n/a
Slovakia	1	2	0	3,56
Bulgaria	0	3	0	3,95
Croatia	1	0	0	1,65
Slovenia	5	4	0	8,95
Serbia	0	0	0	n/a
Bosnia & Herzegovina	0	0	0	n/a
Montenegro	0	0	0	n/a
Moldavija	0	0	0	n/a

IT intensity is in relation to GDP (Fig. 1.1) Their interdependency gives a possibility to estimate IT intensity in countries and areas for which data is not available.

Method of acquiring interdependency is Regression and Correlation Analysis. Besides obtaining proof or interdependency, analysis gives the formula and function of interdependency, derived from the Least Square Method. Parameter R^2 has to be greater than 0,85 in order to presume interdependency. If it is greater than 0,95, interdependency is functional.

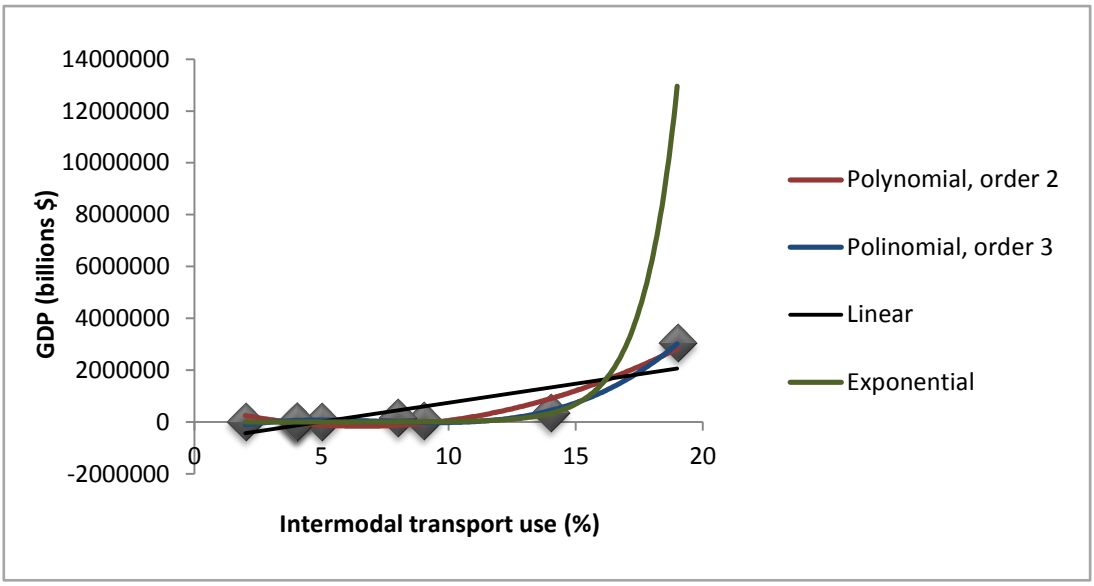


Fig. 1.1 Functions of dependence between GDP and intermodal transport use

Interdependency is shown for Polynomial functions, order 2 (R^2=0,92) and order 3 (R^2=0,99). By increasing intensity of IT (x) for one unit, GDP (y) will increase how it is shown in equations 1 and 2.

$$y = 22,079x^2 - 303,45x + 910,28 \quad (1)$$

$$y = 2,4941x^3 - 55,649x^2 + 362,75x - 564,67 \quad (2)$$

When it comes to container transport, input data is shown in Table 1.8. Difference between previous case and this is in functional interdependency acquired and for linear function (R^2=0,95). Thus, only equation for this one is shown below. Interdependency is obtained for both polynomial functions, order 2 (R^2=0,96) and order 3 (R^2=0,96) – Fig. 1.2.

$$y = 1,8837x + 293067 \quad (3)$$

Table 1.8 Imput data for regression – correlation analysis – GDP and container transport

Country	GDP (bil. $)	Num. of TEUs
Moldavia	5867,1	365
Croatia	44553,9	34115
Bulgaria	45289,3	37807
Romania	160346,1	99737
Slovenia	38836,6	458449
Slovakia	78896,4	621315
Hungary	110795,4	651093
Austria	344493,2	1156260
Czech Republic	168451,9	1476907
Germany	3043650	5979035
Ukraine	84300,9	480000

Source: OECD

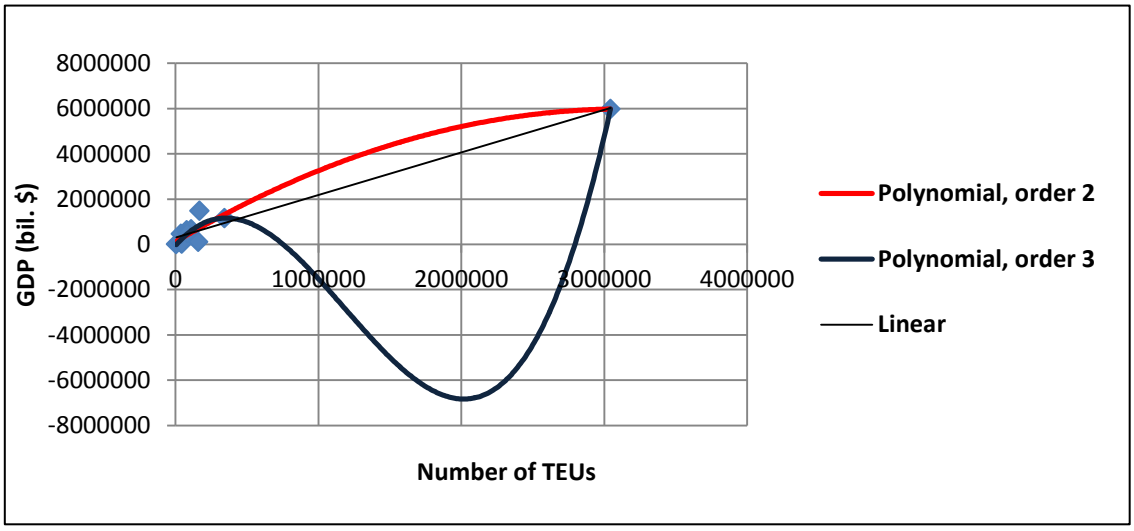


Fig. 1.2 Functions of dependence between GDP and number of TEUs

In order to have a more realistic view of interdependency between GDP and IT, last interdependency is between GDP per capita and IT intensity (Table 1.9). Functional interdependency is obtained for Polynomial function, order 3 (R^2=0,95) and it is shown in Fig. 1.3.

Table 1.9 Imput data for regression – correlation analysis - GDP per capita and intermodal transport use

Country	GDP per capita (bil. $)	Intermodal transport use (%)
Germany	37484,5	19
Austria	40168,2	14
Slovenia	18826,5	9
Czech Republic	15984,8	8
Hungary	11241,9	5
Romania	8069,5	4
Slovakia	14552,9	4
Bulgaria	6288,3	4
Croatia	10544,5	2

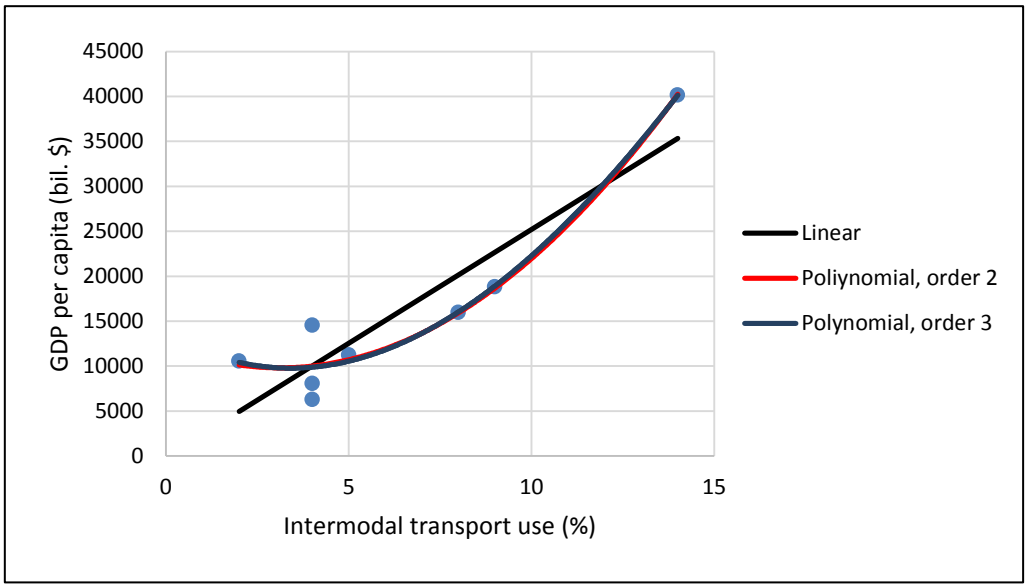


Fig. 1.3 Functions of dependence between GDP per capita and intermodal transport use

In tables that contain input data, only ones that were available are shown. For countries that data was not available, participation of IT is estimated using previously establish interdependency формулаш. In Table 1.10 estimated values are marked in red. For Ukraine and Germany, these are the areas belonging to the Danube Region.

Table 1.10 Data on intermodal transport use by country (region)

Country (region)	GDP per capita (bil. $)	Intermodal transport use (%)
Austria	40168,2	14
Slovenia	18826,5	9
Czech Republic	15984,8	8
Hungary	11241,9	5
Romania	8069,5	4
Slovakia	14552,9	4
Bulgaria	6288,3	4
Croatia	10544,5	2
Germany DR	43240,6	*25,81*
Ukraine DR	1211,4	*12,38*
Serbia	4707,5	*6,42*
Montenegro	5826,6	*5,36*
Bosnia & Herzegovina	4219,9	*7*
Moldavij	1650,3	*11,39*

1.3. Intermodal terminals

In fourteen countries of Danube Region, 166 intermodal terminals have been identified (Table 1.11). The data in Table 1.11 were obtained on the basis of own expert research and a large number of studies and projects in the field of Intermodal freight transport. The most significant are:

- Cooperative Solutions for Managing Optimized Services-COSMOS Project
- Transnational Network for the Promotion of the Water-Ground Multimodal Transport-WATERMODE
- Developing Infrastructure use and Operating Models for Intermodal Shift-DIOMIS
- Customer-driven Rail-freight services on a European mega-corridor based on Advanced business and operating Models-The CREAM Project
- Rhine-Danube Core Network Corridor Study- Final Report
- Accessibility Improved at border Crossing for the Integration of South East Europe-ACROSSE
- AGORA Marco Polo Project

Table 1.11 Identified terminals within Danube Region

No.	Mark	City	Country	TERMINAL	Type	Importance, size	Ownership
1	Asc	Aschaffenburg	DE	**Trimodales Containerterminal Aschaffenburg GmbH**	3	2	D/P
2	Aug	Augsburg	DE	**DUSS-Terminal Augsburg-Oberhausen**	2	1	D
3	Bam	Bamberg	DE	**Die baymodal Bamberg GmbH**	2	5	D/P
4	Bur	Burghausen	DE	**KTB KombiTerminal Burghausen GmbH**	2	6	P
5	Deg	Deggendorf	DE	**Zweckverband Donau-Hafen Deggendorf**	3	1	P
6	Fre	Freiburg	DE	**RAlpin Terminal Freiburg**	2	2	P

7	Hei	Heilbronn	DE	**DUSS-Terminal Heilbronn**	3	1	D
8	Hof	Hof	DE	**Contargo Ziegler Combitrac GmbH**	2	5	P
9	Ing	Ingolstadt	DE	**DUSS-Terminal Ingolstadt**	2	4	D
10	Kar1	Karlsruhe	DE	**DUSS-Terminal Karlsruhe**	2	5	D
11	Kar2	Karlsruhe	DE	**Contargo Wörth-Karlsruhe GmbH**	3	6	P
12	Kor	Kornwestheim	DE	**DUSS-Terminal Kornwestheim**	2	7	D
13	Lan	Landshut	DE	**DUSS-Terminal Landshut**	2	4	D
14	Man1	Mannheim	DE	**Contargo Rhein-Neckar GmbH**	3	8	P
15	Man2	Mannheim	DE	**DUSS-Terminal Mannheim-Handelshafen**	2	7	D
16	Man3	Mannheim	DE	**DP World Mannheim**	3	2	P
17	Mün1	München	DE	**CDM Container Depot München GmbH & Co. Service KG**	2	5	P
18	Mün2	München	DE	**DUSS-Terminal München-Riem**	2	8	D
19	Nür	Nürnberg	DE	**TriCon Container-Terminal Nürnberg GmbH**	3	8	P
20	Pas	Passau	DE	**Der bayernhafen Passau**	3	2	D/P
21	Reg1	Regensburg	DE	**CTR Container Terminal Regensburg GmbH**	2	4	P
22	Reg2	Regensburg	DE	**DUSS-Terminal Regensburg-Ost**	2	7	D
23	Sch	Schweinfurt	DE	**TRANSLOG Transport + Logistik GmbH Terminal Schweinfurt**	2	4	P
24	Sie	Siengen	DE	**Terminal Singen TSG GmbH**	2	5	P
25	Stu1	Stuttgart	DE	**DP World Stuttgart GmbH**	3	4	P
26	Stu2	Stuttgart	DE	**DUSS-Terminal Stuttgart Hafen**	2	4	D
27	Ulm	Ulm	DE	**DUSS-Terminal Ulm**	2	8	D
28	Wie	Wiesau	DE	**Ziegler Logistik GmbH Wiesau**	2	3	P
29	Brn	Brno	CZ	**Terminal Brno, a.s.**	2	2	P
30	C.Tr	Ceská Trebová	CZ	**METRANS a.s. Terminal Ceska Trebova**	2	8	P
31	Dec	Decin	CZ	**Pristav Decin**	3	2	P
32	Kop	Koprivnice	CZ	**TERMINÁL ARGO BOHEMIA KOPRIVNICE**	2	1	P
33	Lab	Labem	CZ	**METRANS a.s. Terminal Usti nad Labem**	3	1	P
34	Lov	Lovosice	CZ	**Intermodal Terminal-DUSS Lovosice CZECH**	2	3	D
35	Mel	Melník	CZ	**Port Mělník- Terminál Mělník**	3	5	P
36	Obr	Obrnice	CZ	**Terminal Obrnice**	2	2	P
37	Ost1	Ostrava	CZ	**Terminal Paskov Ostrava**	2	4	P
38	Ost2	Ostrava	CZ	**METRANS a.s. Terminal Ostrava Senov**	2	4	P
39	Par	Pardubice	CZ	**Trminal Pardubice**	2	1	D/P
40	Plz1	Plzen	CZ	**METRANS a.s. Terminal Plzen Nyrany**	2	6	P
41	Plz2	Plzen	CZ	**Contargo Terminal Plzen**	2	3	P
42	Pra1	Praha	CZ	**METRANS a.s. Terminal Praha Uhrineves**	2	8	P
43	Pra2	Praha	CZ	**Terminal Praha Žižkov**	2	5	D/P
44	Pre	Prerov	CZ	**Terminal Prerov**	2	1	D/P
45	Zli	Zlin	CZ	**METRANS a.s. Terminal Zlin - Zelechovice / Lipa**	2	6	P
46	Bra1	Bratislava	SK	**UKV-Terminal Bratislava**	2	3	D/P
47	Bra2	Bratislava	SK	**Pristav Bratislava Palenisko**	3	3	P
48	D.St	Dunajska Streda	SK	**METRANS a.s. Terminal DUNAJSKA STREDA**	2	8	P
49	Dob	Dobra	SK	**Febra Logisticke Centrum TKD Dobrá**	2	4	P
50	Kos1	Kosice	SK	**METRANS a.s. Terminal Kosice**	2	3	P
51	Kos2	Kosice	SK	**Terminal Košice RCO**	2	4	D/P
52	Sla	Sládkovicovo	SK	**Sládkovicovo Kontajnerový terminál**	2	6	P
53	Zil1	Zilina	SK	**Terminal Žilina RCO**	2	6	D/P
54	Zil2	Zilina	SK	**Public Intermodal Transport Terminal Žilina (ITT ZA)**	2	5	P
55	Ara	Arad Curtici	RO	**Railport Arad S.R.L.**	2	7	P
56	Bac1	Bacau	RO	**Rail Container Bacau**	2	2	P
57	Bac2	Bacau	RO	**Rofersped s.a. Terminal Bacau**	2	1	P

58	Bai	Baia Mare	RO	**Z.S. Baia Mare**	2	0	D
59	Bra	Brasov	RO	**Brasov Intermodal Terminal**	2	3	P
60	Buc1	Bucharest	RO	**Bucharest Intermodal Terminal SC Tibbett Logistics SRL**	2	2	P
61	Buc2	Bucharest	RO	**Bucurestii Noi CFR Marfa**	2	0	D
62	Buc3	Bucharest	RO	**Bucuresti Sud**	2	3	D
63	Con1	Constanta	RO	**Constanta Port (APM)**	2	6	P
64	Con2	Constanta	RO	**Constanta Container Terminal SOCEP**	3	7	P
65	Con3	Constanta	RO	**S.C. Constanta South Container Terminal S.R.L. (DP World)**	3	8	P
66	Cra	Craiova	RO	**Craiova**	2	0	D
67	Leo	Leordeni	RO	**Center Tea & Co Terminal**	2	0	P
68	Mie	Miercurea Ciuc	RO	**Miercurea Ciuc Intermodal Terminal**	2	1	P
69	Ora	Oradea	RO	**Oradea Intermodal Vest S.r.l.**	2	1	P
70	Pit	Pitesti BRADU SE SUS	RO	**Bradu de Sus**	2	0	D
71	Plo1	Ploesti	RO	**Ploiesti Crang CFR Marfa**	2	0	D
72	Plo2	Ploesti	RO	**Allianso Terminal Ploiesti**	2	4	P
73	Ras	Rastolita	RO	**Rastolita**	2	0	D/P
74	Sib	Sibiu	RO	**Sibiu**	2	0	D
75	Sue	Suceava	RO	**Rofersped s.a. Terminal Suceava**	2	3	P
76	Tem	Temisuara	RO	**Temisuara Semenic**	2	2	D
77	Tur	Turda	RO	**Rofersped s.a. Terminal Turda**	2	1	P
78	Val	Valcea	RO	**Bujoreni Valcea**	2	0	D
79	Zal	Zalau	RO	**Rofersped s.a. Terminal Zalau**	2	1	P
80	Baj	Baja	HU	**Port of Baja - Ro-Ro Terminal**	3	1	P
81	Bud1	Budapest	HU	**Rail Cargo Terminal – BILK Ltd.**	2	8	D/P
82	Bud2	Budapest	HU	**MAHART Container Center Ltd**	3	8	P
83	Bud3	Budapest	HU	**METRANS a.s. Terminal Budapest**	2	8	P
84	Deb	Debrecen	HU	**Logistics centre Debrecen**	2	2	P
85	Mis	Miskolc	HU	**Miskolc - Gömöri**	2	0	D
86	Pec	Pecs	HU	**MÁV Kombiterminál Pecs**	2	0	D
87	Sop	Sopron	HU	**Sopron container terminal**	2	5	P
88	Sze	Székesfehérvár	HU	**Székesfehérvár Terminal**	2	0	D
89	Sze	Szeged	HU	**MÁV Kombiterminál Szeged**	2	0	D
90	Szo	Szombathely	HU	**MÁV Kombiterminál Szombathely**	2	0	D
91	Szo	Szolnok	HU	**MÁV Kombiterminál Szolnok**	2	0	D
92	Tör	Törökbálint	HU	**Törökbálint Kombiterminal**	2	1	P
93	Blu	Bludenz	AT	**Rail Cargo Terminal Bludenz**	2	4	P
94	Bre	Brennersee	AT	**Ro La Terminal Brennersee**	2	5	D
95	Enn	Enns	AT	**CTE Container Terminal Enns Ges.m.b.H**	3	8	P
96	Für	Fürnitz	AT	**Villach Süd CCT, Villach Süd RoLa ÖBB**	2	7	D
97	Gra	Graz/Werndorf	AT	**Standort Terminal Graz Süd**	2	7	D/P
98	Hal	Hall in Tirol	AT	**Containerterminal Hall i. T. CCT**	2	4	P
99	Kap	Kapfenberg	AT	**Montan Terminal Kapfenberg**	2	3	P
100	Kre	Krems	AT	**METRANS a.s. Terminal Krems**	3	6	P
101	Lam	Lambach	AT	**Terminal Lambach**	2	4	P
102	Lin	Linz	AT	**Linz Stadthafen CCT**	3	7	P
103	Mad	Madstein	AT	**St. Michael CCT**	2	3	D
104	Pöl	Pölten	AT	**St. Pölten Alpenbahnhof CCT**	2	2	P
105	Sal1	Salcburg	AT	**CTS Container Terminal Salzburg GmbH**	2	7	P
106	Sal2	Salcburg	AT	**Ro La Terminal Salzburg HBF**	2	3	D
107	Wel	Wels	AT	**Wels Vbf. CCT RoLa ÖBB**	2	6	D
108	Wie1	Wien tu je Freudenau	AT	**WIENCONT Container Terminal GMBH**	3	7	P

109	Wie2	Wien	AT	**Wien Süd CCT ÖBB**	2	7p	D
110	Wie3	Wien	AT	**Wien Nordwestbahnhof CCT ÖBB**	2	6	D
111	Wol	Wolfurt	AT	**Wolfurt CCT**	2	5	D
112	Wör	Wörgl	AT	**Wörgl CCT RoLa**	2	2	D
113	Ybb	Ybbs	AT	**Ybbs- Harbor & container terminal**	3	2	P
114	Bou1	Bourgas	BG	**Terminal Bourgas (Dolno Ezerovo)**	2	5	P
115	Bou2	Bourgas	BG	**Port of Bourgas**	3	5	P
116	Rus	Ruse	BG	**Port Complex Ruse J.S. Co.**	3	2	D/P
117	S.Za	Sofia	BG	**Yana Sofia Intermodal Terminal**	2	3p	P
118	Sof	Stara Zagora	BG	**Stara Zagora**	2	3	P
119	Var1	Varna	BG	**Varna West Container Terminal**	3	5	D
120	Var2	Varna	BG	**Varna East Container Terminal**	3	5	D
121	Celj	Celje	SL	**Terminal Celje**	2	2	D
122	Kop1	Koper	SL	**Koper Luka KT**	3	8	D
123	Kop2	Koper	SL	**Port of Koper RoRo Terminal**	3	8p	D
124	Lju	Ljubljana	SL	**Ljubliana Container Terminal**	2	6	D
125	Mar	Maribor	SL	**Maribor Tezno KT**	2	3	D
126	Sež	Sežana	SL	**Logistični centar Sežana**	2	3	D
127	Kot	Kotoriba	CR	**Terminal Kotoriba**	2	0	P
128	Osi	Osijek	CR	**Kontejnerski Terminal Osijek**	2	0	D
129	Plo	Ploče	CR	**Luka Ploce KONTEJNERSKI TERMINAL**	3	4	P
130	Rij	Rijeka	CR	**Rijeka-Adriatic Gate Container Terminal Bradjica**	3	6	D/P
131	Sla	Slavonski Brod	CR	**Slavonski Brod**	2	0	D
132	Spa	Spačva	CR	**nedostupno**	2	0	D/P
133	Spl	Split	CR	**Kontejnerski terminal luka Split**	3	2	D
134	Zag1	Zagreb	CR	**Kontejnerski Terminal Vrapče (Zagreb)**	2	3	D
135	Zag2	Zagreb	CR	**CroKombi Intermodal Terminal**	2	1	D/P
136	Bar	Bar	MN	**Port of Adria**	3	5	P
137	Beo1	Beograd	SE	**Kontejnerski terminal-Luka Beograd**	3	0	P
138	Beo2	Beograd	SE	**Makis Željeznički integralni transport (ŽIT)**	2	2	D
139	Beo3	Beograd	SE	**Nelt privatni intermodalni terminal Dobanovci**	2	1	P
140	D.Do	Donje Dobrevo	SE	**Zeleznicka Stanica**	2	0	D
141	Kra	Kragujevac	SE	**Railway station Kragujevac**	2	0	D
142	Niš	Niš	SE	**Railway station Red Cross, Nis (Nis)**	2	0	D
143	N.Sad	Novi Sad	SE	**Luka Novi Sad Container Terminal Novi Sad**	3	2	D/P
144	Pan	Pančevo	SE	**Port Danube, Pancevo**	3	2	P
145	Sen	Senta	SE	**Luka Senta Kontejnerski terminal**	3	1	P
146	Sme	Smederevo	SE	**Port Feranex AG JSC , Smederevo**	3	0	P
147	S.Mi	Sremska Mitrovica	SE	**SM Container terminal (Luka Leget)**	3	2	P
148	Sub	Subotica	SE	**Railway station Subotica**	2	0	D
149	B.Lu	Banja Luka	BA	**Terminal Banja Luka**	2	1	D
150	Brc	Brčko	BA	**Luka Brcko**	3	0	D
151	Dob	Doboj	BA	**ŽS Doboj**	2	0	D
152	Mos	Mostar	BA	**ŽS Mostar**	2	0	D
153	Sar	Sarajevo	BA	**Terminal Sarajevo Alipasin most**	2	1	P
154	Tuz	Tuzla	BA	**Teminal Tuzla u bosanskoj Poljani**	2	1	D/P
155	Zen	Zenica	BA	**ŽS Zenica**	2	0	D
156	Cho	Chop	UA	**PACOBO Ltd Chop Terminal**	2	4	P
157	Ily1	Ilyichevsk	UA	**Container Terminal of Ilyichevsk Sea Fishing Port**	3	7	D/P
158	Ily2	Ilyichevsk	UA	**RoRo Multimodal Complex**	3	3	D/P
159	Ode1	Odessa	UA	**Container Terminal Odessa HHLA**	3	8	P

160	Ode2	Odessa	UA	**Center of Transport Service"Liski"**	2	8	D
161	Ben	Bender	MD	**Bender2 Rail station**	2	0	D
162	Giu	Giurgiulesti	MD	**Giurgiulesti International Free Port- Container & General Cargo Terminal**	3	2	P
163	Kis	Kisinjev	MD	**Rail station**	2	2	D
164	Okn	Oknica	MD	**Rail station**	2	0	D
165	Reu	Reucel	MD	**Rail station**	2	0	D
166	Ung	Ungeni	MD	**Rail station**	2	0	D

The network of intermodal terminals of Danube Region is shown in Fig. 1.4.

Fig. 1.4 Network of Intermodal Terminals of Danube Region

1.3.1 Identification of the main intermodal terminals - key players of intermodal transport services at the level of Danube Region

In order to identify the main intermodal terminals, in the first step, the classification of Danube region terminal was carried out, according to importance in five basic groups:

- **Group 0** (includes undeveloped terminals from the standpoint of providing of intermodal transport service. These terminals are equipped with only basic equipment for container handling. This group includes railway stations or river ports equipped with the basic handling equipment for containers without developed technological procedure for realization of intermodal transport service.

- **Group 1** (includes small terminals with the basic functions of the intermodal transport service; they are equipped with a small storage capacity (<1,000 TEU), a small transhipment capacity (<10,000 TEU/year), with or without a dedicated rail track. Rail track are small in length)
- **Group 3** (includes medium terminals. In addition to the basic functions of the intermodal transport service, in these terminals, the partial additional services are implemented. The transhipment capacity is larger than the Group 0 (about 20,000 TEU/year), They are equipped with a storage area about 1,000-2,000 TEU, with the purpose built shorter rail track)
- **Group 5** (includes large terminals with possibilities for realization of basic and additional functions of intermodal transport service; transhipment capacity is about of 60,000-100,000 TEU/year; storage area about of 1,500-4,000 TEU; the purpose built rail track is long)
- **Group 7** (includes the largest terminals with basic, additional and others functions of the intermodal transport service. They have a very high level of technological process. The transhipment capacity is from 90,000 to 200,000 TEU/year. The storage area is about 5,000 TEU. These terminals are equipped with several longer purpose built rail tracks)

In addition to the five basic groups of intermodal terminals, in the second step, the remaining terminals of Danube Region are also assigned to "transitional" groups, marked with numbers 2, 4, 6 or 8. According to the criteria of the basic, additional and others functions, groups 2, 4 and 6 are located between the basic groups, 1 and 3; 3 and 5; 5 and 7, respectively. Terminals in Group 8 have an extremely large transhipment capacity (about 400,000 TEU/year), a large storage capacity (about 10,000 TEU), with complex functions and a technological process of intermodal transpor service.

The examples of intermodal terminals from individual groups (1, 3, 5, 7 and 8) are shown in Figs. 1.5, 1.6, 1.7, 1.8 and 1.9.

Fig. 1.5 Example of an intermodal terminal from Group 1

Fig. 1.6 Example of an intermodal terminal from Group 3

Fig. 1.7 Example of an intermodal terminal from Group 5

Fig. 1.8 Example of an intermodal terminal from Group 7

Fig. 1.9 Example of an intermodal terminal from Group 8

In the third step, terminals from groups 6, 7 and 8 are classified as the main providers of intermodal transport service at the level of Danube region. The classification of terminals in detail is shown in Table 1.12.

Table 1.12 Identification of the intermodal terminals by importance at the level of Danube Region

Country	The number of classified terminals by importance at the level of DR, per countries (groups 0 - 8)									The main IT service providers at the level of DR (6+7+8)	IN TOTAL (0+1+2+3+4+5+6+7+8)
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**		
Republic of Austria	-	-	3	3	3	2	**3**	**6**	**1**	**10**	21
Germany (area of DR)	-	3	4	1	6	5	**2**	**3**	**4**	**9**	28
Czech Republic	-	4	3	2	2	2	**2**	**-**	**2**	**4**	17
Slovak Republic	-	-	-	3	2	1	**2**	**-**	**1**	**3**	9
Romania	9	5	3	3	1	-	**1**	**2**	**1**	**4**	25
Hungary	6	2	1	-	-	1	**-**	**-**	**3**	**3**	13
Republic of Moldova	4	-	2	-	-	-	**-**	**-**	**-**	**0**	6
Republic of Bulgaria	-	-	1	2	-	4	**-**	**-**	**-**	**0**	7
Ukraine (area of DR)	-	-	-	1	1	-	**-**	**1**	**2**	**3**	5
Republic of Serbia	6	2	4	-	-	-	**-**	**-**	**-**	**0**	12
Republic of Bosnia and Herzegovina	4	3	-	-	-	-	**-**	**-**	**-**	**0**	7
Republic of Slovenia	-	-	1	2	-	-	**1**	**-**	**2**	**3**	6
Republic of Croatia	4	1	1	1	1	-	**1**	**-**	**-**	**1**	9
Republic of Montenegro	-	-	-	-	-	1	**-**	**-**	**-**	**0**	1
IN TOTAL										**40**	**166**

1.3.2 Identification of main intermodal terminals-key players at the national level in Danube region

Due to the varying degree of development of intermodal transport among the countries of Danube Region, the identification of the main providers of intemodal services at the level of individual countries was also carried out. The data are shown in table 1.13.

Table 1.13 Identified intermodal terminals - The main providers of intermodal transport service at the national level in Danube Region

Country	The main providers of intermodal transport service at the national level									IN TOTAL
	0	1	2	3	4	5	6	7	8	
Republic of Austria	-	-	-	-	-	-	3	6	1	**10**
Germany (area of DR)	-	-	-	-	-	-	2	3	4	**9**
Czech Republic	-	-	-	-	2	1	2	-	2	**7**
Slovak Republic	-	-	-	2	2	-	2	-	1	**7**
Romania			3	2	1	-	1	2	1	**10**
Hungary	-	1	1	-	-	1	-	-	3	**6**
Republic of Moldova	3	-	2	-	-	-	-	-	-	**5**
Republic of Bulgaria	-	-	1	2	-	4	-	-	-	**7**
Ukraine (area of DR)	-	-	-	-	1	-	-	1	2	**4**
Republic of Serbia	2	2	4	-	-	-	-	-	-	**8**
Republic of Bosnia and Herzegovina	1	3	-	-	-	-	-	-	-	**4**
Republic of Slovenia	-	-	1	2	-	-	1	-	2	**6**
Republic of Croatia	2	1	1	1	1	-	1	-	-	**7**
Republic of Montenegro	-	-	-	-	-	1	-	-	-	**1**
IN TOTAL										**91**

1.3.3 Connections between terminals-the main providers of intermodal transport service at the national level in Danube region

The connections between ninety-one terminals, identified in Table 1.13, are shown in Fig. 1.10.

Fig. 1.10 Identified intermodal terminals - the main providers of intermodal transport service at the national level in Danube Region and connections between them

1.3.4 Intermodal flows (combined transport-rail/road) between the countries in Danube region

The available data of the realized transport volumes (type of combined transport - railway/road) in 2016, between the countries in Danube Region are shown in the following tables (Table 1.14 and Table 1.15). The data are expressed in unit TEU/year (Table 1.14) and percentages (Table 1.15).

Tabe 1.14 The realized transport volumes between the countries in Danube Region [TEU/2016]

TEU	To	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Other countries	Summ
From	Country	AT	BH	BG	CR	CZ	DE	HU	MD	MN	RO	SE	SK	SL	UA		
1	AT	0	0	0	0	5760	146180	38050	0	0	7270	0	0	49550	0	55900	302710
2	BH	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10
3	BG	0	0	0	0	0	0	0	0	0	1630	0	0	0	0	530	2160
4	CR	0	0	0	0	0	0	1480	0	0	0	80	0	860	0	30530	32950
5	CZ	13910	0	0	0	0	420200	24490	0	0	0	0	66200	25960	0	291900	842660
6	DE	122680	0	0	610	239590	0	138840	0	0	4010	630	4580	15170	0	2183370	2709480
7	HU	42980	0	0	5560	0	102450	0	0	0	2230	30	0	115100	10	53150	321510
8	MD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	MN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	RO	13250	0	240	0	0	1050	0	0	0	0	0	0	0	120	32540	47200
11	SE	0	0	0	300	0	0	0	0	0	0	0	0	210	0	2060	2570
12	SK	46420	0	0	0	250650	28810	30900	0	0	0	0	0	193480	0	91830	642090
13	SL	8090	10	0	630	25520	10640	64120	0	0	0	190	65440	0	0	2900	177540
14	UA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other countries		96850	0	1070	510	80170	928210	23330	0	0	30450	250	4650	4140	59190	2394530	3623350
Summ		344180	10	1310	7610	601690	1637540	321210	0	0	45590	1180	140870	404480	59320	5139240	
																	8704230

Source: International Union of Railways (UIC). 2017. Combined Transport in Europe.

Table 1.15 The realized transport volumes between the countries in Danube Region [%]

%	To	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Other countries	Summ
From	Country	AT	BH	BG	CR	CZ	DE	HU	MD	MN	RO	SE	SK	SL	UA		
1	AT	0.00	0.00	0.00	0.00	1.90	48.29	12.57	0.00	0.00	2.40	0.00	0.00	16.37	0.00	18.47	100
2	BH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	100
3	BG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	75.46	0.00	0.00	0.00	0.00	24.54	100
4	CR	0.00	0.00	0.00	0.00	0.00	0.00	4.49	0.00	0.00	0.00	0.24	0.00	2.61	0.00	92.66	100
5	CZ	1.65	0.00	0.00	0.00	0.00	49.87	2.91	0.00	0.00	0.00	0.00	7.86	3.08	0.00	34.64	100
6	DE	4.53	0.00	0.00	0.02	8.84	0.00	5.12	0.00	0.00	0.15	0.02	0.17	0.56	0.00	80.58	100
7	HU	13.37	0.00	0.00	1.73	0.00	31.87	0.00	0.00	0.00	0.69	0.01	0.00	35.80	0.00	16.53	100
8	MD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
9	MN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
10	RO	28.07	0.00	0.51	0.00	0.00	2.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	68.94	100
11	SE	0.00	0.00	0.00	11.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.17	0.00	80.16	100
12	SK	7.23	0.00	0.00	0.00	39.04	4.49	4.81	0.00	0.00	0.00	0.00	0.00	30.13	0.00	14.30	100
13	SL	4.56	0.01	0.00	0.35	14.37	5.99	36.12	0.00	0.00	0.00	0.11	36.86	0.00	0.00	1.63	100
14	UA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Other countries		2.67	0.00	0.03	0.01	2.21	25.62	0.64	0.00	0.00	0.84	0.01	0.13	0.11	1.63	66.09	100

1.4 Intermodal transport treatment in national strategic documents

Sustainable and efficient transport system represents the main goal of EU transport politics. In order to improve mobility and interoperabillionity, it is necessary, first at higher level, to adopt strategic document that defines general goals and actions needed for their achievement. Adequate treatment of IT involves definition of actions in accordance with specific situation for area or country that is planned for in order to achieve both national and transnational goals.

1.4.1 Overview of transnational strategic documents

Dominant carrier of transnational documents is EU with its bodies - European Commission (EC) and European Parliament (EP). In researching and enacting regulations scientific institutions are often involved as well as users of IT.

White paper (EC, 2011), an umbrella strategic document in the field of transport, encourages the creation of a competitive and sustainable transport system. The EC in this document focuses on safety, security and environmental standards in transport worldwide, defining the objectives to be achieved by 2050. One of those goals is to maintain climate change below 275K. as one of the measures to achieve this goal they plan to reduce gas emissions by 80 to 90% compared to the level of 1990, and to shift 30% of road freight over 300km to other modes such as rail or waterborne transport by 2030, and more than 50% by 2050. As a way of achieving an efficient transport network they plan to invest in the development of remote and intercontinental transportation, full functional multimodal trans – European Transport Network (TEN-T) across the EU by 2030, and a network of high-capacity and high quality by 2050 with a corresponding set of information services. In addition, one of the goals is to create the appropriate framework to enable the tracking of goods in real time, the use of IT and "clean" modes of transport, as well as providing support to institutions and promotion of railway, waterway and IT.

Analysis of Combined Transport in EU (EC, 2015) research compliance of national framework of countries in EU with previously established Directive 92/106/EEC, which defined combined transport (CT) and guidelines for promotion of it, as well. Requirements for Directive revision are identified and ways of improving regulative framework with guidelines for promotion and use of CT, based on principles of good practice. Besides mentioned, actions for cutting costs of terminal to terminal transport by 50% or cutting handling costs by 30€ per unit are recommended (EC, 2015).

EU, in cooperation with SETA organization (South East Transport Axis Organization) in 2013 brings document named "Evaluation of Intermodal Transport and Terminals in SETA corridor". It identifies the most important problems in the area. Main source of the problems and place for introducing measures is intermodal terminal (SETA, 2013).

On the path of achieving efficient social – economic and environmental sustainability, challenge in front of EU is efficient and balanced use of existing resources (EC, 1997). Integrated infrastructure and development of transport means,

interoperability and interconnected activities, improvement of services and law are seen as a key element for intermodal transport improvement (EC, 1997). Once again, transfer knots are identified as a key problem.

EP in 2016 realized research and brought a document "Research for Tran Committee - Logistics in Ten-T corridors" (EP, 2016). Research results is logistics plan with 34 concretized measures for its achieving. Measures are for improvement of EU transport system in six areas: ITS (Intelligent Transport Systems) and e-commerce, sustainable quality and efficiency, simplifying of transport chain and vehicles dimensions, loads limitations and standards, green corridors and city logistics.

Intermodal transport study (City Net, 2016) of Western Balkans includes overview of existing studies, analysis of market and estimation of intermodal standards in use, analysis of law and institutional framework, estimation of terminals and transport requirements, estimation of main transport corridors in South East Europe and identification of interventions to increase intermodal transport efficiency. This document points out the most important problems of South East Europe. Even though evolvent of intermodal transport is in early phase, forecasts are that European IT will achieve 40% of all transport movement by 2020. (City Net, 2016). IT will be an industry with its identity, strategy and expression.

1.4.2 Overview of national strategic documents

In this group fall all documents related (in)directly to transport system. Average is given to transport policies that aim to create developed transport system of a certain country.

Goal is to, by overviewing available documents, come up with conclusions of manner in which transport as a system is viewed with the focus on IT. In review, each country is presented by the most important characteristic of document.

From all countries, for **Austria** there was not available any strategic document directly connected to transport system. Transport policy of Austria is described in the paper Austrian Transport and Logistics Strategy. Instead of transport strategy, for Austria following documents were analyzed:

- The Austrian Strategy for Sustainable Development and
- ITS Action Plan Austria, Executive Summary.

First document deals with some possible ways of improving transport as well as with other spheres with the focus on environment. Besides that, it suggests performances for tracking an impacts on environment such as emission of various gases while extern costs are seen as a way to achieve fair completive battle among modes. IT is considered as one of the key tools in achieving the plan.

In addition to improve railway infrastructure, guidelines for improvement of IT in The Austrian General Transport Plan are provided. They include development and building of intermodal terminals and boosting of better use of different technologies as well as better integration of railways, roads and inland waterways with ports. As an addition to General Plan Transport Telematics Offensive 2002 is provided. It

should help every mode in increasing of capacities and cutting down pollution, time traveling and optimization and overall safety.

Second document deals with possible optimization of chains and networks by introducing telematics support in transportation system. It is expected to bring to better IT management and better use of infrastructure. Services are offered from giving information about position of units and routing to tracking and tracing shipment trough whole chain. For this purpose, agency named Federal Agency for Technological Measures Ltd was established in 2005.

German document that was analyzed was Freight Transport and Logistics Action Plan. Changes and updates from previous version and connections to other documents are pointed out. In accordance with done and not done, new interventions are proposed for next period of time. Hence, according to current situation in the country. For each intervention responsible party is defined, as well as budget and time horizon. There are various bodies on different level of deaccessioning which are focused on certain topics in area of logistics. For instance, Federal Coordinator for Logistics, consisted of people from scientific world, government organs and companies.

Romanian document is named Romania General Transport Master Plan. It was written by consulting house and approved by Romanian Government. It is distinguishable from other documents due to analysis of different subsystems of IT, of which for the most part terminals. It is needed know system well in order to improve it. Hence, analysis of each subsystem of IT is needed. In this Master Plan, interventions regarding IT are based upon different scenarios used in National Transport Model according to their benefit to environment and economy. Besides this, analysis of goods flow is taken with the view of factors influencing them.

First aim of **Bulgarian** documents is performance efficiency increment and modernization of infrastructure; second one is introducing Bulgaria in European transportation network at third is to establishment of healthy conditions of market business with business transparency. Its aims are matched to identified problems and priorities are defined. Each goal has actions by its to be realized.

Rear example when regarding to identification of different technologies (A and B, C and D) is **Hungary**, analyzing factors impacting on it. About 65-70 train compositions is circling among Hungary, Austria and Slovenia weekly. Besides this, Hungary was the only country to recognize the lack of projects regarding bottle necks as a problem. One of the aim is to increase share of intermodal transport.

In **Czech** document area that is the best covered is regarding financing of logistics systems as well as transport system generally. It mentions two possible ways of financing, traditional and alternatives, and it implies on two additional documents, one of which is only about logistics systems (support from the budget). Also, there is some about expansion of PPP (Public Private Partnership).

In its document, Transport Development Strategy in the Republic of Slovenia**, Slovenia** got her attention to till that day enacted documents and projects, both national and transnational (TEN-T projects and White paper). Role of the ministry has been analyzed, well elaborated National Transport Model presented after which SWOT analysis has been provided accompanied by goals and measures with the environment impact estimation. Model is based upon data from borders crossing:

plate registration country and delays, etc. Geographically, model covers area from Spain and Britain to Russia; from Baltic till Create. Goods are categorized in several groups according to costs (connected to space covered and time, filling the transportation unit and handling). Results of the model is given in costs and the most efficient route to be taken.

When it comes to goals directly connected to IT, attention is given to terminals. Aim Is to provide access to terminals no matter of ownership. Having that said, substantial amounts of stimulating measures are to be used for intermodal units and industrial trucks wherever it is economically justified.

Slovakia in its document Strategic Transport Development Plan of the Slovak Republic up to 2030 – Phase II estimated impact of each measure. Every measure has merit (from 1 to 5) and ranking giving the opportunity to establish priorities. The most important measure is modernization of border crossing in relation to railways, important for freight and passenger transport.

Croatian document named Strategy for transport development of Republic of Croatia for the period 2014 – 2030 stands out with its well-structured and connected matrix of goals and measures pointing out priorities and benefits of each. This document is one with the most proposed measures. Besides Slovenia, Bulgaria and Czech Republic, Croat recognized performance measures as a way to tract terminal connectedness and service continuity in IT. This document is similar to Slovenian.

Montenegro and **Bosnia & Herzegovina** have documents similar to Croatia (26), especially when it comes to goals and measures structure. In second document measures are concretized and financially defined and time related: short, medium and long period. Among more important problems in Montenegrin document are non-liberalized market and business transparency, efficiency of borders crossings and formalities.

Serbia is a rear example of dedicating a chapter to IT - recognizing it as an independent area. Its document Development Strategy for Railway, Road, Waterway, Air and Intermodal Transport in Republic of Serbia – 2015. Vision that includes: role of the government and organizational measures, development guidelines and medium to short term development strategy for IT. Document is outdated and replaced by The Plan for Development of Railway, Road, Waterway, Air and Intermodal Transport in Republic of Serbia from 2015 till 2020. Base for this document are Strategy of Infrastructural and Institutional development of Railway Sector in the Republic of Serbia for the Period of 2012 till 2021. and General Plan for Transport Development in the Republic of Serbia for the Period of 2009 till 2027.

In a strategic document for **Moldova**, *Transport and Logistics Strategy for 2013 – 2022,* huge problem is the lack of modern terminal. Goals and measures are well defined where each measure has its deadline and financial outcome, performance indicator and responsible party.

At least, strategic document for **Ukraine**. It is named Updated *National Transport Strategy of Ukraine* and it is split in two parts. First part is about current situation and literature review, problems and suggested actions in different areas (institutional and operational, regional and politics related). Second is SWOT based – for the whole transport sector and for each mode, derived from the first one.

By analyzing all the documents, one can have a proposition how to do things right. Countries differently engage in similar practices thus analysis is important to be made. Areas of analysis are shown in Table 1.16. They are (in)directly connected to IT. In second column country that has treated that are the best is named and with the mark of its treatment.

Table 1.16 Aspect of analysis in national strategic documents

Aspect of analysis	Country (mark)
Documents connectedness and structure	Germany (10)
IT subsystems analysis	Romania (8)
Financing	Austria (9)
Institutional framework and defined responsible parties	Germany (10)
Goals and measures	Germany (10)
Danube	Romania (5)
Promotion	Germany (9)
Documents updating	Germany (10)

When it comes to Danube, it is important to mention that Austria has a dedicated document named National Action Plan, Danube Navigation – via Dunau which is part of national transport politics and Action programmer for Inland Waterway Transport (naiDaes). It proposes 40 actions and it is a part of national program from 2007. Some of them are regarding development of ports on Danube in intermodal centers and establishment of regular container liner with promotion of different technologies.

For the rest of the countries, review is given in Table 1.17. Less developed countries have documents that are often unreal i.e. goals and measures are not fitting current situation.

Table 1.17 Marks of analyzed aspects in other national strategic documents

Country	Aspect of analysis (mark)
Czech Republic	Financing, Goals and measures (7)
Slovenia	National transport model (7)
Slovakia	Goals and measures (7)
Bulgaria	Goals and measures (6)
Croatia	Goals and measures (5)
Hungary	Analysis of goods and transport flows (5)
Serbia	A separate issue of intermodal transport (4)
BiH	Measures (4)
Montenegro	Measures (3)
Moldova	Measures (3)
Ukraine	SWOT analysis of the transport system (4)

At last, Table 1.18 show characteristics of countries' documents. Keep in mind that documents are not of the same type (soma are action plans and some strategies). Country is an independent document bringer if the government body did the research and writing of it and not for an example consulting firm.

Table1.18 National strategic documents characteristics

Country	By government	Year	Overview of IT system	Defined goal and actions	No. of goals (actions)	Mark
Austria	Yes	2012, 2011	No	No	1 (1)	n/a[2]
Bosnia & Herzegovina	Yes	2016	No	Yes	6 (15)	5
Bulgaria	Yes	2010	No	Yes	10 (18)	5
Montenegro	Yes	2010	No	No	1 (17)	4,5
Czech Republic	Yes	2013	No	Yes	5 (31)	7
Croatia	Yes	2014	No	No	1 (18)	6
Hungary	Yes	2007	No	No	3 (19)	5
Moldova	Yes	2013	No	Yes	8 (11)	4
Germany	Yes	2010	No	Yes	5 (14)	9
Romania	No	2014	Yes	Yes	2 (12)	8
Slovakia	Yes	2016	No	Yes	3 (10)	7
Slovenia	Yes	2014	No	No	6 (17)	6,5
Serbia	Yes	2008	No	No	4 (12)	4
Ukraine	No	2016	No	No	1 (3)	3

Intermodal transport system overview is done when the document analyzed at least the half of IT subsystems. IT subsystems are: handling and transport unit, transport infrastructure, terminals and logistics centers, terminal network and transport organization, operators and associations, logistics strategies and telematics. In order for system to be overviewed, it is necessary for it to be identified as an independent area with its own problems and interventions.

Defined goals & measures signify concretized goals and measures: established responsible party and time horizon, connectedness of goals and measures as well as defined priority. In the next column number of those (in)directly connected to IT is shown. Measures of the same type are not numbered double (revitalization of different part of train tracks for instance). Croatia and Slovenia did not define fully but just connected goals and measures.

1.5 LPI

Logistics Performance Index (LPI) represents an important national and transnational factor when it comes to choosing country for investment. Companies are not choosing ones with the low LPI thus LPI is an investment factor.

LPI ranges from 0 to 5 where 5 is the best one. It is a synthetic parameter developed by World Bank, applicable worldwide. There are two types of it: domestic and international LPI. In first case LPI is obtained by interviewing domestic operators while international is obtained by operators having to rate business in other

[2] Zarad kasnije analize će ova vrednost biti pretpostavljena na 7 s obzirom na kvalitet dostupnih dokumenata a nedostupnost transportnog strateškog dokumenta

countries. Four or six areas respectively are ranked. Amon others, those are infrastructure, delivery time and customs procedures.

Reviewing the report from 2016. ranks of DR's countries is obtained (Fig. 1.11). It is necessary to mention that ranking when compared to neighboring countries is more important than global rank.

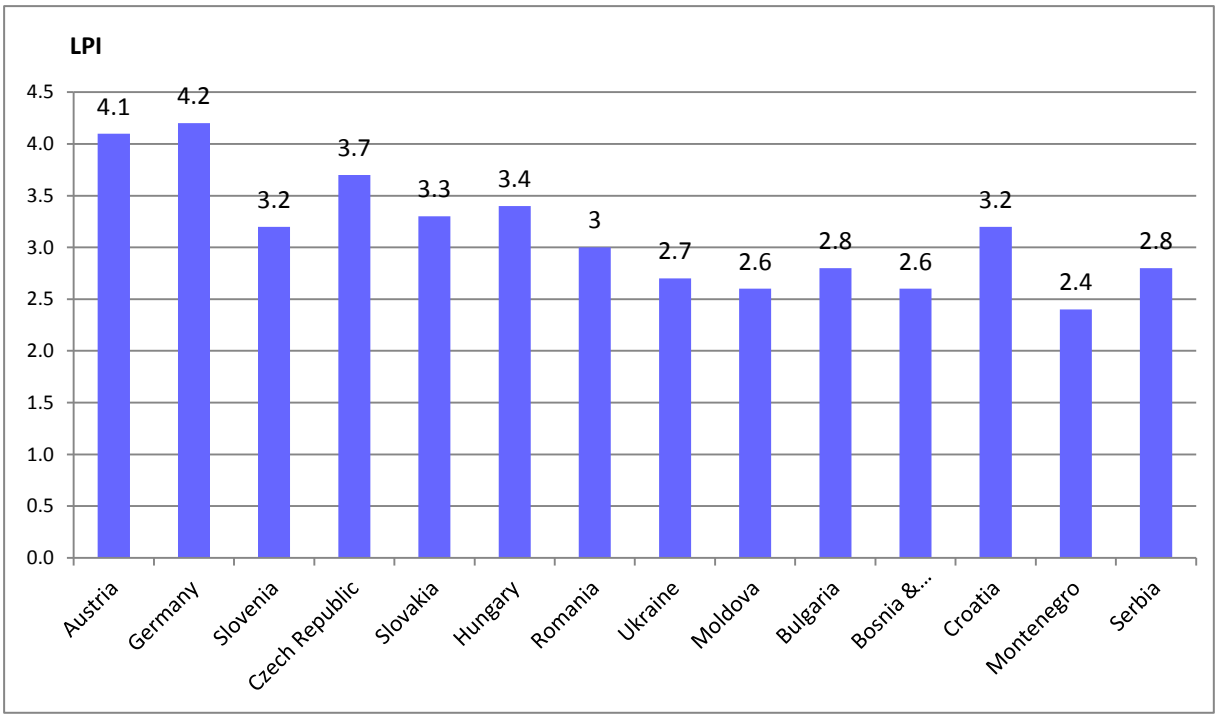


Fig. 1.11 LPI in Danube Region countries

International LPI (Table 1.19) shows the worst ranked and the best ranked areas by countries. International deliveries are related to easiness of contracting the best way of shipping.

Countries with the lower LPI are mostly landlocked without land bridges thus global connections are more difficult to make. According to LPI, all countries can be divided into four groups:

- *Excellent logistics* (I) – top 20% of the list; excellent performances in every aspect;
- *Good logistics* (II) – countries with better logistics parameters than other countries with the similar economic characteristics (second fifth);
- *Partial logistics* (III) – countries with the low and medium GDP with some good logistics parameters (3rd and 4th fifth) and
- *Poor logistics* (IV) – less developed countries with low GDP and bad logistics parameters (last fifth).

Table 1.19 International LPI by areas in different countries of Danube Region

Country	Areas and makrs							
	Customs	Infrastructure	International shipments	Logistics competence	Tracking & Tracing	Timeliness	Rank	Group
Germany	4,12	4,44	3,86	4,28	4,27	4,45	1	I
Austria	3,79	4,08	3,67	4,18	4,36	4,37	7	
Czech Republic	3,58	3,36	3,65	3,65	3,84	3,94	26	
Hungary	3,02	3,48	3,44	3,35	3,4	3,88	31	
Slovakia	3,28	3,24	3,41	3,12	3,12	3,81	41	II
Slovenia	2,88	3,19	3,1	3,2	3,27	3,47	50	
Croatia	3,07	2,99	3,12	3,21	3,16	3,39	51	
Romania	3	2,88	3,06	2,82	2,95	3,22	60	
Bulgaria	2,4	2,35	2,93	3,06	2,72	2,31	72	III
Serbia	2,5	2,49	2,63	2,79	2,92	3,23	76	
Ukraina	2,3	2,49	2,59	2,55	2,96	3,51	80	
Moldova	2,39	2,35	2,6	2,48	2,67	3,16	93	
Bosnia & Herzegovina	2,69	2,61	2,28	2,52	2,56	2,94	97	
Montenegro	2,22	2,07	2,56	2,31	2,37	2,69	123	

Source: The World Bank. 2016. Connecting to Compete

1.6 Defining micro regions

Comparing directly countries of DR could lead to "unreal picture" of analysis since some of them are among the most developed countries globally and some are less developed. In order to obtain a view of DR in its true state, countries are grouped into MRs.

MRs are defined upon previously established data, from chapter 1.1 to 1.5 and are given in Table 1.20. Network density is obtained by dividing the number of service providers (total 91) and surface are, multiplied by 10^4.

Countries are ranked using a method PROMETHEE *(*Preference Ranking Organization Method for Enrichment Evaluation*).* The ranking criteria are given in Table 1.20. In the first case (scenario 1), the ranking was done according to all previously described criteria (Table 1.21). In the second case (scenario 2) the intensity of intermodal transport is excluded (Table 1.22) because it is estimated for some countries (Chapter 1.2). The obtained ranking according to the scenarios, the flows of combined transport between countries (chapter 1.3.4, Table 1.14) and the geographical aspect make the parameters on the basis of which the micro regions were identified.

Table 1.20 Criteria for country ranking

Criteria	IT use (%)	No. of important terminals	Network density	Mark of document	LPI group
Weight of criteria	**3.5**	**3.5**	**2**	**1**	0.5
Bulgaria	4	0	19,02	5	3
Czech Republic	8	4	69,73	7	1
Germany DR	25,81	9	78,08	9	1
Croatia	2	1	53,00	6	2
Hungary	5	3	47,30	5	1
Austria	14	10	104,91	7	1
Romania	4	4	26,84	8	2
Slovenia	9	3	207,17	6,5	2
Slovakia	4	3	97,88	7	2
Montenegro	5,36	0	50,68	4,5	3
Serbia	6,42	0	29,42	4	3
Bosnia & Herzegovina	7	0	21,48	5	3
Moldova	11,39	0	41,36	4	3
Ukraine DR	12,38	3	33,78	3	3

Table 1.21 Rankings of coutnries using PROMETHEE, scenario 1

Country	Rang	Phi	Micro region
Germany	1	0,6464	1
Austria	2	0,5651	
Slovenia	3	0,2646	2
Ukraine	4	0,1764	
Moldova	5	0,0434	3
Czech Republic	6	0,0069	
Slovakia	7	-0,125	
Romania	8	-0,14	
Hungary	9	-0,1538	
BiH	10	-0,2236	4
Serbia	11	-0,2336	
Montenegro	12	-0,2336	
Croatia	13	-0,2446	
Bulgaria	14	-0,2953	

Table 1.22 Rankings of coutnries using PROMETHEE, scenario 2

Country	Rang	Phi	Micro region
Austria	1	0,5053	1
Germany	2	0,4384	
Slovenia	3	0,3409	2
Czech Republic	4	0,0376	3
Slovakia	5	0,0277	
Romania	6	0,0039	
Hungary	7	-0,0482	
Ukraine	8	-0,0532	
Croatia	9	-0,1271	4
Montenegro	10	-0,2032	
Moldova	11	-0,2139	
Serbia	12	-0,2275	
BiH	13	-0,2379	
Bulgaria	14	-0,2427	

Two different scenarios are used in order to determine sensitivity of results when changing input data. Order of the countries does not change significantly, except in the case of Moldova and Ukraine.

In the scenario 1, Ukraine is in the MR 2 while in the scenario 2 is in MR3. Moldova from MR 3 switches to MR 4. Unavailability of the data makes calculation more difficult. Including the geographical aspect and the ranking results, the grouping of countries into three Danube micro regions (DMR) was carried out. Slovenia is added to DMR 1, while Ukraine and Moldova belong to DMR 2 (Table 1.23).

Table 1.23 Identified micro regions based on country characteristics

Micro region	Countries
DMR 1	Germany, Austria, Slovenia
DMR 2	Czech Republic, Slovakia, Romania, Hungary, Moldova, Ukraina
DMR 3	Croatia, BiH, Serbia, Montenegro, Bulgaria

2 OVERVIEW OF IT PROBLEMS IN DANUBE REGION

Reviewing national strategic documents, 44 problems are identified (table 2.1) If a problem is not listed, that does not mean that it does not exist but that country has not identified it. For example, in Ukrainian and B&H (Bosnia and Herzegovina) documents lack of information systems (ITS) is not mentioned though it is a problem in most of the countries (86%). For a problem to be mentioned as identified, it is necessary that document itself deals with it: problem is described and recognized and actions for resolving it are proposed. Table 2.2 shows problems by country. Last column shows the percentage of countries recognized problem.

Table 2.1 Identified problems in strategic documents

Area	Problem	Order No.
Transport infrastructure	Railway tracks	1
	Allowed axle pressure (min 22.5 t/axle))	27
	Connectedness of city terminals	4
	Connectedness of hubs (other)	16
	Traveling time	8
	Maintenance plan	11
	Navigational conditions	34
Transport means	Obsolescence and lack of transport means	13
Terminal	Obsolete technology in terminals	2
	Will be lacking capacity in future	21
	Lack of space in ports	22
Terminals network	Lack of terminals	3
	Lack of Freight Villages	30
Institutional framework	Institutional framework	23
Law	Unregulated law related to IT	24
Finance	PPP	6
	Financing of the railways	15
	Non profitable companies (privatization)	29
	Financial sustainability and lack of funds in budget for railways	43
Environment	Energetic efficiency	10
	Lack of awareness of polluting	37
ITS	Lack of ITS applications, Lak of use of ITS	12
	Documentation	7
	Inaccessibility of statistical data	32
Border	Customs formalities and procedures	9

	Delays at border crossings	14
Management	Business transparency	26
	Business practice	28
	Exclusion of operators from international goods flow	31
	Capacity utilization	33
	Influence of a national railway operator	35
	Service offered	36
	Subventions use	39
	Centralized management of railways	40
	Non liberalized market	42
International cooperation	Absence of international cooperation	41
Goods flow	Freight flows trend	19
Projects	Lack of project for IT improvement	5
	Period of projects realization	25
	Projects regarding bottlenecks	38
	Researches and studies	44
Politics	Uncertain situation, problems with neighboring countries	20
Human resources	Training and educational programs	17
	Qualified human resources	18

Table 2.2 Identified problems by countries in strategic documents

Order No.	Romania	Bulgaria	Hungary	Slovakia	Moldova	Ukraine	Austria	Croatia	Germany	Serbia	Montenegro	Bosnia & Herzegovina	Czech Republic	Slovenia	Number of countries with identified problem	Frequency by countries (%)
1	1	1			1	1		1		1	1	1	1	1	10	71
2	1					1			1	1			1	1	6	43
3	1				1	1		1			1	1	1	1	8	57
4	1						1							1	3	21
5			1	1	1	1		1		1		1			7	50
6		1				1			1	1	1		1		6	43
7	1				1	1				1					4	29
8	1		1	1	1	1				1	1				7	50
9					1	1		1		1	1				5	36
10	1	1		1	1		1	1	1	1	1		1	1	11	79
11								1		1					2	14
12	1	1	1	1	1		1	1	1	1	1		1	1	12	86
13		1	1	1	1	1		1		1		1			8	57
14						1		1		1				1	4	29
15		1			1			1				1		1	5	36
16	1						1	1	1					1	5	36
17				1				1	1		1				4	29
18								1		1					2	14

19	1						1										2	14
20						1	1				1						3	21
21					1		1			1							3	21
22		1								1							2	14
23	1						1				1	1					4	29
24						1	1		1		1	1	1				6	43
25		1			1		1								1		4	29
26	1	1				1	1		1			1					6	43
27	1		1	1					1	1							5	36
28	1	1	1	1	1	1			1		1					1	9	64
29	1								1			1	1				4	29
30		1															1	7
31		1				1	1		1		1						5	36
32		1	1	1					1		1	1					6	43
33			1	1				1	1			1	1			1	7	50
34				1	1				1		1						4	29
35			1		1												2	14
36			1		1				1								3	21
37			1						1		1						3	21
38			1														1	7
39			1												1		2	14
40				1							1						2	14
41				1					1		1						3	21
42				1	1	1			1		1	1	1	1	1		9	64
43											1	1	1	1	1		5	36
44														1			1	7

Frequency of the areas in total identified problems is given in table 3.3. Assumption was that problem transport infrastructure (17,06%) is a most common one identified, but that was not the case– problems regarding management are (21,33%): from non-liberalized markets and poor business practices to poorly used resources capacities. Those problems are nonfinancial type. For example, problems related to IKS are recognized by most countries (86%), but they don't constitute the largest part of the problem (10.47%).

Table 2.3 Problems frequency by area

Area	Frequency (%)
Management	21,33
Transport infrastructure	17,06
ITS	10,43
Finance	9,48
Environment	6,64
Projects	6,16
Terminal	5,21
Border	4,27
Terminals network	4,27
Transport means	3,79
Human resources	2,84
Law	2,84
Institutional framework	1,90
International cooperation	1,42
Politics	1,42
Goods flow	0,95

2.1 The most important problems

In this group fall all problems that are representing the biggest obstacles to IT development. For example, those regarding infrastructure, law, institutional framework, customs and transport means (Table 2.4). Transport means and traffic infrastructure are of huge importance since they are subsystems of IT system without which it couldn't function.

Since law and institutional framework direct and build framework of business for different operators; as well as guide, provide or restrict it, they are also significant. Obstacles regarding customs on borders checks are usually caused by inefficient procedures. There is a tendency to shorten this time to 30 minutes and that does not require substantial investments.

Transport means obsolescence, especially in rail and inland waterways sectors, is a common problem not only identified in less developed countries. European network lacks of R type railcars since those are most wanted for IT – where the space for some other possibilities could emerge. Besides transport means, lack of intermodal units is also mentioned. Countries has identified that the most part of those are in the same ownership as the goods are. As in previous case, here is also space for resource savings.

Two problems are related to borders crossing and recognized as bottle necks in Europe time ago. Delays could be caused by durable procedures or flow density; while customs procedures could be complicated but done swiftly due to efficient systems (via ITS for example).

Table 2.4 The most important problems identified in strategic documents

Problem	Number of countries	Percent of countries recognized it (%)
ITS	6	86
Railway tracks	5	71
Lack of (convenient) terminals	4	57
Obsolesce and lack of transport means	4	57
Traveling time	3	50
Law in area of IT	3	43
Obsolesce technology in intermodal terminals	3	43
Customs procedures and formalities	2	36
Allowed axle pressure in railway domain (min 22.5t/o)	2	36
Connectedness of hubs (other)	2	36
Institutional framework	2	29
Navigational conditions	2	29
Delays at border crossings	2	29
Connectedness of city terminals	1	21
Total	42	

It could be seen that problems are not related only to one of decision levels. Dealing with systems problems requires systematic approach, at each level and in all areas, coordinated and with specified goals to achieve. It is not enough to improve railway tracks if borders delays are such that total travel time is not shortened.

Law related problems refer to unregulated business practices and conditions upon which everyday practice is done. In certain countries stimulating measures are introduced as well as some limitations and benefits to intermodal operators. It is obvious how much this is not studied and regulated concerning that only few of national strategic documents have a part dedicated only to IT. It is commonly gathered with railways. This is also related to institutional framework problem.

Institutional framework is made of with different bodies, agencies, associations, be it for coordination, national or transnational concerns in IT and logistics domain. Those could represent important support in international relations to domestic operators; guide and improve conditions of everyday business, promote and improve IT in whichever manner. This bodies could be first point of contact to foreign company involved in IT that looks to provide services or in opposite. At least that those could do is to provide useful information and guidelines that will lead to IT development while promoting it. Lack of such institutions could be seen in low percentage use of IT and different technologies on the market, lack of knowledge of ITs possibilities and the way of its functioning.

2.2 Nonfinancial problems

This type of problems is those for which resolving substantial amounts of resources are not needed. They (Table 2.5) are especially important since they are making

about half of all problems (47,87%) and could be dealt with less resources. From the field of "Finance", the implementation of the Public Private Partnership (PPP) model has a non-financial character. Area „Management" takes the most part of nonfinancial problems (44,55%).

Table 2.5 Non-financial problems identified in strategic documents

Area and problems	Frequency (%)
Environmental	1,42
Lack of awareness of polluting	1,42
Finance	2,84
PPP	2,84
Border	4,27
Customs formalities and procedures	2,37
Border delays	1,90
ITS	2,84
Unavailability of statistical data	8,84
Institutional framework	1,90
Institutional framework	1,90
International cooperation	1,42
Lack of international cooperation	1,42
Politics	1,42
Uncertain situation, problems with neighboring countries	1,42
Management	21,33
Centralized management in railways	0,95
Exclusion of operators from international networks	2,37
Resource utilization	3,32
Use of subventions	0,95
Non liberated market	4,27
Service packages offered	1,42
Company practice	4,27
Business transparency	2,84
Nacional railway operator influence	0,95
Projects	5,69
Nonexistent project for IT development	3,32
Period of projects realization	1,90
Bottle neck projects	0,47
Human resources	0,95
Qualified human resources	0,95
Goods flow	0,95
Goods flow trend	0,95
Law	2,84
Unregulated law in area of IT	2,84
Total	47,87

Poor company practice, as the biggest problem, beside non-liberalized market, is composed of irrational use and allocation of resources, lack of cooperation among companies and inefficient choice of supply, railway operators which those not compete with other companies and other companies whose business is not efficient, effective and ecological (EEE).

Low capacity use of recourses is commonly connected to railways cars and terminal recourses. This problem is viewed apart from company practice since it can be coupled, but it is not mandatory. At least, it is clear that company management takes great part in problems.

Non liberated market problem refer to services providing in railway sector where monopoly has usually one state owned company, though it could be related to unequal conditions of access to services provided by logistics centers and terminal for different parties.

Bad national railway operator influence is identified as a problem in 2 countries, one of them EU country. Since cargo has been for very long time transported by rail, railway carriers stopped competing and started waiting for freight to come be itself. Then, railway lost the competitor battle. It could be seen today that goods that should be naturally transported by rail are carried by road due to poor service conditions offered by railways operators.

Service packages offered (identified in 3 countries) is described as inadequate, non-existent or poor service offered by logistics companies or carries in railway and inland sector. It can result from not understanding user's needs, inadequate completion conditions or lack of knowledge.

Lack of projects and studies regarding IT as well as long period of projects realization are problems occurring in both more or less developed countries. Lack of qualified human resources, politics problems and business transparency are typical ones found in less developed countries. Only problem that is common for more developed countries is the lack of ITS.

Inadequate data bases are great problem. Namely, countries use simulation models (National Transport Model in strategy for Romania, or in Slovenian document) in order to determine the best actions and scenarios or long and short term development. However, to do that, it is necessary to have valid and time determined data. This problem is identified in six countries, mostly in less developed countries.

Business transparency is identified as a problem in six less developed countries. It is considered that it could be resolved by „making" companies to work so the insight in their business is possible. For example, transparency in human resource managing, infrastructure investments and resource distribution.

Exclusion of operators from international networks is inevitable when we notice the lack of terminals network, compatible technologies along a chain (which has to be uninterrupted), institutional framework, inadequate use and presence of subventions, nonexistent financial aid and/or PPP and other that are of great influence on presence of operators in international trade links. Besides mentioned, great impact has a poor business practice (possibly caused by untrained human resources).

In „service packages offered" fall services offered by logistics providers and carriers. It is identified in Hungary, Croatia and Moldova. It can be connected to lack of full package service, that is VAL services (Value Added Logistics). In Moldova this problem is conspicuous since Moldova does not have a modern terminal.

Use of subventions is often not defined properly. In Serbian document there is a mention of subventions, but in practice it is hard to get to them as well as to information that would say something more about it. Besides being unapproachable, they could also be displaced without concrete goal or problem resolved by it.

When talking about centralized management, it is considered that financial resources are already consumed by managing it decentralized (and less efficiently). For resolving these problems substantial amount of financial resources are not needed compering to other type of problems that are financial type.

Finally, it is important to remember that even the smallest impact on an area that makes a large share of problems (ABC rule) has significant results. Likewise, solving one problem can solve many others and achieve more goals. It is therefore important in the definition of actions to have a wider picture and to determine the priority of the implementation of interventions according to their contribution.

2.3 Financial problems

Financial problems (Table 2.6) are those for whose solving substantial amount of financial resources are needed. Typical problems are transport infrastructure (especially railway infrastructure), intermodal terminals and network of terminals.

Table 2.6 Financial problems identified in strategic documents

Area and problems	Frequency (%)
Environment	5,21
Energetic efficiency	5,21
Finance	6,64
Financial sustainability and lack of funds in budget for railways	2,37
Financing of railways cars	2,37
Unprofitable companies (privatization)	1,90
ITS	7,58
Lack of ITS applications, Lak of use of ITS	5,69
Documentation	1,90
Terminals network	4,27
Projects	0,47
Researching, studies	0,47
Human resources	1,90
Training and educational programs	1,90
Terminal	5,21
Will be lacking capacity in future	1,42
Lack of space in ports	0,95
Obsolete technology in terminals	2,84
Transport infrastructure	17,06
Allowed axle pressure (min 22.5 t/axle))	2,37
Maintenance plan	0,95
Navigational conditions	1,90
Connectedness of city terminals	1,42
Connectedness of hubs (other)	2,37
Traveling time	3,32
Railway tracks	4,74
Transport means	3,79
Obsolescence and lack of transport means	3,79
Total	52,13

2.4 Problems in respect of micro regions

Problems identified in each micro regions (MR) are show by area. Some of MRs have more countries then other. Result of comparing MRs is bringing up tree top areas regarding the number of problems (second columns, 3rd is frequency compared to total number of problems in that area from all countries gathered). Problems in MRs are shown in tables 2.7, 2.8 and 2.9.

Table 2.7 Problems in MR1

Area and problems	No.	Frequency (%)
Transport infrastructure	7	19
Management	4	9
Terminal	4	36
Environment	3	21
ITS	3	14
Financing	2	10
Border	1	11
Terminals network	1	11
Human resources	1	17

Table 2.8 Problems in MR2

Area and problems	No.	Frequency (%)
Environment	4	28,57
Finance	4	20,00
Border	2	22,22
ITS	8	36,36
Institutional framework	2	50,00
International cooperation	1	33,33
Terminals network	3	33,33
Politics	1	33,33
Management	17	37,78
Projects	8	61,54
Human resources	1	16,67
Goods flow	2	100,00
Terminal	5	45,45
Transport infrastructure	13	36,11
Transport means	3	37,50
Law	1	16,67
Total	75	35,55

Table 2.9 Problems in MR3

Area and problems	No.	Frequency (%)
Environment	7	50,00
Finance	13	65,00
Border	6	66,67
ITS	11	50,00
Institutional framework	2	50,00
International cooperation	2	66,67
Terminals network	5	55,56
Politics	2	66,67
Management	24	53,33
Projects	5	38,46
Human resources	4	66,67
Goods flow	0	0,00
Terminal	2	18,18
Transport infrastructure	16	44,44
Transport means	5	62,50
Law	5	83,33
Total	109	51,66

Areas of greatest number of problems in all micro-regions are ***transport infrastructure and ITS***. Not including MR1, area Management accounts for the most number of problem, especially in MR3.

Less developed countries meet problems such as lack of political support to IT and cost efficient solutions on longer distance lines, lack of logistics centers and terminals. Besides mentions, there are also long turnaround time of flat railway car and ownership of intermodal units, uncompetitive prices in ports and terminals, Non liberated market and lack of business transparency.

Great part of problems in financial area is contributed from these countries. MR1 accounts for problem regarding PPP while in other MRs it is connected to railways financing and its financial sustainability.

Comparison of types of problems is given in Fig. 2.1. All results are obtained from analyzing national strategic documents. If problem is not listed, it means that country does not recognize it, not that it does not exist.

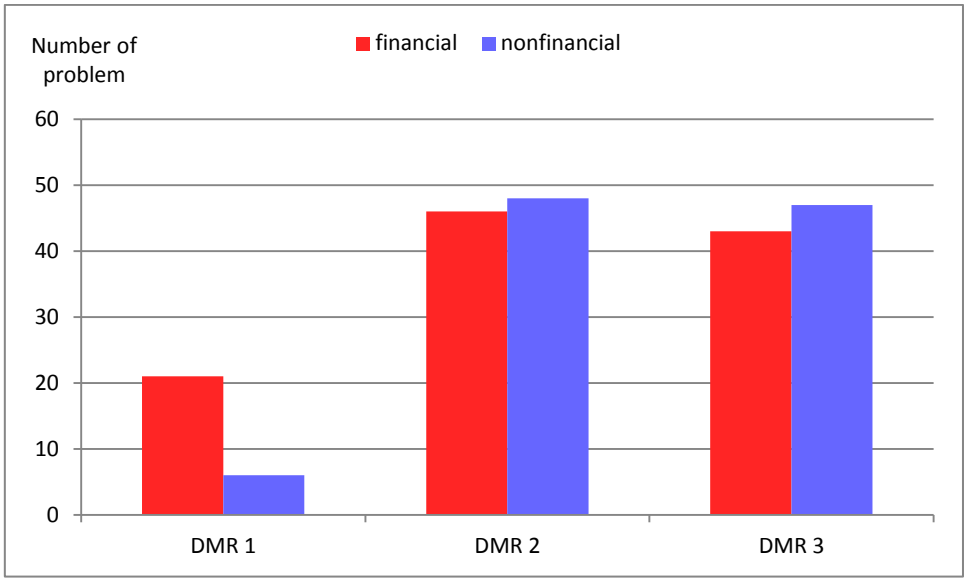


Fig. 2.1 Number of problems in MRs by type

The most part of problems is contributed from MR3 and as for non-financial problems, the most part of them are in the area of management. In group of financial ones, problems in area of transport infrastructure are the most contributing. Problems in area of management are contributing greatly to presence of domestic operators in international markets (Table 2.10). The biggest one, identified in five of six countries in MR3 is non liberated market. Problem connected to useo f subventions is not identified in neither country.

Table 2.10 Problems in areas of Bussiness and Infrastructure of MR3

Problems in different areas	No.
Management	24
Non liberated market	5
Exclusion of operators from international networks	4
Company practice	4
Business transparency	4
Resource utilization	3
Service packages offered	2
Centralized management in railways	1
Nacional railway operator influence	1
Transport infrastructure	16
Railway tracks	6
Navigational conditions	3
Traveling time	3
Maintenance plan	2
Allowed axle pressure (min 22.5 t/axle))	1
Connectedness of hubs (other)	1

The main problem in area of transport infrastructure is in relation to railway tracks and is present in each country of MR3. Meanwhile, connectedness of city terminals is

not identified. Problem of lack of Freight villages (FV) is identified in only one country – Bulgaria.

Problems related to management are the most contributing in MR2 as well (Table 2.11). For example, this problem identified in Romanian document is described as „poor business practice and lack of sophisticated technologies in resources of CFR Marfa" where the solution is seen in privatization of the company. When it comes to infrastructure, traveling time on railway is the biggest one with low traveling speed.

Meanwhile, problems such as financing of railways (focus on railways cars), lack of maintaince planning and lack of space in ports are not identified. Unique problems for this MR (identified only in this group) are projects for bottle necks (Hungary) and need for projects related to reasearch and studying in area of logistics (Czech Republic). Many of the countries are aware of bottle necks, but they did not set up systematic aproach for resolving it.

Table 2.11 Problems in areas of Bussiness (Management) and Infrastructure of MR2

Problems in different areas	No.
Management	17
Company practice	4
Non liberated market	3
Resource utilisation	2
Use of subventions	2
Business transparency	2
Centralized management in railways	1
Exclusion of operators from international networks	1
Service packages offered	1
Nacional railway operator influence	1
Transport infrastructure	13
Traveling time	4
Allowed axle pressure (min 22.5 t/axle))	3
Railways tracks	3
Navigational conditions	1
Conectedness of city terminals	1
Conectedness of hubs (other)	1

MR1 is consisted of Slovenia, Germany and Austria. Even though it has important river Sava (Slovenia), only navigatable one from Sisak to Belgrade and at which there is almost nonexistent intermodal traffic, it is not mentioned as a navigatable problem in Slovenian document (Table 2.12). MR1 also includes Austria and Germany which as well have problems in area of transport infrastructure in relation to conectedness of terminals and allowed axle pressure. In „Conectedness of hubs (other)", other is for all hubs and terminals that are not city terminals.

Table 2.12 Problems in areas of Bussiness (Management) and Infrastructure of MR1

Problems in different areas	No.
Management	4
Services offer	2
Non liberalized market	1
Resource utilisation	1
Transport infrastructure	7
Conectedness of hubs (other)	3
Conectedness of city terminals	2
Allowed axle pressure (min 22.5 t/axle))	1
Railway tracks	1

Finally, it is important to remind once again that even small effort made in area that is contributing considerably can make immensive results. Solving one problem can help in achieving more then one goal. That is why it is important to percive „whole picture" in order to establish goals and actions as well as the priorities of interventions according to benefits.

3 INTERMODAL TRANSPORT QUALITY STUDY

In order to determine real state of IT in DR, research based on questioners, both for users and providers, has been done. Team of experts from Faculty of Transport and Traffic Engineering has defined two groups of questineeres (for users and providers, appendix 1 and 2) with a goal to determine needs and conditions of everyday work, problems and wishful state of the system i. e. quality of IT services.

Given that the number of users and providers is immense in IT chains within DR and that study is limited, minimum for realizing study has been defined as following: 70 filled in questionariees for both providers and users from each of 14 countries. Project team has chosen method of purposive sample with criteria company's importance (market share) and company's ownership. For each of 14 countries in DR sample with 5 to 40 main users (cosignors and consigners – trading, manufacturing and other companies) and from 10 to 40 services providers (terminal and intermodal operators, main logistics and railway providers, shipping agents and others) with a focus on companies in private sector. In a manner to assure a representative sample, Managing group dedicated to priority area b1 (SG PAb1) has been asked for verification and complementation of lists of companies, especially regarding list of IT users.

Questineeries has been sent to over 800 mail addresses. Results of multiple e-mails resending with a request for questinery filling in have been poor, which caused additional engagement and prolonged time spent in researching. Members of project team has been presented on multiple regional scienctif and business gathering and conferences with an aim to animate companies and get questionerees filled in. This approach has had an limitied success (having 15 completed questionarees). The most part of ascuaried questionarees is the result of personal contacts (more than 50% of them). It is important to emphasize that the biggest problem was with Ukraine and Molodva in which case, with the help of members of Managing group for priority area b1, has been ascquaried one and two complete questinerees for both groups, respectively.

A survey has been closed on 20.04.2018 and the result of it is 147 filled in questineeres: 71 for users and 76 for providers of IT (Table 3.1). Number of complited questineeres differ depending on the country. Reason lies in better personal contacts of project team members with the companies in Serbia and region.

After survey closing up, obtained questineeries has been analyzed. Answers has been analyzed on national level and MR level as well as DR level, separating two groups. Results follow in chapters 3.1 and 3.2.

Table 3.1 Filled questionnaires by countries

Danube micro region	Country	Users	Providers	Total
DMR 1	Austria	4	4	8
	Germany	4	5	9
	Slovenia	5	7	12
DMR 2	Czech Republic	4	5	9
	Slovakia	4	6	10
	Hungary	4	5	9
	Romania	5	5	10
	Ukraine	1	1	2
	Moldova	2	2	4
DMR 3	Bulgaria	4	5	9
	Bosnia & Herzegovina	10	6	16
	Croatia	5	8	13
	Montenegro	6	6	12
	Serbia	13	11	24
Total		**71**	**76**	**147**

3.1 Analysis results of questineeres for intermodal transport users

Questineery contained made of 14 questions (appendix 1). Last one was intended for additional suggestions regarding IT development on both national and DR level. Processing of answers gave the following results.

Quality of intermodal transpot across countries

Rating of IT services quality by users (Table 3.2) differ signifantly accross countries and vary from very high in Austria and Germany, high in Czech Republic to very poor in Moldova and Serbia, primarily in Bosnia & Herzegovina.

When it comes to MRs, rating of IT services quality by users corresponds with the analysis when defining of them. Rating of IT quality in MR1 is high, sometning lower in Slovenia, in MR2 is a moderate (with an exepion of Czech Republic where is higher) and Moldova (lower). In MR3 is low with the exepsion of Croatia and Montenegro where is something higher (Table 3.2, Fig. 3.1).

In DR, users rated quality of IT as moderate (around 40%) and poor (around 28%). However, final rating of IT quality in DR is moderate when considering that about 29% of users ranked it as very high and high (Tablle 3.2, Fig. 3.2).

Table 3.2 Intermodal transport quality in Danube Region ranked by users

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Very high	75.0	75.0	0.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	46.2	5.0	2.6	11.3
High	25.0	25.0	20.0	75.0	50.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	7.7	23.1	30.0	7.9	16.9
Medium	0.0	0.0	80.0	0.0	50.0	50.0	80.0	100.0	50.0	75.0	20.0	60.0	33.3	30.8	30.8	50.0	36.8	39.4
Low	0.0	0.0	0.0	0.0	0.0	25.0	20.0	0.0	50.0	25.0	70.0	20.0	33.3	46.2	0.0	15.0	44.7	28.2
Very low	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	15.4	0.0	0.0	7.9	4.2
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

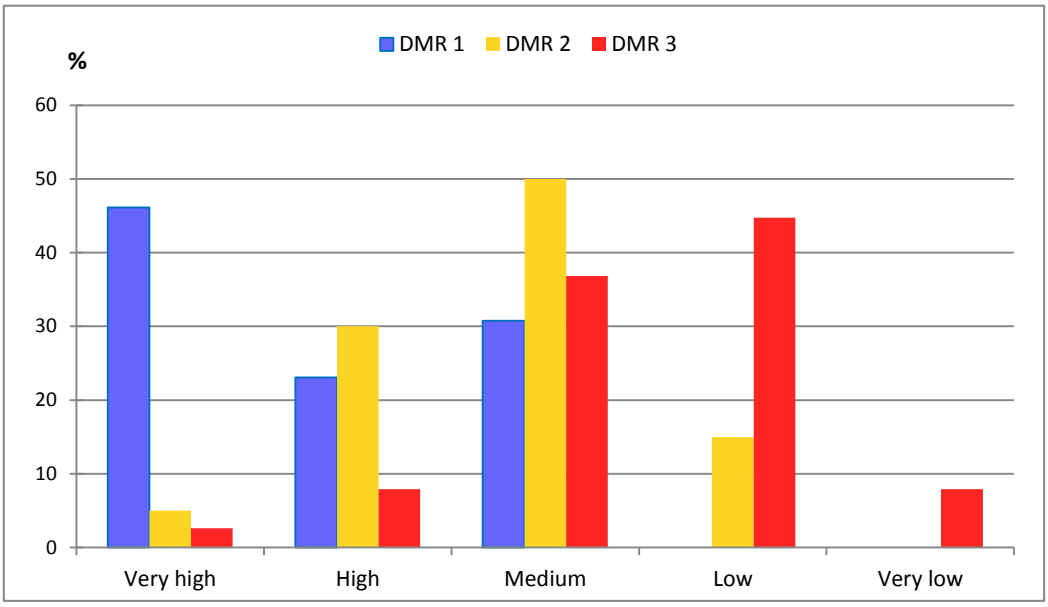


Fig. 3.1 Intermodal transport quality in MRs ranked by users

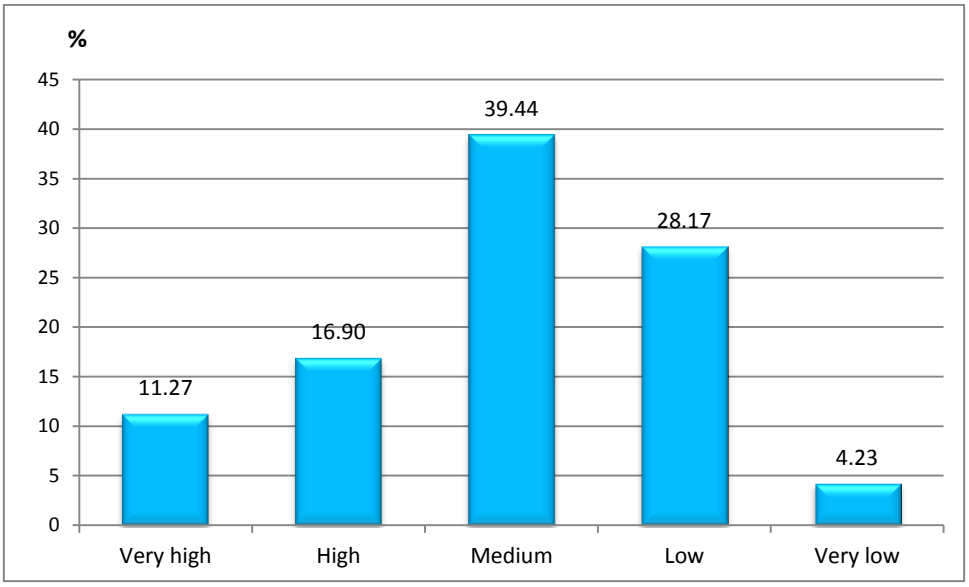


Fig. 3.2 Intermodal transport quality in Danube Region ranked by users

Intermodal transport services offer in countries

Offer is the best ranked in Germany and Czech Republic. The poores rated offer is in Moldova and Bulgarian, Serbia and Bosni & Herzegovina (Table 3.3).

Table 3.3 Ocena ponude usluga operatora intermodalnog transporta u zemlji – korisnici usluga

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Very good	50.0	100.0	0.0	75.0	25.0	50.0	0.0	0.0	0.0	0.0	0.0	20.0	16.7	7.7	46.2	30.0	7.9	21.1
Adequate	50.0	0.0	100.0	25.0	50.0	50.0	80.0	100.0	50.0	50.0	70.0	80.0	83.3	53.8	53.8	55.0	65.8	60.6
Poor	0.0	0.0	0.0	0.0	25.0	0.0	20.0	0.0	50.0	50.0	30.0	0.0	0.0	38.5	0.0	15.0	26.3	18.3
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

In case of MRs, service offer in MR1 is rated as very good with the exepsion of Slovenia where is adequate as in MR2, while in MR3 it is poorer (Table 3.3, Fig. 3.3). It can be concluded that differences among MRs are greater when it comes to quality of IT than IT services offer. In DR, users rated IT service offer as adequate (Table 3.3, Fig. 3.4).

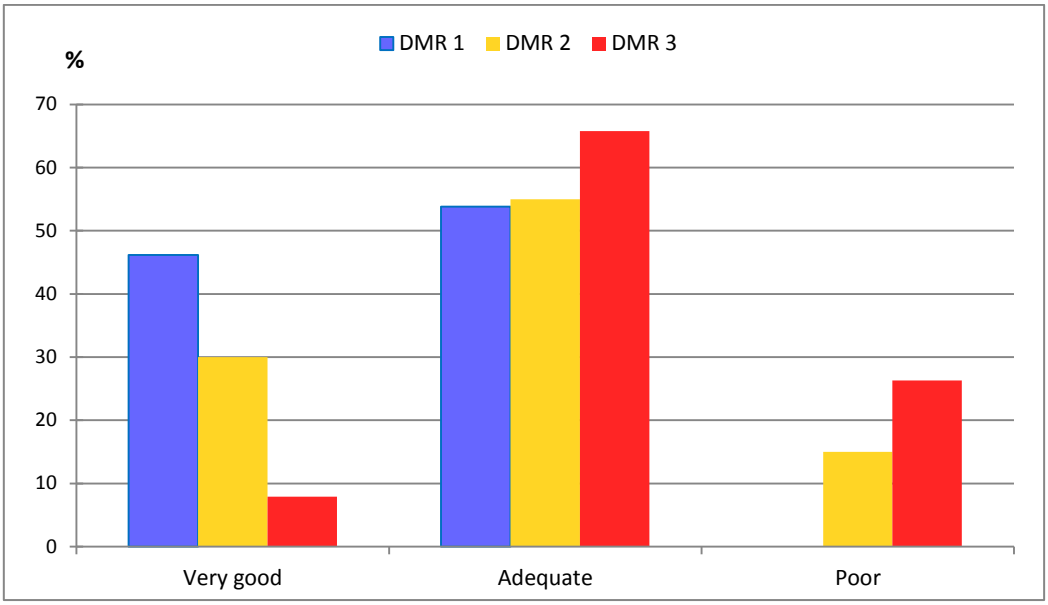


Fig. 3.3 Offer of intermodal transport services in MRs ranked by users

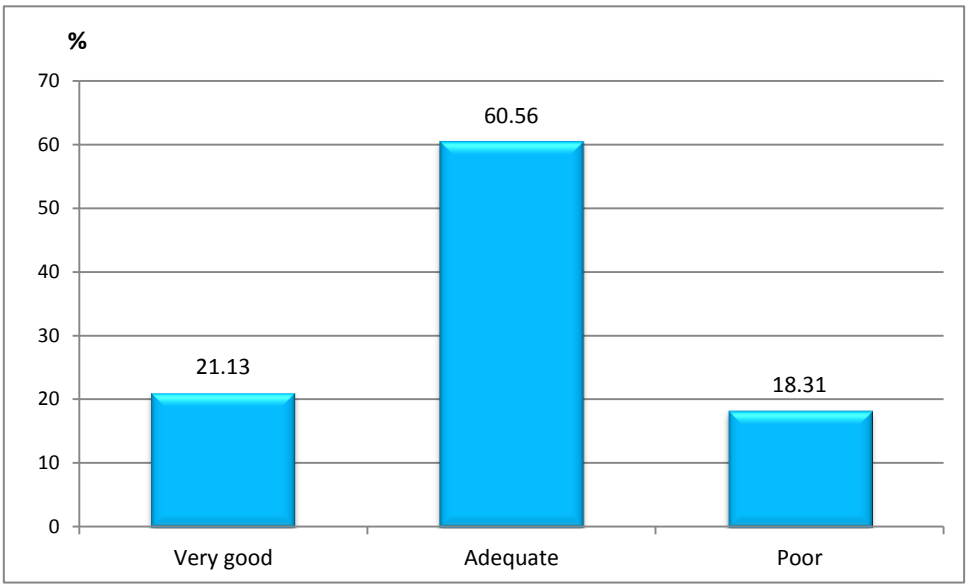


Fig. 3.4 Offer of intermodal transport services in Danube region ranked by users

Lead time in intermodal transport chains

Lead time in intermodal transport is the best rated in Germany, Austria and Czech Republic. The lowest rated is in Moldova, Romania and Serbia (Table 3.4).

When it comes to MRs, users in MR1 are satisfied with delivery time, with the exepction of Slovenia where this parametar is significantly lower. Average rate of delivery time in MR2 is moderate with a great variations among countries (in Czech Republic users are better satisfied while in Moldova and Romania time is rated as long). In MR3 users are less satisfied with deliverz time with the excepion of Montenegro where average delivery time is ranked as moderate (Table 3.4, Fig. 3.5). Time delivery in DR is evaluated as moderate (Table 3.4, Fig. 3.6).

Table 3.4 Lead time in intermodal transprot chains rated by users in Danube region

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Very short	50.0	25.0	0.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.1	5.0	0.0	5.6
Short	25.0	75.0	0.0	50.0	50.0	50.0	0.0	100.0	0.0	0.0	10.0	0.0	33.3	0.0	30.8	35.0	7.9	19.7
Medium	25.0	0.0	80.0	25.0	50.0	50.0	20.0	0.0	0.0	75.0	60.0	80.0	33.3	46.2	38.5	30.0	55.3	45.1
Long	0.0	0.0	20.0	0.0	0.0	0.0	80.0	0.0	100.0	25.0	30.0	20.0	33.3	46.2	7.7	30.0	34.2	28.2
Very long	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7	0.0	0.0	2.6	1.4
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

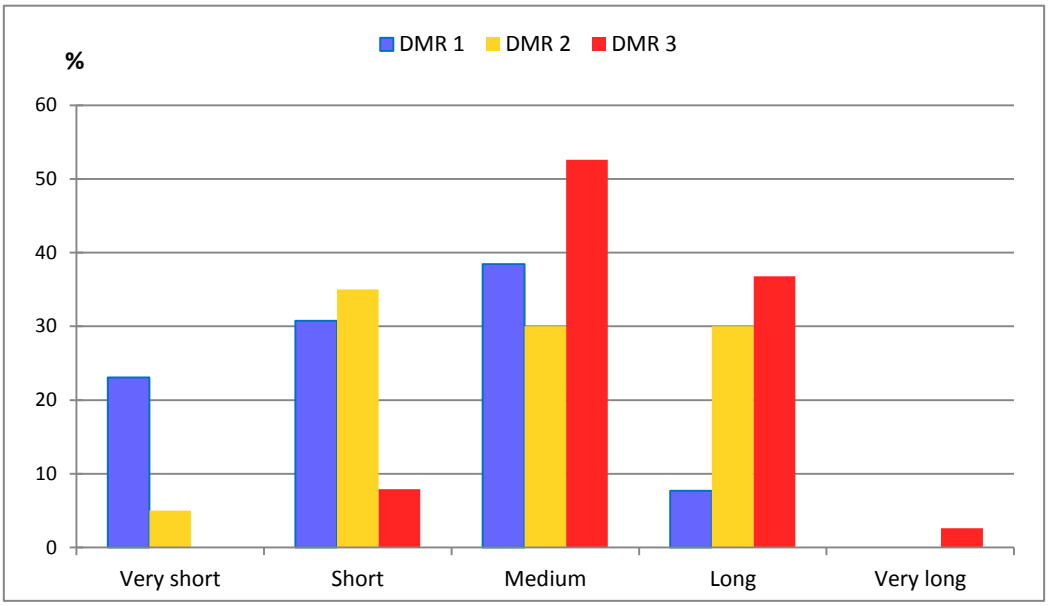


Fig. 3.5 Lead time in intermodal transprot chains rated by users in MRs

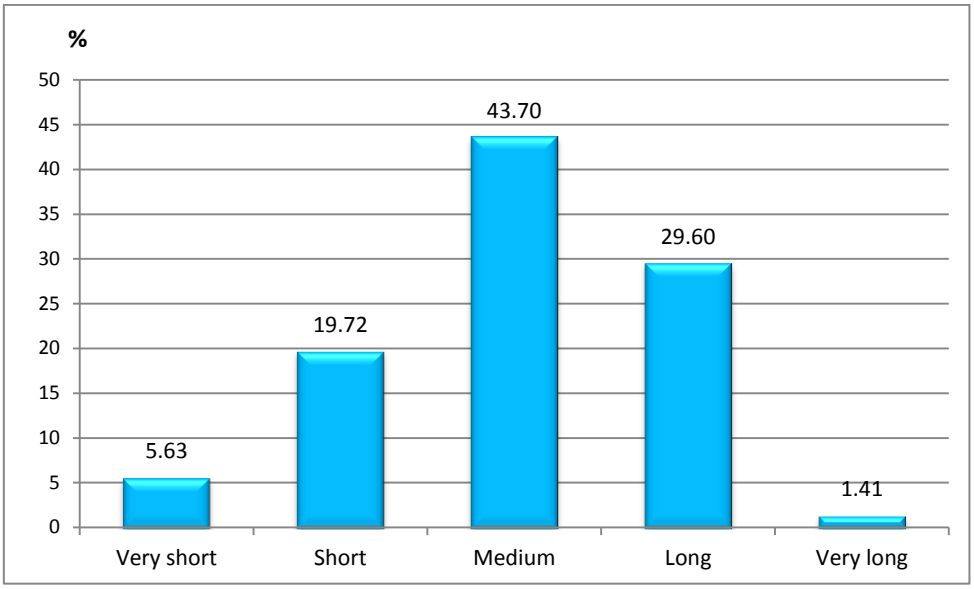


Fig. 3.6 Lead time in intermodal transprot chains rated by users in Danube region

Cene usluga intermodalnog transporta

Prices of intermodal transport services

Prices are evaluetad as moderate. This parameter of IT quality is the lowest rated in Montenegro and Moldova and the best rated in Slovakia and Serbia (Table 3.5).

Differences in prices among MRs are not that expressed and are moderate in average. Significant deviations are shown between MR1 and MR3 (Table 3.5, Fig. 3.7). This result shows that prices do not have improtant impact on general ranking of TI quality. Given that price of IT is rated similar across MRs, on the level of DR its rank is average (Table 3.5, Fig. 3.8).

Table 3.5 Intermodal transport prices in Danube Region ranked by users

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
High	25.0	0.0	0.0	0.0	0.0	25.0	20.0	0.0	50.0	0.0	0.0	20.0	83.3	7.7	7.7	15.0	18.4	15.5
Medium	75.0	75.0	100.0	75.0	50.0	75.0	80.0	100.0	50.0	100.0	90.0	60.0	16.7	46.2	84.6	70.0	60.5	67.6
Low	0.0	25.0	0.0	25.0	50.0	0.0	0.0	0.0	0.0	0.0	10.0	20.0	0.0	46.2	7.7	15.0	21.1	16.9
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

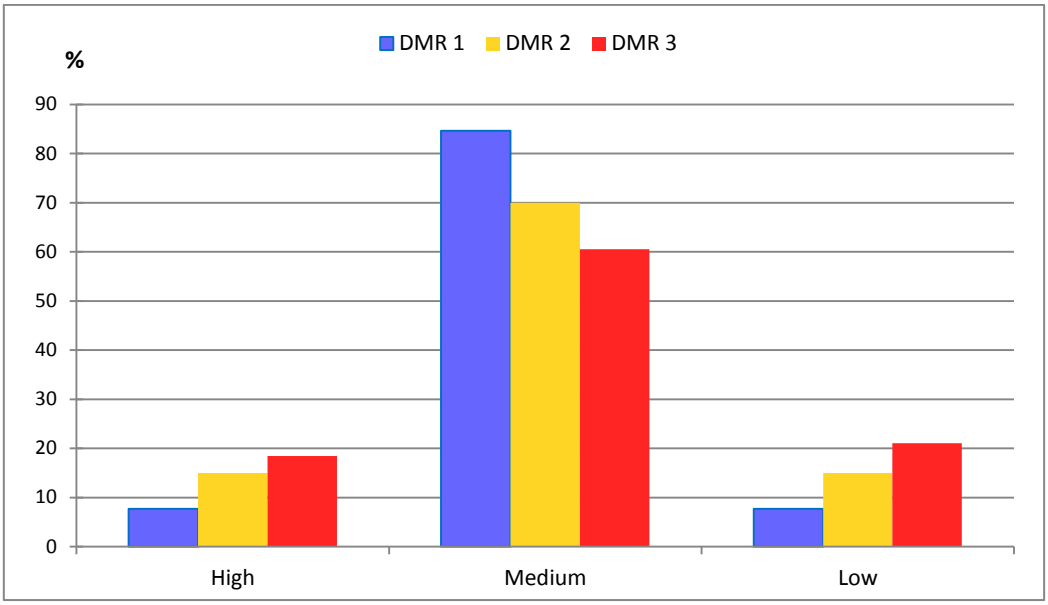


Fig. 3.7 Intermodal transport prices in MRs ranked by users

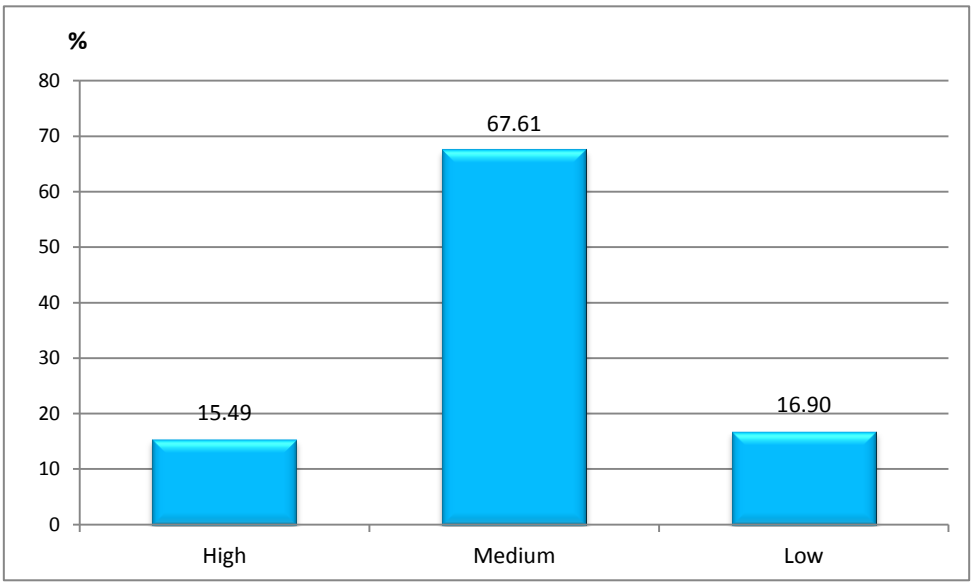


Fig. 3.8 Intermodal transport prices in Danube Region ranked by users

Connection of business centers with intermodal transport chains

Connection of business centers is rated dominantly as satisfying in Germany, Czech Republic and Hungary and dominantly bad in Bulgaria and Moldova, Serbia and Croatia (Table 3.6). It is improtant to mention that it is rated as very good only by the part of users in Slovenia and Montenegro, and as very bad in Montenegro and Bosnia & Herzegovina.

When MRs are in question, conectedness differ, but not significantly. In MR1 is mainly satisfying, but differences are not that expressed. In MR1 it is satisfying, in MR2 is between satisfying and bas while in MR3 is mainly bad even though variations are the biggest in this MR (Table 3.6, Fig. 3.9). When DR is in question, over 50% of

users rated as bad, even though final rank is between satisfying and bad (Table 3.6, Fig. 3.10).

Table 3.6 Connections of bussines centers with intermodal transport chains in Danube region ranked by users

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Very good	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	7.7	0.0	5.3	4.2
Adequate	50.0	75.0	40.0	75.0	50.0	75.0	40.0	100.0	0.0	0.0	60.0	20.0	16.7	15.4	53.8	55.0	26.3	39.4
Poor	50.0	25.0	40.0	25.0	50.0	25.0	60.0	0.0	100.0	100.0	30.0	80.0	16.7	84.6	38.5	45.0	60.5	52.1
Very poor	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	33.3	0.0	0.0	0.0	7.9	4.2
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

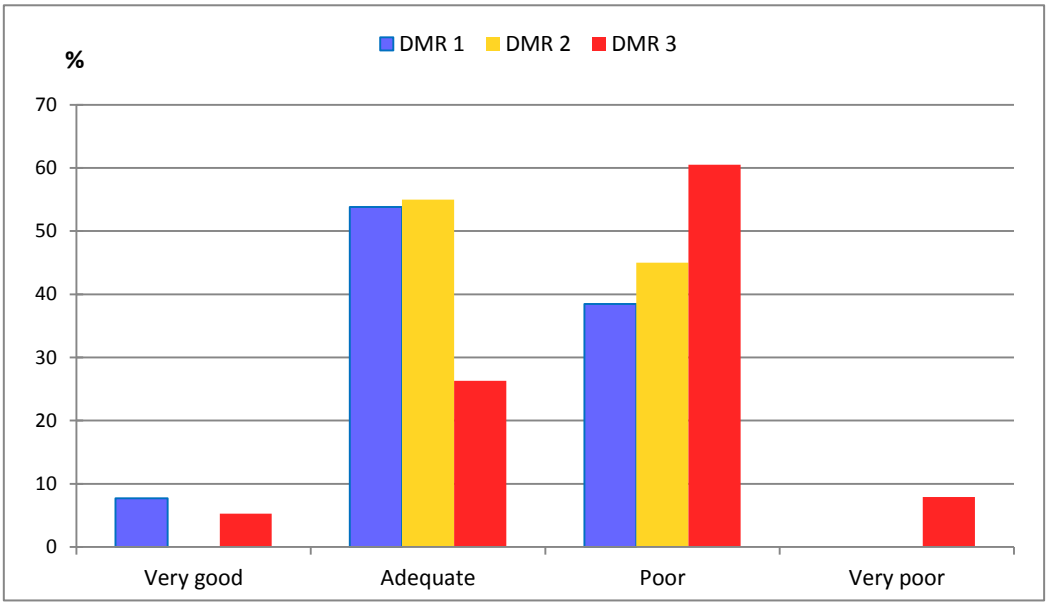


Fig. 3.9 Connections of bussines centers with intermodal transport chains in MRs ranked by users

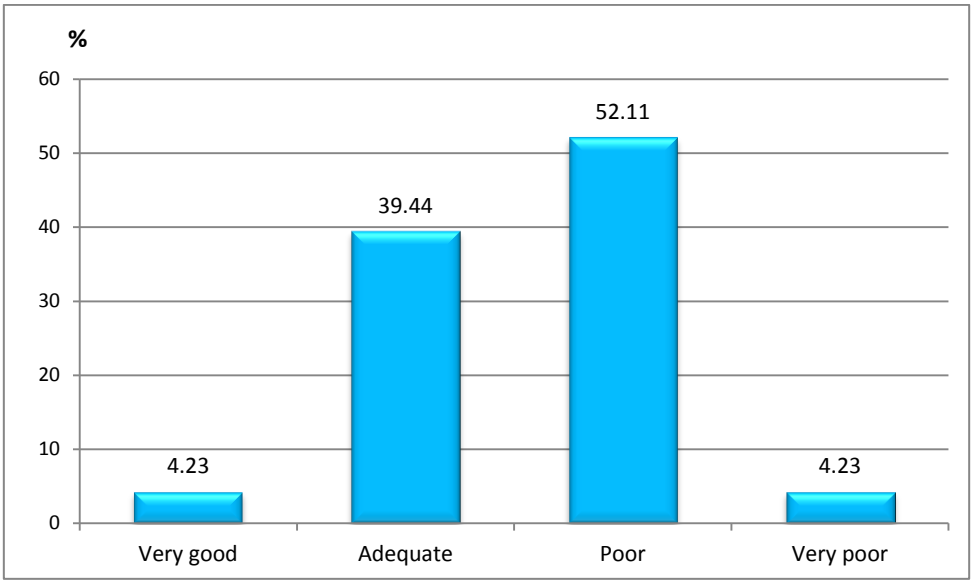


Fig. 3.10 Connections of bussines centers with intermodal transport chains in Danube region ranked by users

Level of development of intermodal transport network and market coverage

Level of development of terminals network is the best rated in Germany, Czech Republic and Austria, while it is the lowest in Bosnia & Herzegovina, Serbia and Moldova (Table 3.7).

When it comes to MRs rankings differ significantly. In MR1 level of development is rated as high, with the exsepcion of Slovenia where it is rated as moderate; in MR2 as moderate and in MR3 as low with the notable number of users that rated it as very bad (30%) (Table 3.7, Fig. 3.11). In DR users rated level of development as moderate and loow (Table 3.7, Fig. 3.12).

Table 3.7 Level of development of intermodal transport network and markt coverage ranked by users

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Very high	0.0	25.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7	10.0	0.0	4.2
High	75.0	50.0	40.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	7.7	53.8	10.0	7.9	16.9
Medium	25.0	25.0	20.0	50.0	50.0	50.0	80.0	100.0	0.0	100.0	20.0	40.0	0.0	7.7	23.1	55.0	23.7	32.4
Low	0.0	0.0	40.0	0.0	50.0	0.0	20.0	0.0	100.0	0.0	20.0	60.0	33.3	53.8	15.4	25.0	36.8	29.6
Very low	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.0	0.0	33.3	30.8	0.0	0.0	31.6	16.9
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

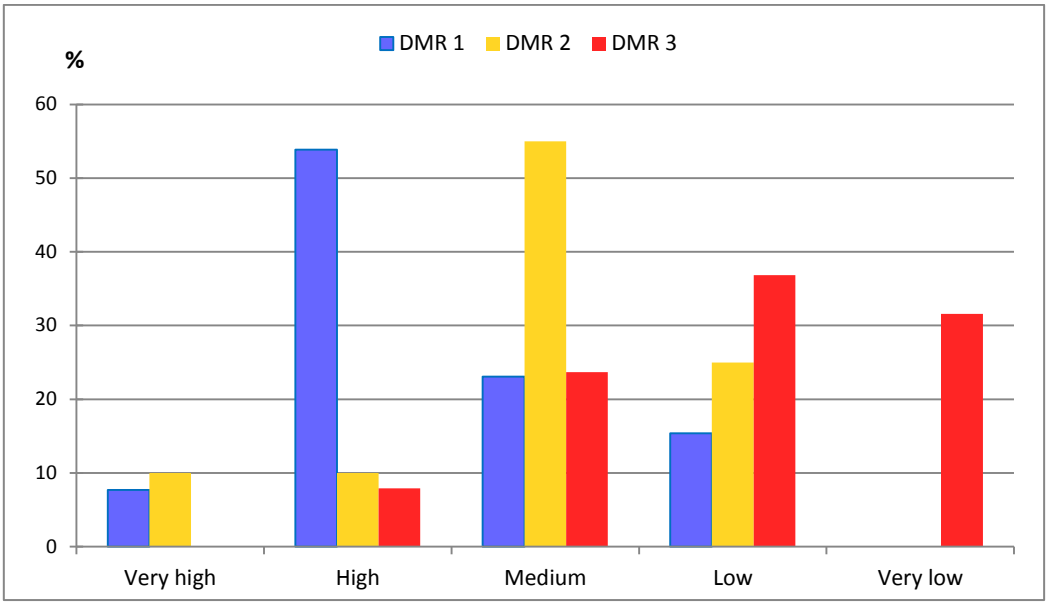


Fig. 3.11 Level of development of intermodal transport network and markt coverage in MRs ranked by users

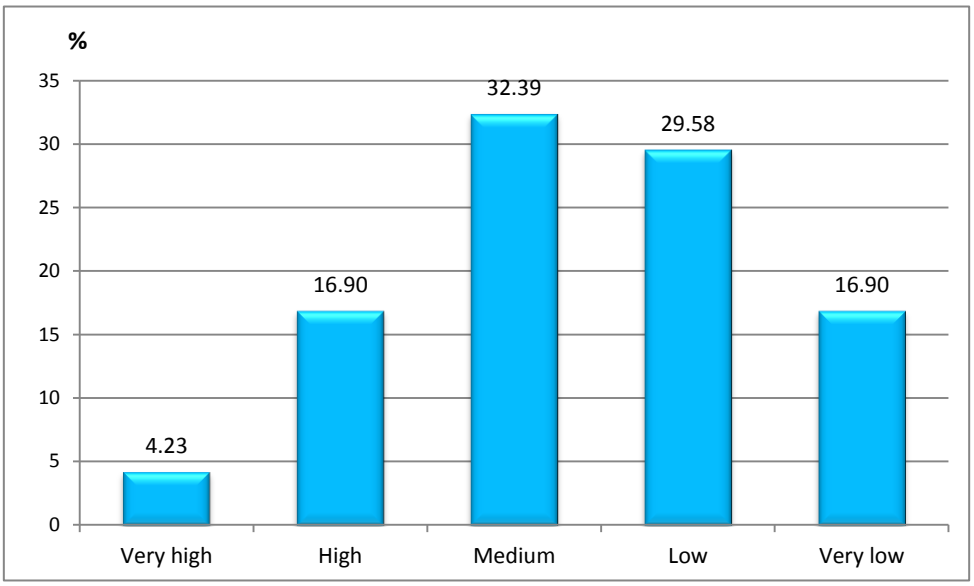


Fig. 3.12 Level of development of intermodal transport network and markt coverage in Danube region ranked by users

Accessibility of intermodal transport

Accessibility of intermodal transport is the best rated in Austria and Germany and the poores rated in Bosnia & Herzegovina, Croatia and Serbia and Moldova (Table 3.8). Even though the development of IT terminals in Austria is rated worse than in Germany and Czech Republic, ranking of accessibility is better, expecialy when compered with Czech Republic. Ranking of accessibility in Czech Republic and Slovakia are the the same even though the development of IT terminals network in Czech is significantly higher. Accessibility is worse rated than network developement by users in Croatia.

When it comes to MRs there are variations and differences. In MR1 ranking of accessibility is between high and medium, in MR2 is average while in MR3 is between medium and poor (Table 3.8, Fig. 3.13). Differences between ratings for network development and accessibility are not that big when compared to national level.

In DR, above half of users said that accessibility of IT is medium, while more than one 3rd estimated as bad (Table 3.8, Fig. 3.14).

Table 3.8 Accesibility of intermodal transport ranked by users

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
High availability	100.0	50.0	0.0	25.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.7	7.7	46.2	10.0	5.3	14.1
Medium availability	0.0	50.0	80.0	50.0	50.0	100.0	80.0	100.0	50.0	100.0	40.0	40.0	33.3	30.8	46.2	70.0	42.1	50.7
Low availability	0.0	0.0	20.0	25.0	25.0	0.0	20.0	0.0	50.0	0.0	60.0	60.0	50.0	61.5	7.7	20.0	52.6	35.2
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

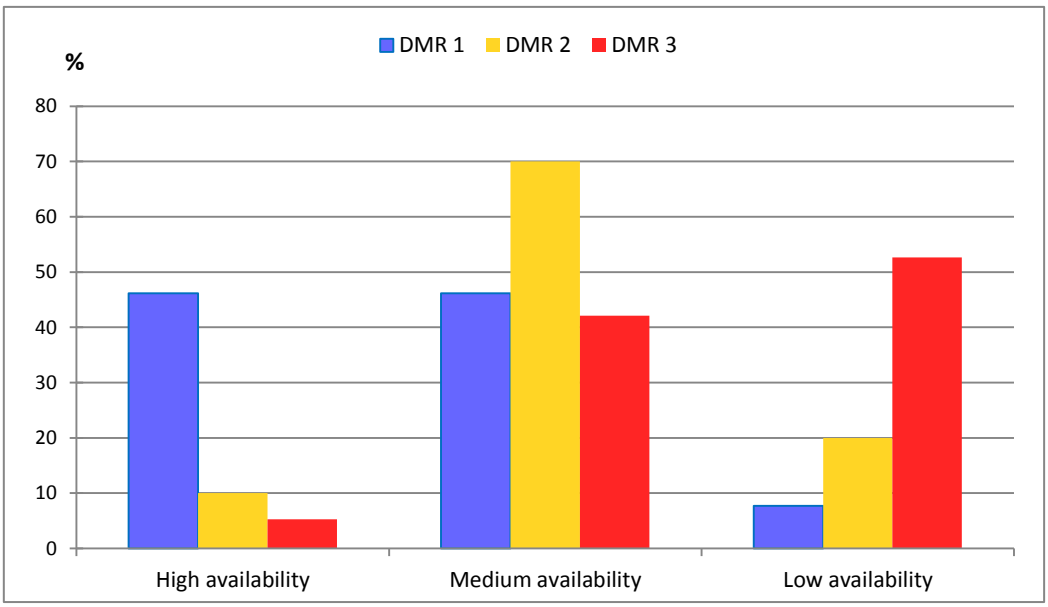


Fig. 3.13 Accesibility of intermodal transport in MRs ranked by users

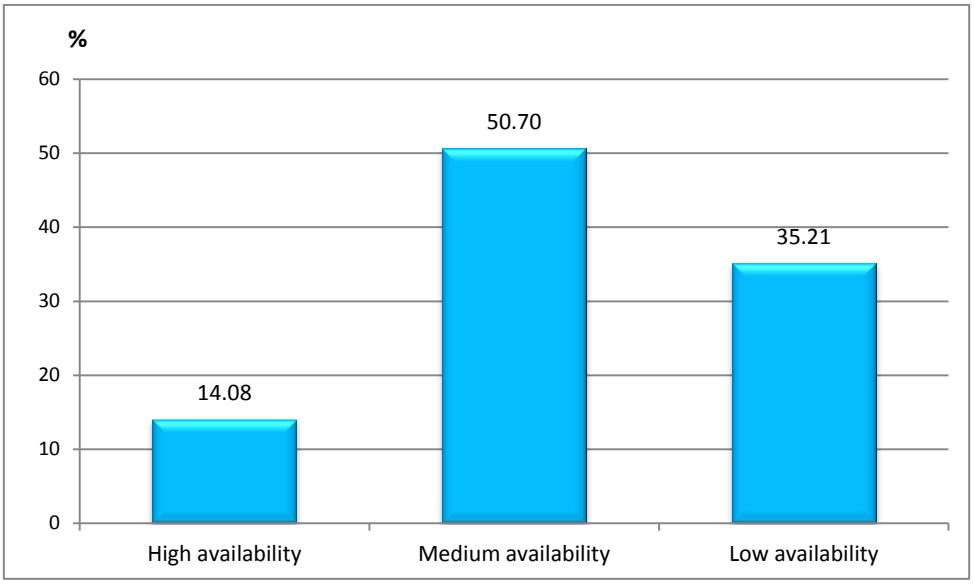


Fig. 3.14 Accesibility of intermodal transport in Danube region ranked by users

Quality of intermodal transprot on corridors

Quality of services across corridors, defined for each coutnry, is the best rated in Germany and Czech Republic (mostly average), and the lowest in Moldova and Croatia (Table 3.9). Significant number of users said that it is not familiar with the quality of services on certain corridors, mostly in Ukraine and Bulgaria, Romania and Hungary.

When it comes to MRs there are is no noteworthly differences, especialy between MR2 and MR3. Users in MR1 rated qualit of services as average, while those in MR2 and MR3 rated between medium and low, with a great share (about 30%) of „unknow" (Table 3.9, Fig. 3.15). In DR, quality is rated between low and average (Table 3.9, Fig. 3.16).

Table 3.9 Quality of intermodal transport services on corridors rated by users

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
High	20.8	40.0	22.9	35.0	25.0	4.2	0.0	0.0	0.0	0.0	18.0	0.0	12.5	4.3	26.6	11.2	7.3	11.9
Medium	41.7	50.0	45.7	45.0	40.0	33.3	11.4	0.0	25.0	25.0	38.0	24.0	29.2	21.4	45.6	27.6	26.3	30.2
Low	4.2	0.0	25.7	20.0	15.0	16.7	31.4	0.0	75.0	12.5	32.0	72.0	45.8	17.9	12.7	26.7	29.3	25.5
Not in use	33.3	10.0	2.9	0.0	20.0	45.8	57.1	100.0	0.0	62.5	12.0	4.0	4.2	48.7	13.9	34.5	32.3	29.5
Nonexistent	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.3	7.7	1.3	0.0	4.7	2.8
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

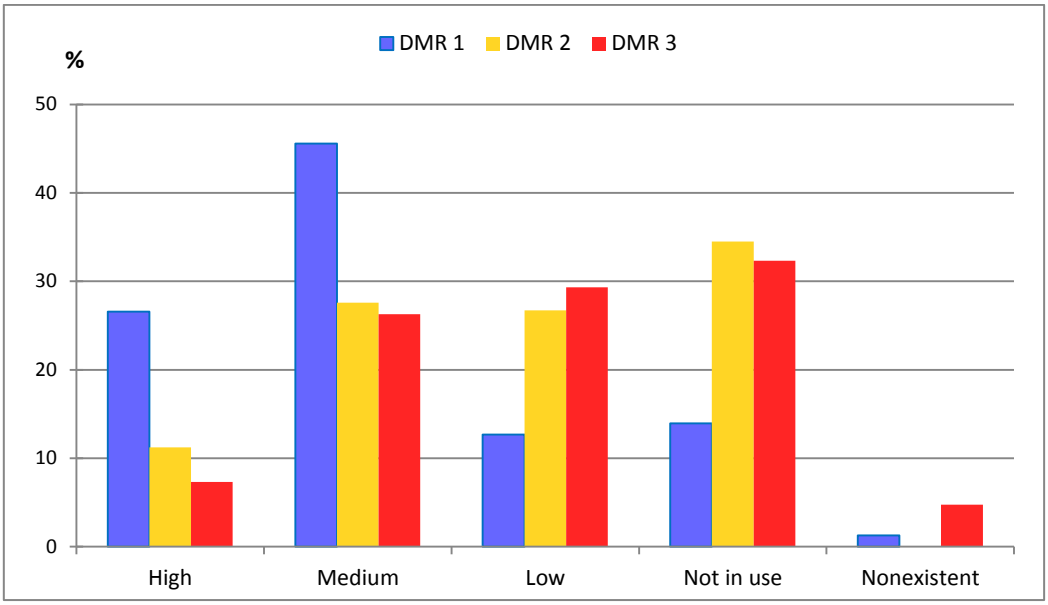


Fig. 3.15 Quality of intermodal transport services on corridors in MRs rated by users

Na nivou Dunavskog regiona, kvalitet usluga intermodalnog transporta na koridorima korisnici ocenjuju uglavnom kao „srednji" i „loš" (Table 3.9, Fig. 3.16).

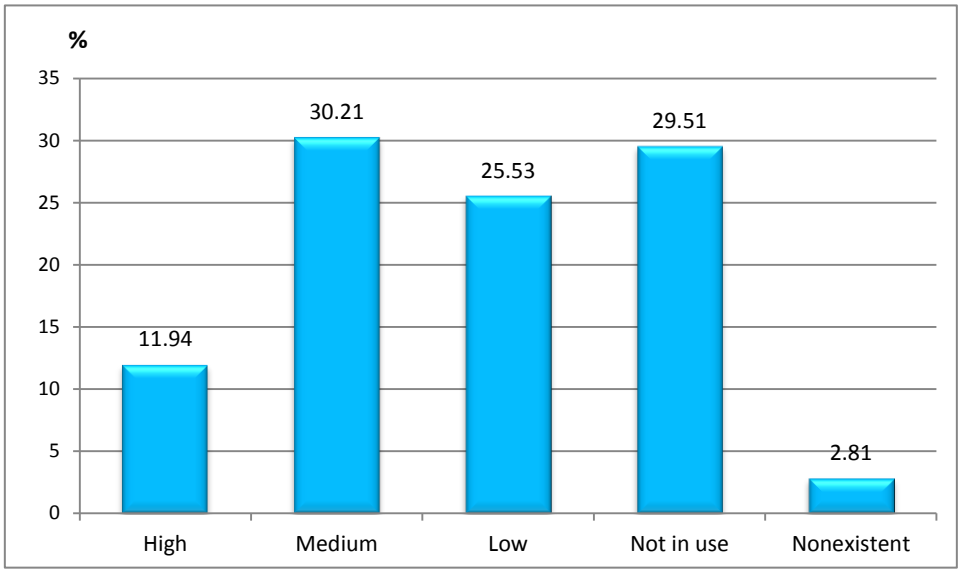


Fig. 3.16 Quality of intermodal transport services on corridors in Danube region rated by users

The users in Austria estimated that the quality of intermodal service is the best on the corridor to the Adriatic ports, primarily Koper. They gave the highest number of rating „high", fewer of ratings „medium" and „low" rating is not assigned. On the corridors to Prague and the Ceska Trebova slightly lower quality of intermodal service has been identified (more „medium" rating, less „high" rating, no rating „low"). The quality of service on the corridors to Sopron, Dunajska Streda and destinations in Croatia were assessed by users in Austria as a „medium".

As in the case of Austria, in Germany, the users estimated that the quality of intermodal service is the highest on the corridor to Koper. The corridors to the Czech Republic and the Northern European ports are rated with slightly lower quality of service (the average rating between „high" and „medium"). With the dominant rating „medium", the quality of intermodal service on the corridors to Budapest and the corridors to Croatia and Serbia has been evaluated.

The users in Slovenia gave the dominant „medium" rating for quality of intermodal service to corridors to Budapest, Furnitz, Graz and Munich. The quality of the service on the corridor to the Dunajska Streda can be characterized as the „medium". For this corridor, a greater dispersion of results is identified. For the corridors to Zagebu and Belgrade, the quality of the service was most often rated as „low" .

The users in the Czech Republic estimated that the quality of intermodal service is most favorable on the corridors to Munich and Northern European ports (the dominant rating is „high"). The quality of intermodal service on the corridors to Hungary and Slovakia can be assessed as „medium". Corridors to Austria (Krems and Salzburg), users rated between „medium" and „low" .

The users in Slovakia estimated that the quality of intermodal service is the most favorable on the corridors to Ceska Trebova and Koper (the overall rating between „high" and „medium"). The slightly lower quality of intermodal service is estimated on the corridor to Budapest and even lower on the corridor to Krems. Although Slovakia borders Ukraine, the users do not use corridors to Ukraine.

The users in Hungary estimated that the corridor to Koper is the most favorable from the standpoint of quality of intermodal service, but with the dominant rating „medium". A little lower quality of intermodal service is identified on the corridors to Munich and Dunajska Streda. Corridors to Romania and especially to Serbia are poorly used; the quality of service on these corridors is most often rated as „low" . As in the case of Slovakia, there is no intermodal transport with neighboring Ukraine.

The users in Romania have indicated that they are mostly using the corridor to Hungary. The rating on this corridor is the highest compared to other corridors (predominantly the „medium" rating). Corridors with the Ukrainian regions in Danube Region, Serbia and Moldova are very poor used. The level of quality of intermodal service is marked mainly by „low" . Corridors to Bulgaria (to Stara Zagora and Varna) are more used than corridors to Moldova, but the dominant rating is „low" .

The obtained data for Ukraine are very poor. For the five offered corridors, two users did not give a rating because they do not use the offered corridor, ie two answers are "not used."

The data for Moldova are very poor also (two completed questionnaires). The users estimated that corridors within Ukraine (to Kiev, Kharkov etc.) and Romania (Bacau, Rastolita, Suecava) are of low of quality of intermodal service („low" rating). On the corridors to Constanta, Chop and Ilyichevsk the quality of service is slightly higher than for the previous corridors (the average rating is between „medium" and „low").

The users in Bulgaria have been identified the corridors to Romania (Bucharest, Ploiesti, Constanta) as the most favorable with the most common „medium" rating. Connections with Serbia (Belgrade and Pristina) are not used.

In Bosnia and Herzegovina, the corridors to Croatian ports of Ploče and Rijeka and corridos to Belgrade and Ljubljana are rated by the average „medium" quality. The users gave a slightly lower rate of quality of intermodal service to the Corridor to Bar.

The users in Croatia are rated the quality of intermodal service on the corridors to Budapest and Ljubljana as the most favorable (average rating „medium"). The corridors to Belgrade, Sarajevo, Banja Luka are rated dominantly as „low" .

The users in Montenegro evaluated the quality of intermodal service on offered corridors similar to those in Bosnia and Herzegovina, although the intensity of intermodal flows is very low. The corridors to Belgrade and the Adriatic ports (Koper and Rijeka) are predominantly rated as „medium". Some lower quality of intermodal service is identified by the users to the corridors to Sarajevo and Pristina.

Half of the users in Serbia estimated the corridor to Rijeka as the most favorable (the dominant rating is „medium"). The other half does not use this corridor. The slightly lower quality (the average rating is a bit lower than the „medium") is characteristic for the corridors to Koper, Ljubljana and Bar. 70% of the respondents do not use the corridors to Constanta, Bulgaria, Bosnia and Herzegovina, Budapest and Thessaloniki, while the remaining users listed the predominantly „low" quality of intermodal service except for the corridor to Thessaloniki (estimated predominantly as „medium").

Lead time on intermodal transport corridors

Lead time on intermodal transprot corridors is rated the best in Germany and Czech Republic (mostlz as short and average). The worst is rated in Croatia, Montenegro and Slovenia (mostly long and very long) (Table 3.10). It is interesting to mention that users in some coutnries, as are Slovenia and Montenegro, rated quality of services on corridors better than time delivery. Meanwhile, in Hungary users better rated lead time than quality of service.

Table 3.10 Lead time on intermodal transprot corridors rated by users

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Very short	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	1.3	0.0	1.3	0.9
Short	29.2	45.0	17.1	40.0	25.0	12.5	2.9	0.0	0.0	0.0	8.0	4.0	8.3	8.5	27.8	14.7	7.4	13.1
Medium	37.5	40.0	11.4	60.0	45.0	37.5	25.7	0.0	58.3	33.3	34.0	16.0	25.0	14.5	26.6	39.7	21.2	27.2
Long	0.0	0.0	31.4	0.0	10.0	8.3	2.9	0.0	33.3	0.0	36.0	60.0	37.5	19.7	13.9	7.8	28.1	20.0
Very long	0.0	0.0	34.3	0.0	0.0	0.0	11.4	0.0	0.0	6.7	6.0	16.0	16.7	3.4	15.2	3.4	6.9	7.5
Not in use	33.3	10.0	2.9	0.0	20.0	41.7	57.1	100.0	8.3	60.0	10.0	4.0	4.2	47.9	13.9	34.5	31.2	28.9
Nonexistent	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.3	6.0	1.3	0.0	3.9	2.3
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Differences regarding lead time are seeable among MRs more than when it comes to quality of IT. The most part of of users in MR1 rated delivery time as short and average, in MR2 as average while in MR3 it was rated as average and long (Table 3.10, Fig. 3.17). In DR, delivery time on IT corridors is rated as average and long (Table 3.10, Fig. 3.18).

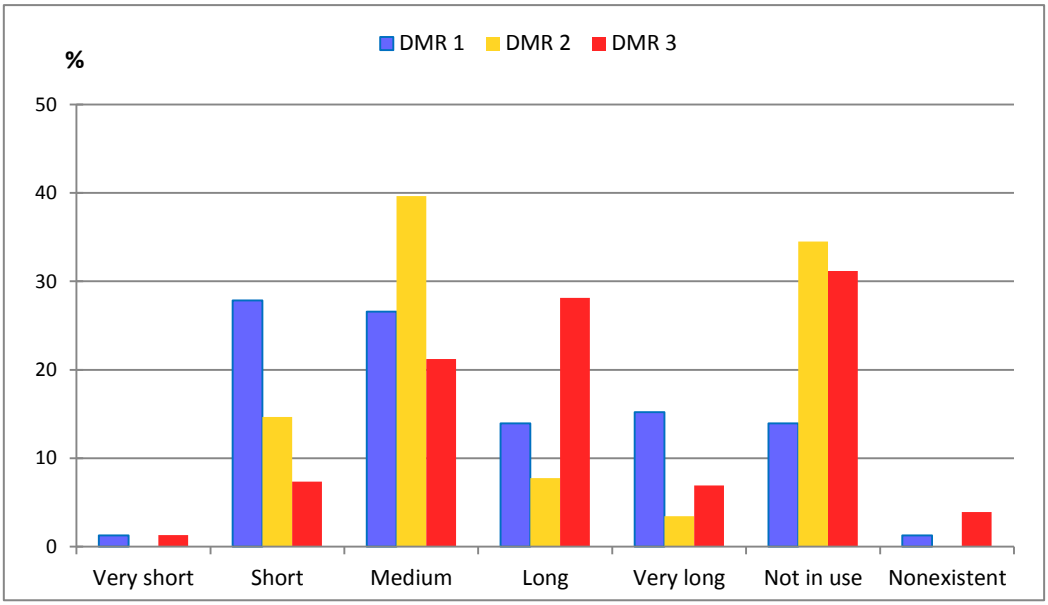


Fig. 3.17 Lead time on intermodal transprot corridors in MRs rated by users

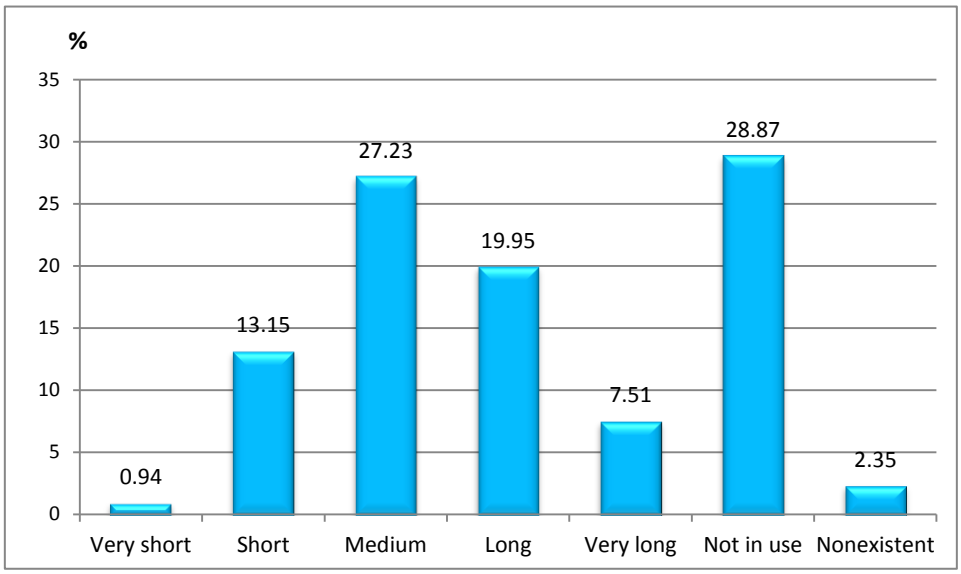


Fig. 3.18 Lead time on intermodal transprot corridors in Danube region rated by users

The users in Austria estimated that the delivery time is thr shortest on the corridors to the Adriatic ports, primarily to Koper and Prague (half of the ratings are „short" and a quarter of the ratings are „medium"). Regarding these two corridors, the delivery time is „long" on the corridors tos Zagreb, the Ceska Trebova and Dunajska Streda (half of the ratings are „medium" and a quarter of the ratings are „short") The longest delivery time is on the corridor to Sopron.

In Germany, the delivery time is shortest on the corridors to Northern European ports (the dominant rating is „short"). Corridors to the Adriatic ports, Budapest, destinations in the Czech Republic and Slovakia are identically estimated in average between „short" and „medium". Half of the users rated the delivery time on the corridors to Croatia and Serbia as „medium".

From the standpoint of delivery time, the users in Slovenia rated the corridor to Graz an average rate which slightly tends to the „medium" level. A slightly shorter delivery time, with small differences, was identified for the corridors to Budapest, Furnitz, Dunajska Streda, Zagreb, Munich (average rating is between „medium" and „long"). The longest delivery time is characteristic for the corridor to Belgrade (80% of users rated it as "very long"). The results of the users describe a high degree of dispersion besides the results for the corridor to Belgrade.

According to users in Czech Republic, the corridors to the Northern European ports, Munich and the destinations in Hungary and Slovakia are identical (the average rating is between „medium" and „short"). The delivery time is slightly longer on the corridors to Austria (Krems and Salzburg), which are also identically rated (the average rating tends to the „medium" level).

The users in Slovakia rated the delivery time as mostly same for the corridors to Krems, Ceska Trebova and Budapest; the average rating tends to the „medium" level. A slightly more favorable delivery time is on the corridor to Adriatic ports, primarily to Port of Koper.

The users in Hungary estimated that the delivery time is predominantly on the „medium" level for corridors to Munich, Dunajska Streda and Koper. The corridor to Belgrade is also rated as „medium" but this corridor is used from only 25% of users. The longest delivery time is on the corridor to Arad (the rate is „long").

According to users in Romania, the shortest delivery time is on the corridor to Budapest (the average rating is slightly above the „medium" level). The average delivery time is characteristic for the corridor to Burgas and Stara Zagora and *Ilichevsk*. Only 20% of the users use the corridor to *Ilichevsk*. The most unfavorable delivery time is characteristic for the corridors to Chop, Chisinau and Belgrade. In addition to the fact that the delivery time is rated as "very long", this corridor is used from only 20% of users.

According to the very poor data for Ukraine, one user replied that he did not use any offered corridor.

According to the poor data for Moldova, for all offered corridors (to Kiev, Bacau, Rastoliti, Suekava, Constanta and Chop) the users estimated that the delivery time is between „long" and „medium" except for the corridor to Ilichievsk (delivery time is slightly shorter, the rating is „medium").

The users in Bulgaria rated the delivery time as „medium" for the corridors they use (to Bucharest, Ploiesti and Constanta).

The users in Bosnia and Herzegovina estimated that the delivery time is most favorable on the corridor to Ljubljana (the average rating is between „short" and „medium"). A slightly longer delivery time is characteristic for the corridors to Koper, Rijeka and Ploče (the average rating tends to the „medium" level), while the delivery

time is the most unfavorable for the corridors to Belgrade and Bar (the average rating is „long"). The results of the users describe a high dispersion.

In Croatia, the most favorable delivery time is on the corridor to Ljubljana. The average rating is above the „medium" level. In relation to the corridor to Ljubljana, the users estimated that the delivery time is unfavorable on the corridors to Belgrade, Sarajevo, Banja Luka and Budapest. The average rating for these corridors is very similar to each other and it is tends to the level „long" .

The users in Montenegro estimated that the delivery time on the corridors to Belgrade and Sarajevo is on the level between „medium" and „long" . Delivery time on the corridor to the Adriatic ports tends at the level „long" . The delivery time is the longest on the corridor to Prishtina (the average rating is "very long").

The users in Serbia estimated that the delivery time is most favorable on the corridor to Rijeka (the average rating is „medium"). Tthe delivery time is very similar to the corridors with a destination in Koper, Ljubljana and Bar (the average rating is slightly lower than the „medium"). Other corridors (to Thessaloniki, Constanta, Budapest, destinations in Bulgaria) also have a similar average of delivery time (the average estimate is generally „long"). High dispersion is characteristic for all user results.

Not lot of users answered questions about lacking links of business centers in DR. Some are:

- Germany: links with the Serbia (Munich - Belgrade) and Romania (Munich-Arad);
- Czech Republic: links with Serbia (Belgrade), Croatia (Zagreb), Romania (Arad) and with the East part of DR;
- Slovakia: links with Serbia (Belgrade), Romania (Arad), Moldova and Ukraine;
- Hungary: : links with Serbia (Belgrade) and Ukraine;
- Romania: : links with Serbia (Bucharest-Belgrade), Slovenia (Koper), Germany and Ukraine (Odessa);
- Moldova: links with Romania (Chisinau-Giurgiulesti) and Ukraine (Chisinau-Odessa);
- Bulgaria: links with Serbia (Belgrade), Slovenia (Koper, via Zagreb), Hungary (Budapest, via Arad);
- Bosnia & Herzegovina: poor connections within country are highlighted, primarily with Doboj, Sarajevo and Banja Luka, and than with Serbia (Belgrade, Novi Sad) a zatim veze sa Srbijom (Belgrade, Novi SaD) and Croatia (Zagreb);
- Croatia: links with Serbia (Zagre-Belgrade, Novi Sad), Slovenia (Zagreb-Ljubljana), Romania (Zagreb-Timisoara) as well as connections with Port of Ploče and trough Montenegro;
- Serbia: links with Hungary and Bulgaria, Romania (Belgrade-Bucharest) and Germany (Port of Hamburg), and also, poor conectedness of business centers withinh country.

Place for loading/unloading of intermodal transport units

The nearest intermodal terminal as a dominant place ***for loading/unloading*** was an answer provided only by the users in Romania. Consignor/consignee's premises were a places for loading and unloading was identified in Moldova and Slovenia, Bosnia & Herzegovina and Serbia (Table 3.11).

Important differences could not be seen among MRs, especialy between MR1 and MR2. In this MRs as a dominant palce were mentioned consignor/consignee's premises and in some cases it is a nearest intermodal terminal (about 8%). Similar situation is seen in MR2 were a nearest intermodal terminal is identified by 20% of users (Table 3.11, Fig. 3.19). In DR, above half of users highlighted consignor/consignee's premises while only 11% of them identified intermodal terminal (Table 3.11, Fig. 3.20).

Table 3.11 Place for loading/unloading of intermodal units ranked by users

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
At company's premises	50.0	50.0	80.0	50.0	50.0	50.0	20.0	0.0	100.0	25.0	80.0	60.0	33.3	69.2	61.5	45.0	60.5	56.3
It depends	25.0	50.0	20.0	50.0	50.0	25.0	20.0	100.0	0.0	50.0	20.0	20.0	50.0	30.8	30.8	35.0	31.6	32.4
At intermodal terminal	25.0	0.0	0.0	0.0	0.0	25.0	60.0	0.0	0.0	25.0	0.0	20.0	16.7	0.0	7.7	20.0	7.9	11.3
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

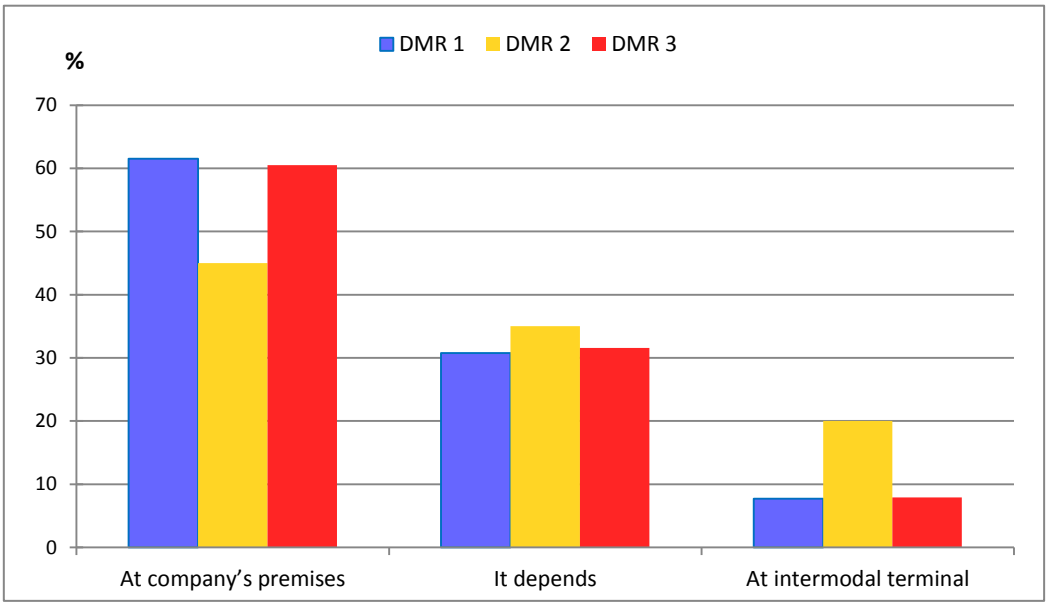


Fig. 3.19 Place for loading/unloading of intermodal units in MRs ranked by users

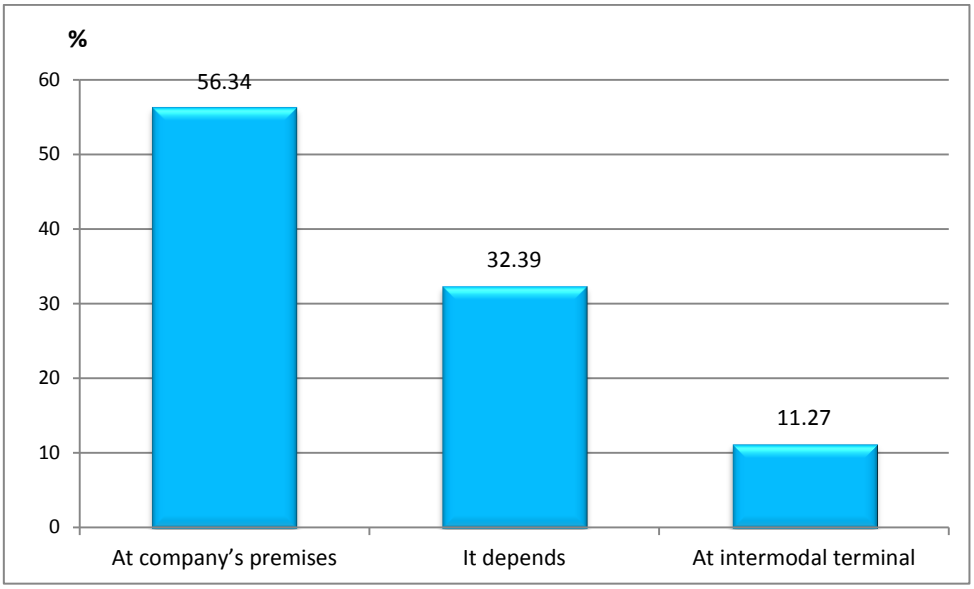


Fig. 3.20 Place for loading/unloading of intermodal units in danube region ranked by users

Main problems of intermodal transport development

Users' opionion regarding this matter differ among countries (Table 3.12). In Germany, as the most developed country when it comes to IT, lack of intermodal units and poor organization that is lack of intermodal connections are highlighted. In less developed countries regarding IT, problems regarding terminals, transport infrastructure and investments are identified.

Table 3.12 Problems of intermodal transport development ranked by users

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Terminals	0.0	50.0	40.0	50.0	75.0	75.0	80.0	0.0	50.0	75.0	100.0	80.0	66.7	92.3	30.8	65.0	86.8	70.4
Infrastructure	50.0	25.0	100.0	75.0	100.0	100.0	80.0	100.0	100.0	75.0	80.0	100.0	66.7	76.9	61.5	90.0	78.9	78.9
ITU	0.0	75.0	40.0	25.0	75.0	0.0	20.0	0.0	0.0	50.0	40.0	20.0	16.7	7.7	38.5	25.0	23.7	26.8
Lead time	25.0	0.0	80.0	0.0	0.0	50.0	60.0	0.0	50.0	75.0	30.0	80.0	50.0	69.2	38.5	30.0	57.9	46.5
Organization	25.0	75.0	20.0	75.0	50.0	25.0	80.0	0.0	100.0	75.0	40.0	80.0	50.0	61.5	38.5	60.0	57.9	54.9
Information	50.0	25.0	0.0	50.0	50.0	0.0	40.0	0.0	0.0	50.0	20.0	80.0	16.7	38.5	23.1	30.0	36.8	32.4
Regulations	0.0	50.0	0.0	50.0	50.0	0.0	0.0	100.0	0.0	25.0	40.0	60.0	33.3	30.8	15.4	25.0	36.8	29.6
Operators	75.0	25.0	40.0	25.0	25.0	25.0	40.0	0.0	50.0	75.0	80.0	60.0	16.7	30.8	46.2	30.0	50.0	43.7
Investments	75.0	0.0	60.0	50.0	0.0	50.0	60.0	0.0	50.0	75.0	90.0	60.0	66.7	69.2	46.2	40.0	73.7	59.2
Other	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.0	0.0	0.0	7.7	7.7	0.0	10.5	7.0

When analyzing problems among MRs, it was conlcued that there are no specificly improtant area of problems, except infrastructure that was identified in Slovenia. In less developed MRs, users identified inadequate transport infrastructure and development of terminals as well as organizational problems, while in MR3 unsufficient investments in development was recognized (Table 3.12, Fig. 3.21).

In total, on the level of whole DR, users highlightes problems rearding transport infrastructure and intermodal terminals with unsufficient investments and poor organization following (Table 3.12, Fig. 3.22). Reason is, mainly, the most part of users are from MR2 and MR3. Problems that are identified seldom are: regarding intermodal unites (except Germany and Slovakia), regualtions (with the exception of Ukraine and Germany, Czech Republic and Slovakia) and ITS (exceptions are Croatia and Austria, Czech Republic and Slovakia).

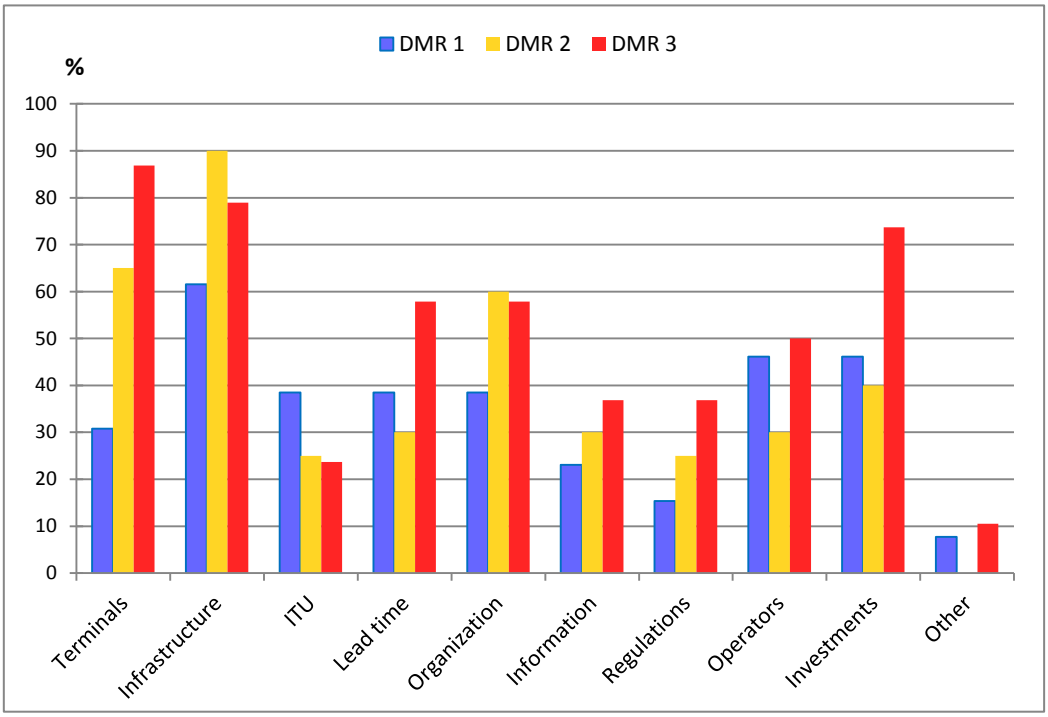


Fig. 3.21 Problems of intermodal transport development in MRs ranked by users

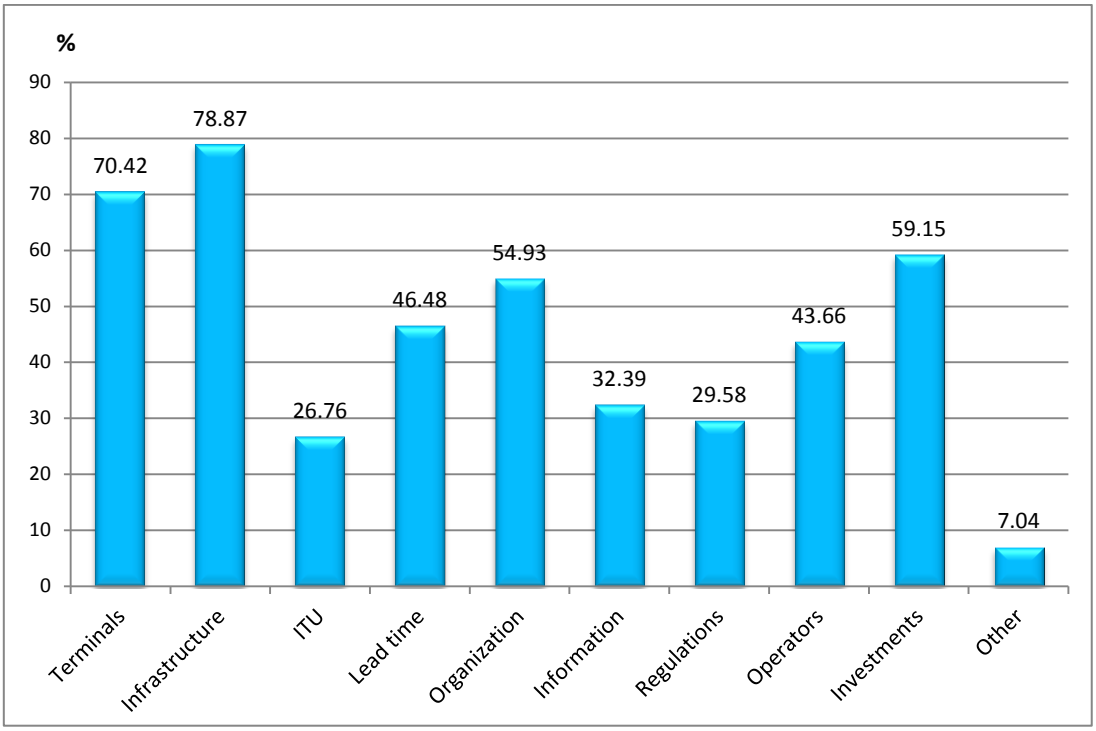


Fig. 3.22 Problems of intermodal transport development in Danube region ranked by users

Main benefits from using intermodal transport services

Opionions are not that different among countries. Rankings are given in Table 3.13.

The more developed coutries regarding IT (MR1) are expecting primarily more efficient inclusion in international flows and higher level of environment proteciton. On the other hand, countries with less developed level of IT (MR3), small advantage is given to complete and good quality service with more efficient inclusion in international flows and markets following, reliability and lower costs of service realization (Table 3.13, Fig. 3.23). In total for DR, effects of use of IT were said to be, primarily, inclusion in international flows and lower costs of transportation and handling (Table 3.13, Fig. 3.24).

Table 3.13 Benefits from using intermodal transport services ranked by users

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Connecting	100.0	75.0	60.0	100.0	75.0	100.0	80.0	0.0	100.0	75.0	60.0	60.0	83.3	69.2	76.9	85.0	68.4	74.6
Costs	75.0	75.0	60.0	100.0	75.0	75.0	80.0	0.0	100.0	75.0	40.0	60.0	66.7	61.5	69.2	80.0	57.9	66.2
Time	75.0	100.0	40.0	25.0	25.0	50.0	40.0	100.0	100.0	75.0	60.0	80.0	50.0	38.5	69.2	45.0	55.3	54.9
Quality	0.0	100.0	40.0	25.0	25.0	25.0	60.0	0.0	50.0	25.0	90.0	100.0	50.0	69.2	46.2	35.0	71.1	56.3
Reliability	50.0	50.0	40.0	25.0	50.0	25.0	60.0	100.0	50.0	50.0	60.0	40.0	66.7	69.2	46.2	45.0	60.5	53.5
Safety	50.0	50.0	20.0	0.0	25.0	50.0	20.0	0.0	0.0	0.0	50.0	40.0	33.3	76.9	38.5	20.0	50.0	39.4
Goods protect.	0.0	50.0	20.0	25.0	50.0	0.0	0.0	0.0	50.0	25.0	30.0	40.0	33.3	46.2	23.1	20.0	36.8	29.6
Environmental	100.0	100.0	40.0	75.0	75.0	75.0	60.0	0.0	0.0	50.0	40.0	40.0	16.7	61.5	76.9	60.0	44.7	54.9
Other	25.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7	5.0	0.0	2.8

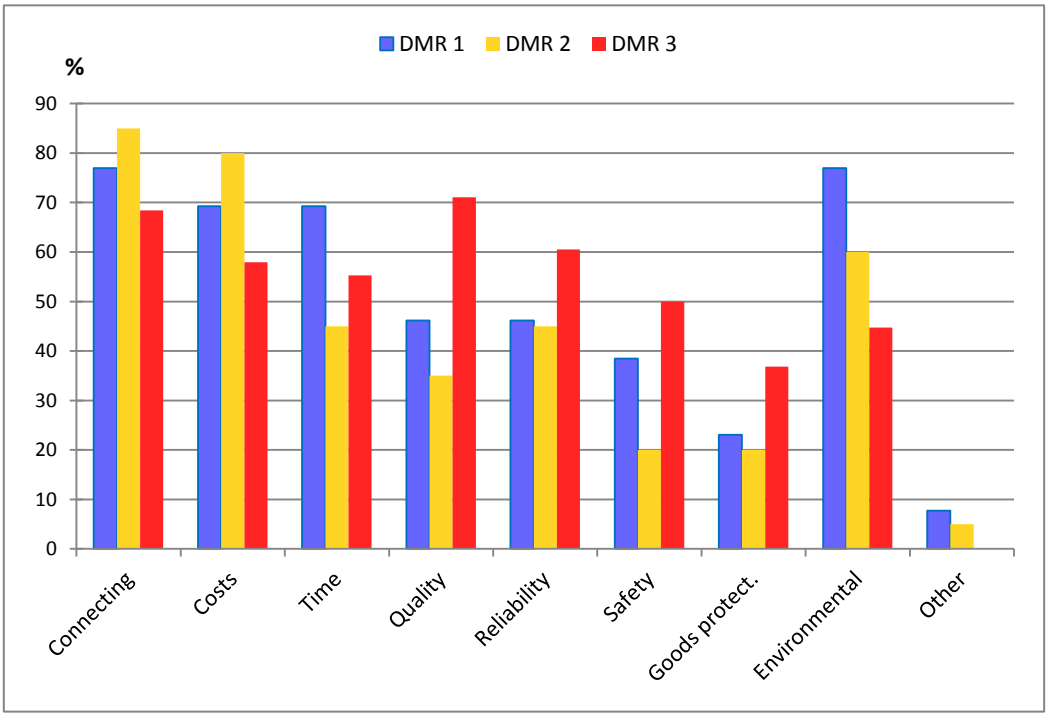


Fig. 3.23 Benefits from using intermodal transport services in MRs ranked by users

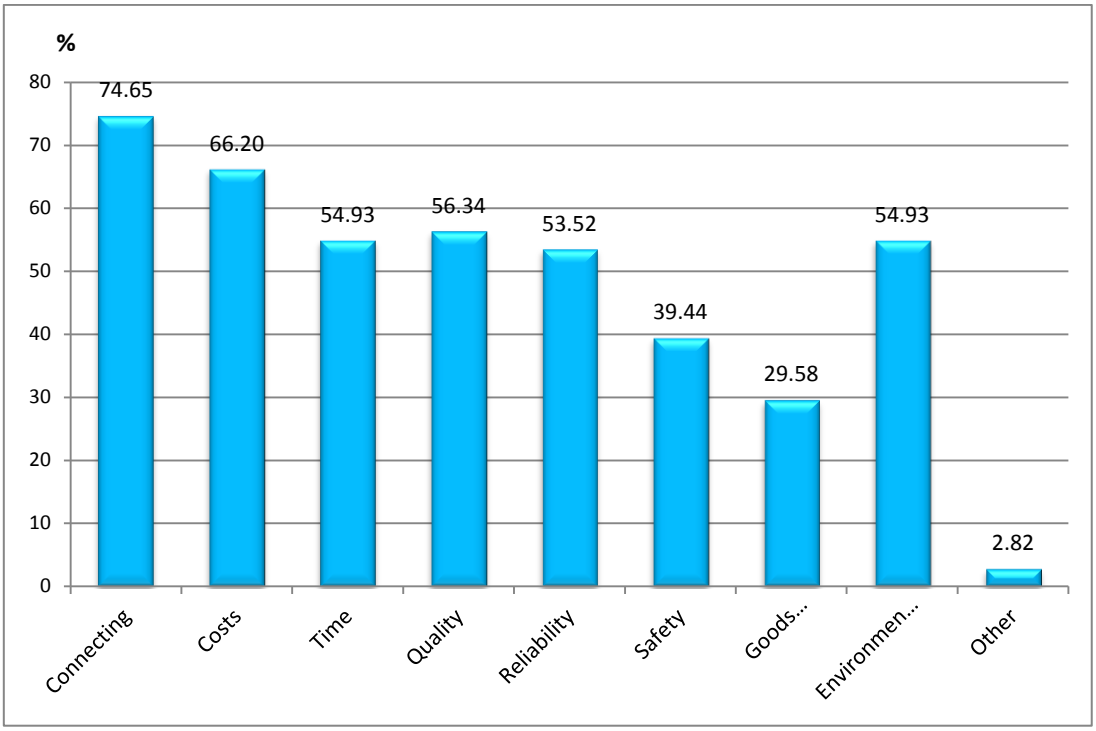


Fig. 3.24 Benefits from using intermodal transport services in Danube region ranked by users

3.2 Analysis results of questioners for intermodal transport services providers

Questienry for service providers containted 18 questions (appendix 2) where the last one is intented for additional coments and suggestions regarding IT development and problems on both national and transnational level in DR. Results follows.

Intermodal transport market potential in Danube region

IT services providers ranked this potential as high, especialy those from Germany and Czech Republic. Lower rankings are given by providers in countries with less developed IT. It is interesting that only three users rated as low: in Romania, Hungary and Croatia (Table 3.14).

When it comes to MRs, in the 1st one is rated as very high and high with the exception of Slovenia were two providers rated as average. In MR2 potential is rated as high while in MR3 was rated as high and average (Table 3.14, Fig. 3.25). In DR, providers rated potential as high (Table 3.14, Fig. 3.26).

Table 3.14 Potencial of intermodal transport market in Danube region rated by providers

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Very high	25.0	80.0	14.3	60.0	50.0	40.0	0.0	0.0	50.0	0.0	0.0	25.0	0.0	0.0	37.5	37.5	5.6	22.4
High	75.0	20.0	57.1	40.0	33.3	20.0	20.0	100.0	50.0	80.0	50.0	12.5	33.3	63.6	50.0	33.3	47.2	43.4
Medium	0.0	0.0	28.6	0.0	16.7	20.0	60.0	0.0	0.0	20.0	50.0	50.0	66.7	36.4	12.5	20.8	44.4	30.3
Low	0.0	0.0	0.0	0.0	0.0	20.0	20.0	0.0	0.0	0.0	0.0	12.5	0.0	0.0	0.0	8.3	2.8	3.9
Very low	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

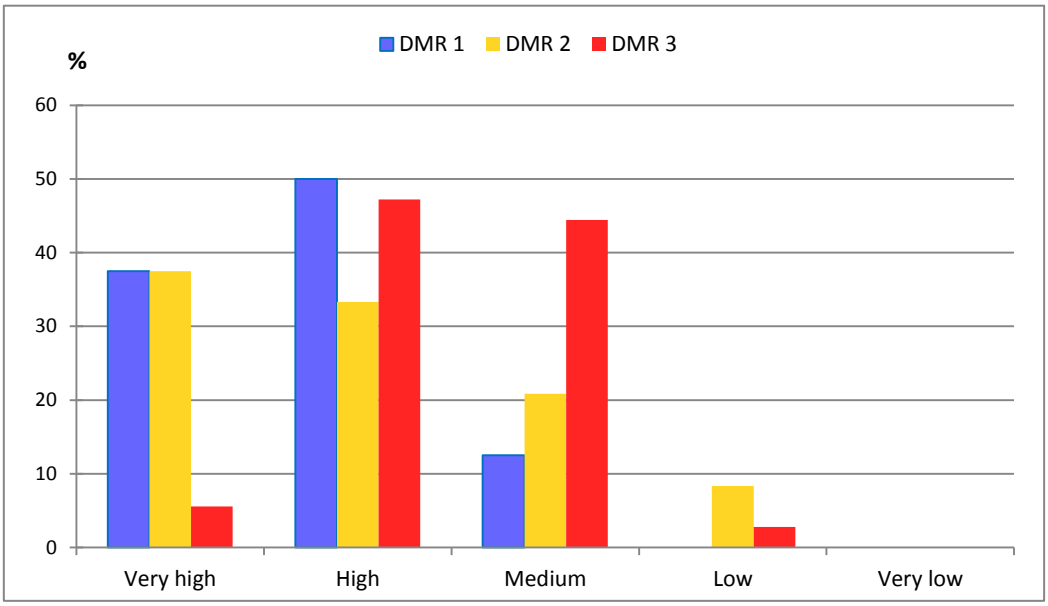


Fig. 3.25 Potencial of intermodal transport market in MRs rated by providers

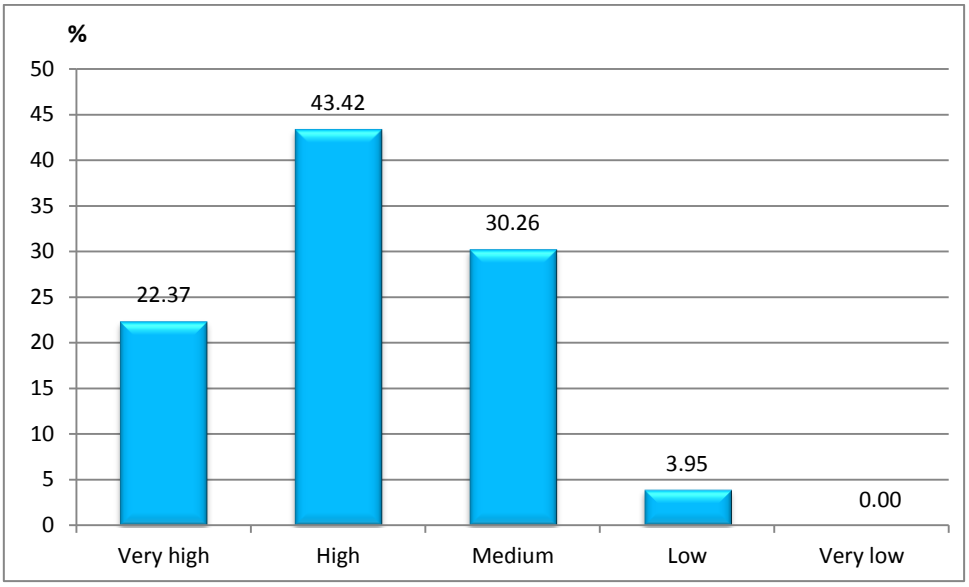


Fig. 3.26 Potencial of intermodal transport market in Danube region ranked by providers

Level of development of intermodal transport

Rating of level of IT development by proveders differ among countries in DR. Level is rated as very high in Germany (100%) and Austria (75%) while providers in Moldova and Bosnia & Herzegovina rated as low and very low (Table 3.15).

When it comes to MRs, in MR1 potential is rated as very high with the exception of Slovenia where it is rated as high. In MR2 dominant are high and average. Only in Moldova it is rated as low and very low. In MR3 average adn low are dominant, with the exception of Bulgaria, where it is rated as significantly higher (Table 3.15, Fig. 3.27). On the level of DR, potential is rated as average (Table 3.15, Fig. 3.28).

Table 3.15 Level of development of intermodal transport ranked by providers

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Very high	75.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.00	0.00	0.00	10.53
High	25.00	0.00	85.71	100.00	16.67	80.00	0.00	0.00	0.00	80.00	0.00	12.50	0.00	9.09	43.75	41.67	16.67	30.26
Medium	0.00	0.00	14.29	0.00	66.67	20.00	80.00	100.00	0.00	20.00	0.00	25.00	66.67	54.55	6.25	41.67	36.11	31.58
Low	0.00	0.00	0.00	0.00	16.67	0.00	20.00	0.00	50.00	0.00	83.33	50.00	33.33	36.36	0.00	12.50	41.67	23.68
Very low	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.00	0.00	16.67	12.50	0.00	0.00	0.00	4.17	5.56	3.95
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

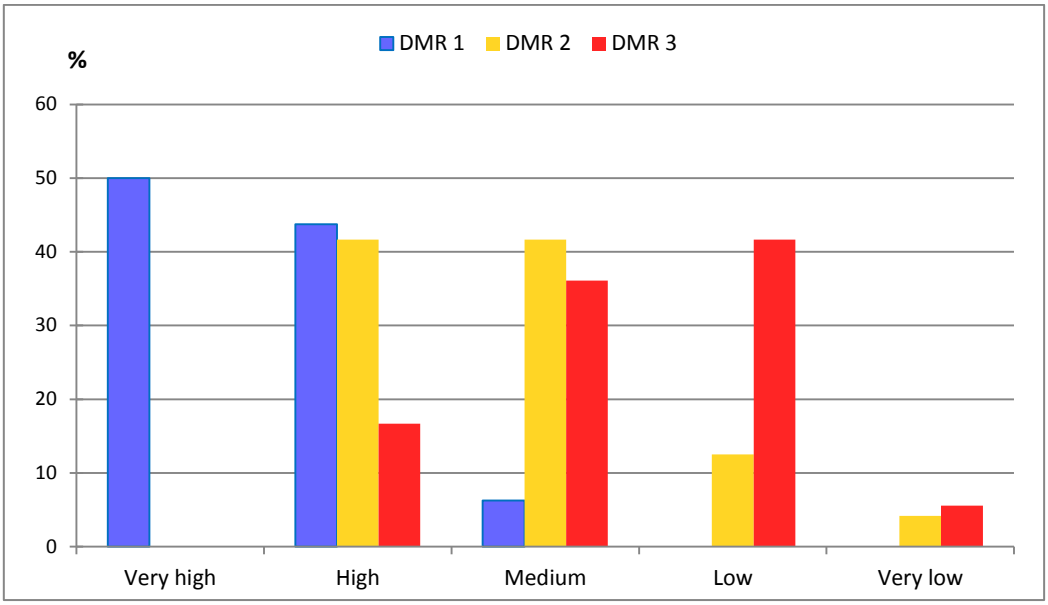


Fig. 3.27 Level of development of intermodal transport in MRs ranked by providers

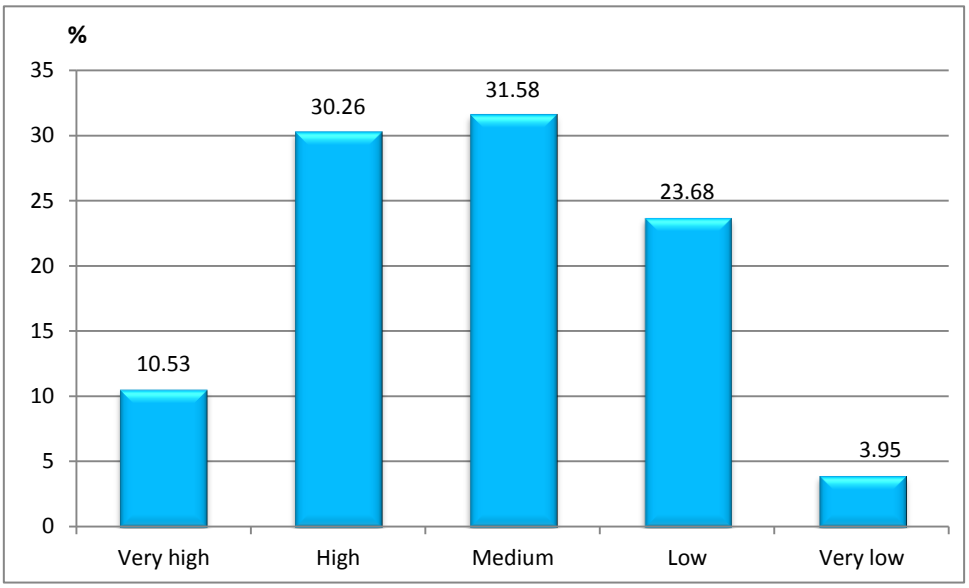


Fig. 3.28 Level of development of intermodal transport in Danube region ranked by providers

Development and connectivity of transport infrastructure for intermodal transport development

Level of connectivity and development of transport infrastructure for intermodal transport development is the best rated in Austria with Germany and Czech Republic following. In the most of remaining countries, providers are not satisfied with the level of transport infrastructure development (Table 3.16).

In MR1 are very satisfied with the development level and connectedness of transport infrastructure. Similar for the most part of providers in MR2. In MR3 providers are unsatisfie (Table 3.14, Fig. 3.29). Level of development and connectedness of

infrastructure in DR is rated as average given that the dominant ranks are satisfing and bad (Table 3.16, Fig. 3.30).

Table 3.16 Development and connectivity of transport infrastructure in Danube region ranked by providers

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Very good	75.0	40.0	14.3	20.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	37.5	4.2	2.8	10.5
Adequate	25.0	60.0	42.9	80.0	66.7	100.0	40.0	100.0	0.0	40.0	0.0	12.5	33.3	27.3	43.8	66.7	22.2	40.8
Poor	0.0	0.0	42.9	0.0	33.3	0.0	60.0	0.0	100.0	40.0	83.3	87.5	66.7	63.6	18.8	29.2	69.4	46.1
Very poor	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.7	0.0	0.0	9.1	0.0	0.0	5.6	2.6
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

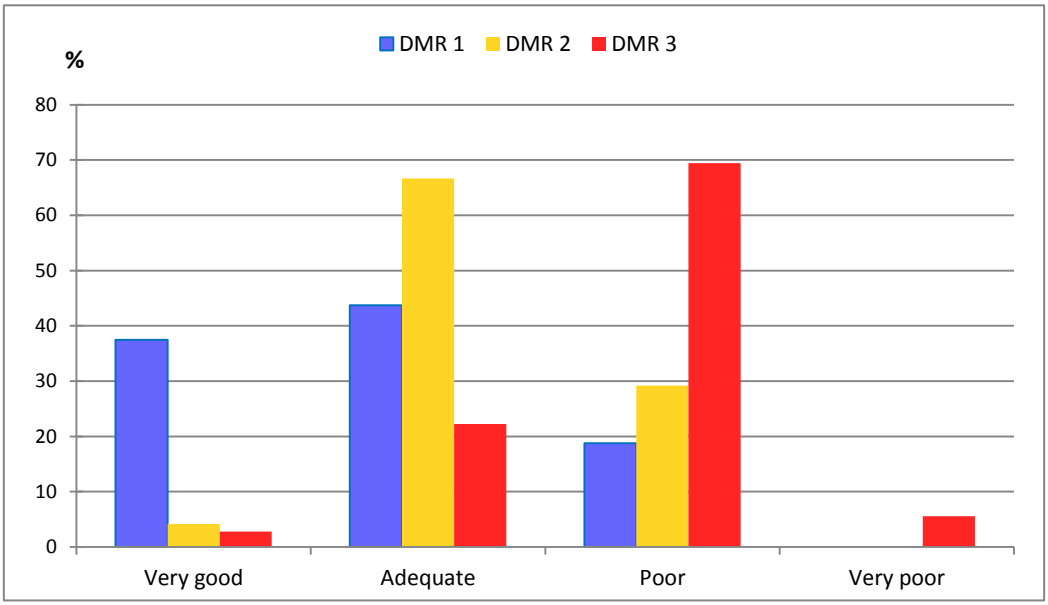


Fig. 3.29 Development and connectivity of transport infrastructure in MRs ranked by providers

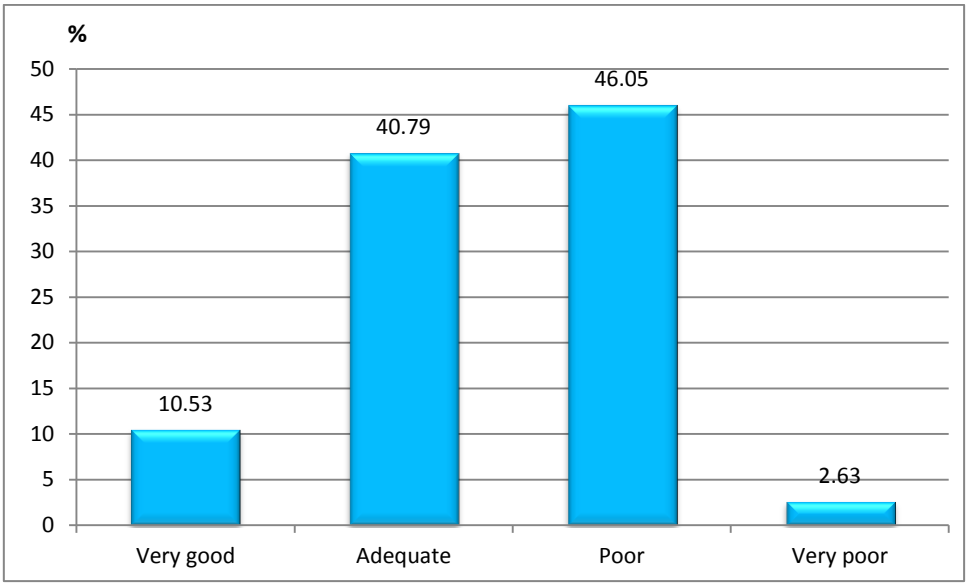


Fig. 3.30 Development and connectivity of transport infrastructure in Danube region ranked by providers

Development of intermodal terminals network and market coverage

This level of development of intermodal terminals is ranked differently in coutnries. The best rated is in Germany and Austria, while the lowest ranks are given in Moldova and Bosnia & Herzegovina (Table 3.7).

In MR1 this matter is rated as very high, with the exception of Slovenia where rankings varies from average to very low. In MR2 are rated as average, while in MR3 is rated from average to very low (Moldova and Montenegro, Bosnia & Herzegovina) (Table 3.17, Fig. 3.31). In DR, providers rated intermodal terminal network development as average and low (Table 3.17, Fig. 3.32).

Table 3.17 Development of intermodal terminals network and market coverage ranked by providers

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Very high	75.0	60.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	37.5	0.0	2.8	9.2
High	25.0	40.0	28.6	60.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.3	12.5	0.0	10.5
Medium	0.0	0.0	42.9	40.0	66.7	100.0	40.0	100.0	0.0	60.0	33.3	25.0	50.0	54.5	18.8	58.3	44.4	43.4
Low	0.0	0.0	28.6	0.0	33.3	0.0	40.0	0.0	50.0	20.0	33.3	75.0	16.7	36.4	12.5	20.8	38.9	27.6
Very low	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	50.0	0.0	33.3	0.0	33.3	9.1	0.0	8.3	13.9	9.2
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

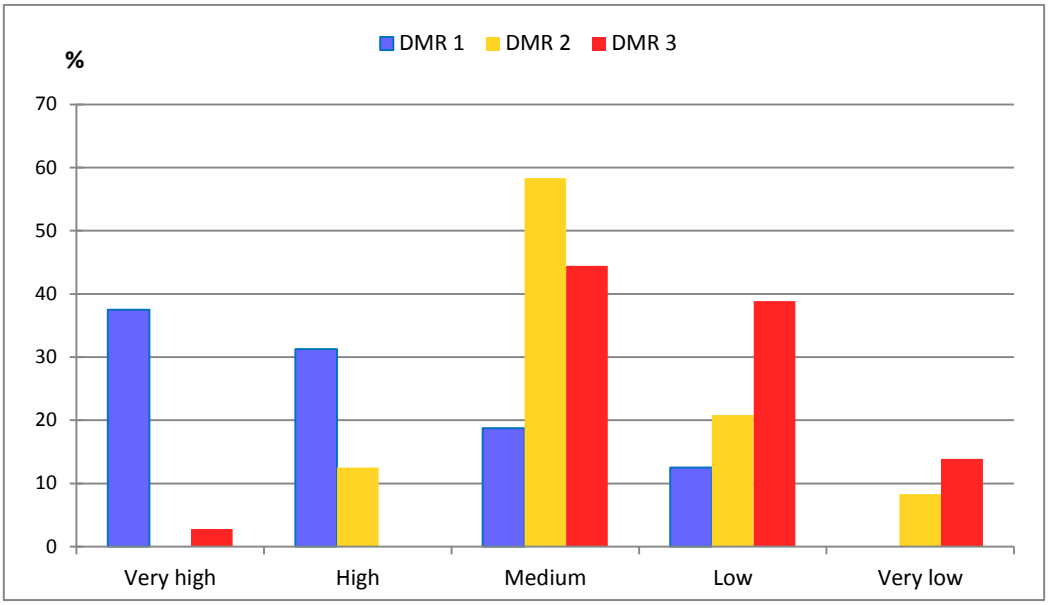


Fig. 3.31 Development of intermodal terminals network and market coverage in MRs ranked by providers

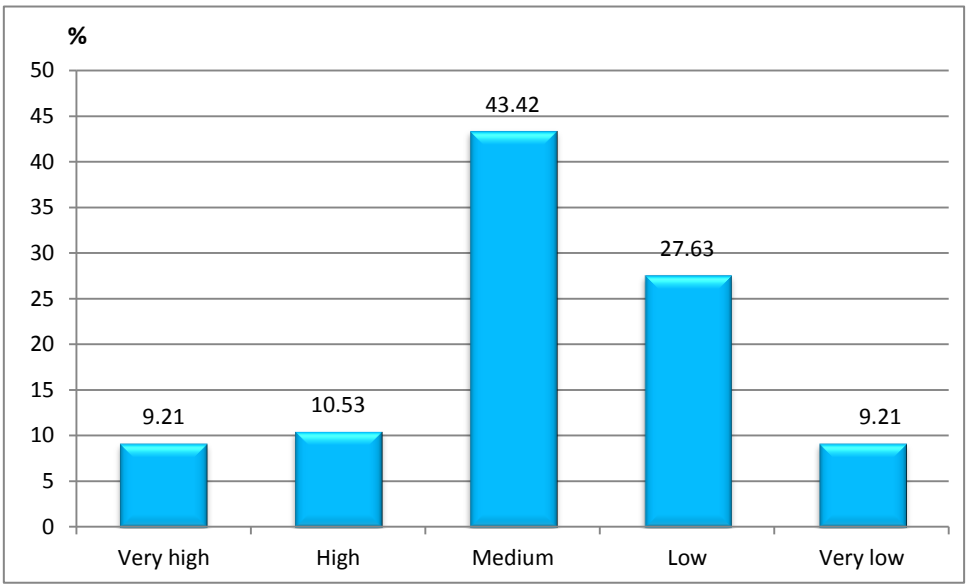


Fig. 3.32 Development of intermodal terminals network and market coverage in Danube region ranked by providers

Connection of business centers in Danube region with intermodal transport chains

This matter is rated dominantly as satisfying by providers in Germany and Ukraine, and dominantly bas by providers in Bosnia & Herzegovina and Moldova (Table 3.18). Rank as very good is given only by couple of providers in Bulgaria nad Slovenia and as very bad in Serbia.

When it comes to MRs, differences are not that highlighted. In MR1 connectedness is for the most part satisying, in MR2 and MR3 mainly poor although in MR3 it varies

from very good to very bad (Table 3.18, Fig. 3.33). in DR, above 50% of providers rated connectednes as bad/poor although in total rating is satisfying and bad (Table 3.18, Fig. 3.34).

Table 3.18 Connection of business centers with intermodal transport chains ranked by providers

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Very good	0.0	0.0	14.3	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	6.3	0.0	2.8	2.6
Adequate	75.0	100.0	14.3	20.0	66.7	40.0	20.0	100.0	0.0	20.0	0.0	50.0	33.3	54.5	56.3	37.5	36.1	40.8
Poor	25.0	0.0	71.4	80.0	33.3	60.0	80.0	0.0	100.0	60.0	100.0	37.5	66.7	36.4	37.5	62.5	55.6	53.9
Very poor	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5	0.0	9.1	0.0	0.0	5.6	2.6
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

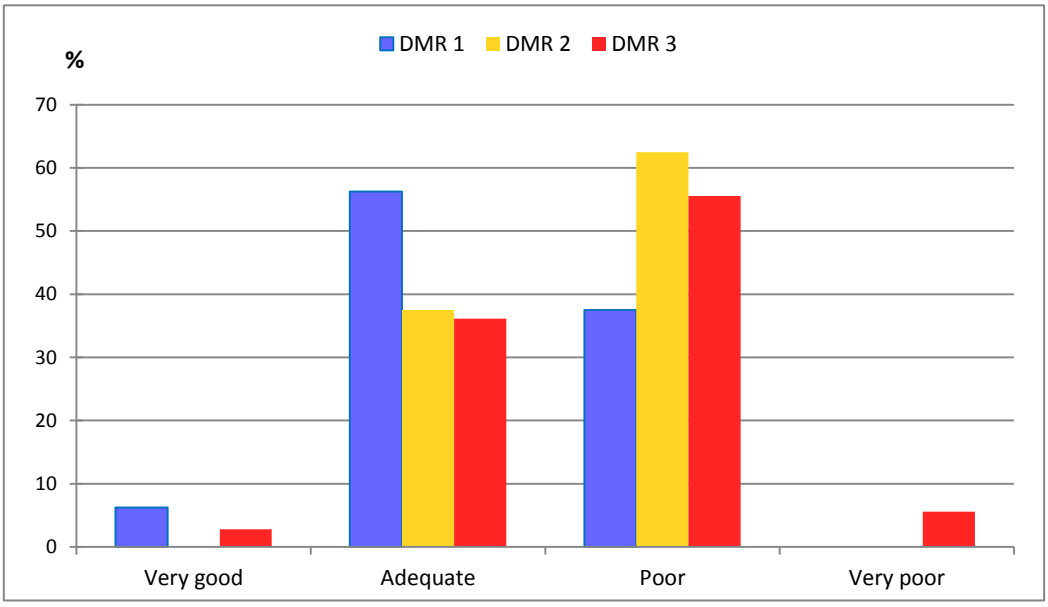


Fig. 3.33 Connection of business centers with intermodal transport chains in MRs ranked by providers

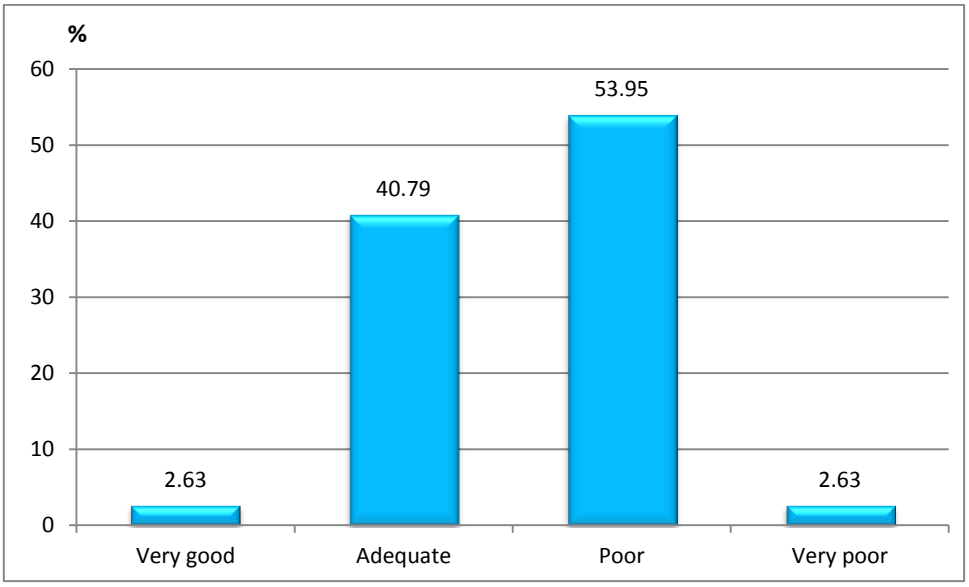


Fig. 3.34 Connection of business centers with intermodal transport chains in Danube region ranked by providers

Competition in intermodal transport

Rating of competition in IT by providers varies from very strong (100% in Austria and Germany) to weak in Moldova and Bosnia & Herzegovina (Table 3.19). the most part of providers ranked as strong in Slovenia nad Slovaka while in Montenegro it is dominantly rated as weak.

When it comes to MRs, MR1 is singled out where only two providers rated low. In MR2 competition is rated as average while in MR3 is rated as average and low (Table 3.19, Fig. 3.35). In DR it is rated as average (Table 3.19, Fig. 3.36).

Table 3.19 Competition in intermodal transport ranked by providers

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Strong	100.0	100.0	71.4	40.0	66.7	20.0	0.0	0.0	0.0	20.0	0.0	12.5	16.7	18.2	87.5	29.2	13.9	34.2
Average	0.0	0.0	14.3	60.0	33.3	80.0	80.0	100.0	0.0	80.0	0.0	50.0	33.3	36.4	6.3	58.3	38.9	38.2
Weak	0.0	0.0	14.3	0.0	0.0	0.0	20.0	0.0	100.0	0.0	100.0	37.5	50.0	45.5	6.3	12.5	47.2	27.6
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

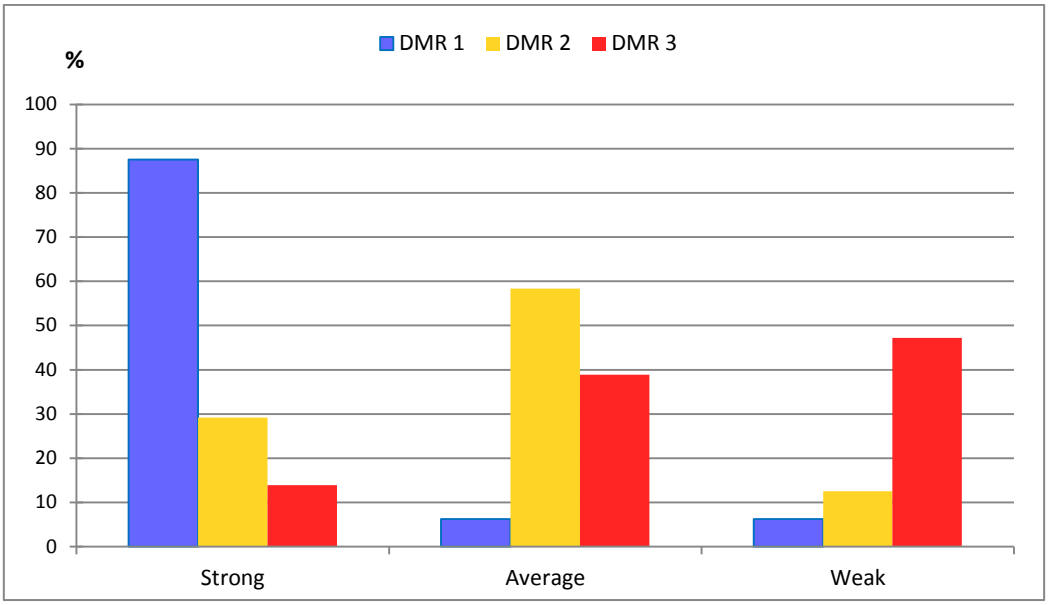


Fig. 3.35 Competition in intermodal transport in MRs ranked by providers

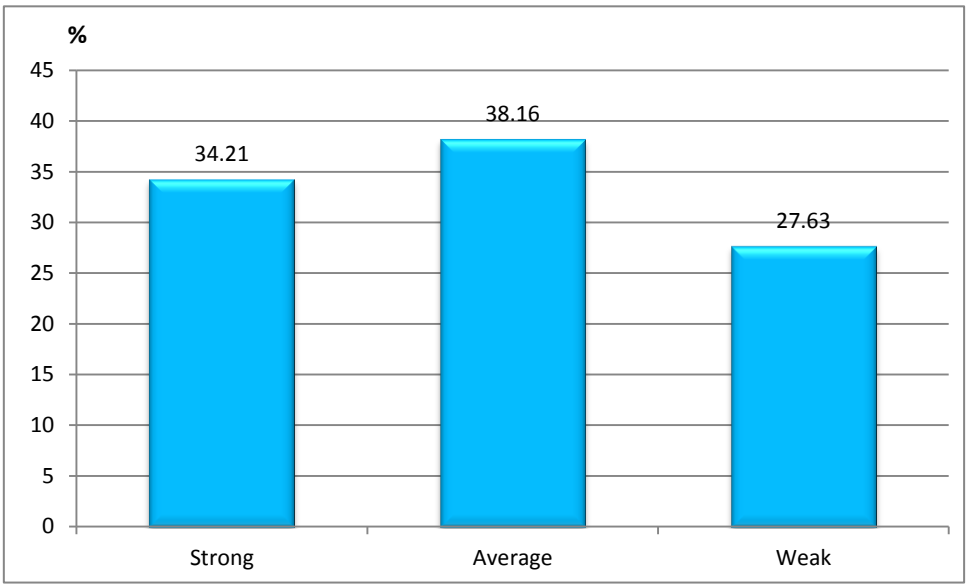


Fig. 3.36 Competition in intermodal transport in Danube region ranked by providers

Intermodal transport quality in Danube Region

Ratings regarding quality do not vary in countries. Only in Ukraine it is rated as high (Table 3.20). Given that opinions regarding quality of IT do not differ immensly, difference is not seen among MRs so in total rating is average (Table 3.20, Fig. 3.37).

Table 3.20 Intermodal transport quality in Danube Region ranked by providers

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Very high	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	1.3
High	0.0	0.0	14.3	0.0	0.0	20.0	0.0	100.0	0.0	0.0	0.0	37.5	16.7	36.4	6.3	8.3	22.2	14.5
Medium	75.0	100.0	42.9	40.0	83.3	40.0	60.0	0.0	100.0	80.0	66.7	50.0	83.3	36.4	68.8	58.3	58.3	60.5
Poor	25.0	0.0	42.9	60.0	16.7	40.0	40.0	0.0	0.0	0.0	33.3	12.5	0.0	27.3	25.0	33.3	16.7	23.7
Very poor	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

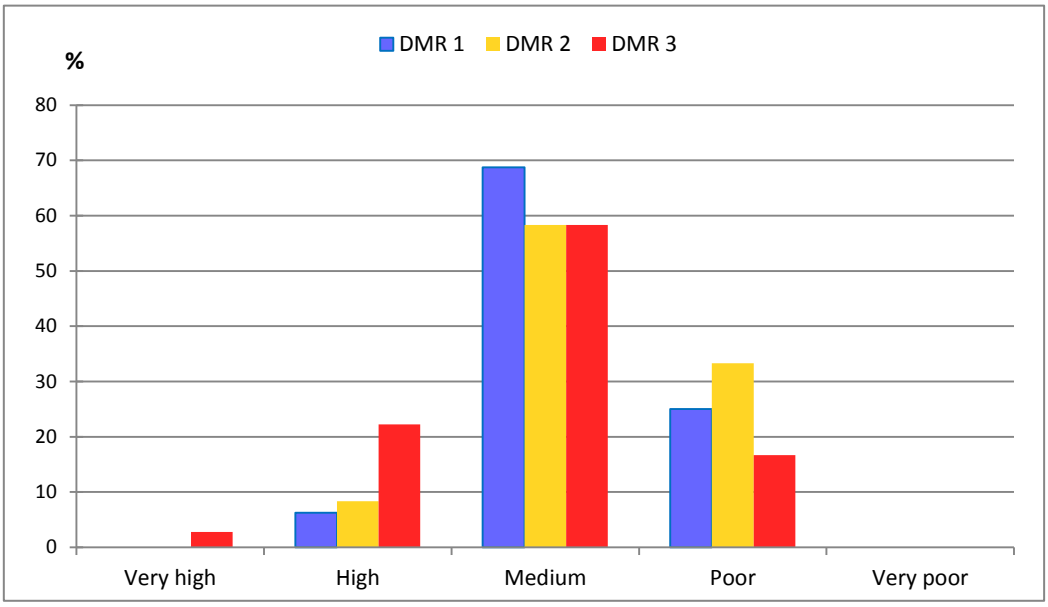


Fig. 3.37 Intermodal transport quality in Danube Region by MRs ranked by providers

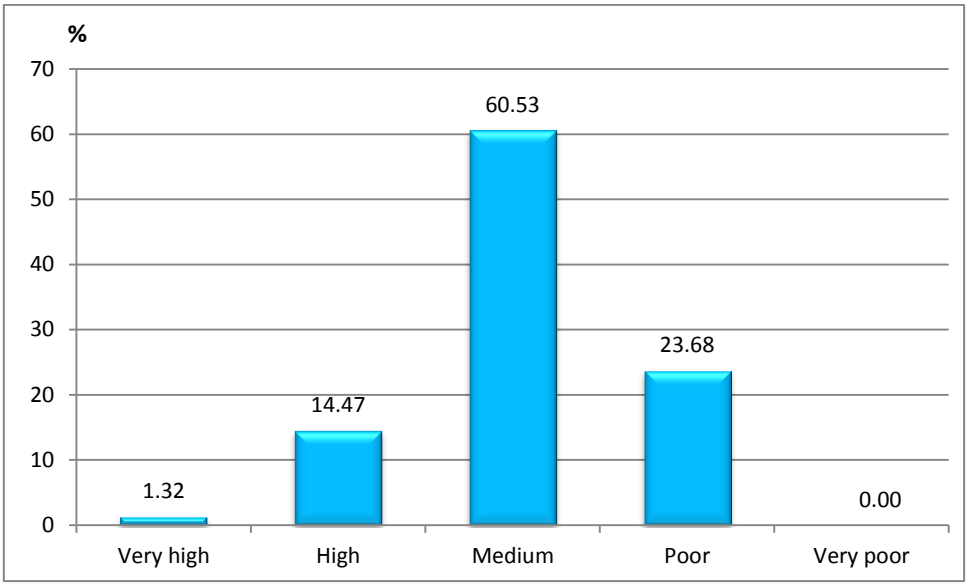


Fig. 3.38 Intermodal transport quality in Danube Region ranked by providers

Intermodal transport quality in countries

Rating of service provided regarding quality differ significantly. It is ranekd very high in Austria and Germany and very low, mainly in Moldova and Bosnia & Herzegovina (Table 3.21).

Posmatrano po mikro regionima, ocena kvaliteta sistema intermodalnog transporta od strane davaoca usluga odgovara analizi prilikom njihove identifikacije. Ukupna ocena kvaliteta u MR 1 je „visoka", u MR 2 je „srednja", a u MR 3 je uglavnom „loša", sa izuzetkom Bugarske, gde je ocena kvaliteta viša (Table 3.21, Fig. 3.39).

Table 3.21 Intermodal transport quality in countries ranked by providers

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Very high	75.0	60.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	37.5	0.0	2.8	9.2
High	25.0	40.0	57.1	0.0	16.7	60.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1	43.8	16.7	2.8	15.8
Medium	0.0	0.0	42.9	100.0	66.7	40.0	40.0	100.0	0.0	80.0	0.0	62.5	50.0	27.3	18.8	58.3	41.7	42.1
Poor	0.0	0.0	0.0	0.0	16.7	0.0	60.0	0.0	50.0	0.0	66.7	37.5	50.0	63.6	0.0	20.8	47.2	28.9
Very poor	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	33.3	0.0	0.0	0.0	0.0	4.2	5.6	3.9
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Na nivou Danubeskog regiona, davaoci usluga su kvalitet sistema intermodalnog transporta ocenili uglavnom kao „srednji" (oko 42%) i „loš" (oko 29%). Ipak, ukupna ocena kvaliteta sistema intermodalnog transporta u Danubeskom regionu je

„srednja" s obzirom da ga je oko 25% davaoca ocenilo kao „veoma visok" i „visok" (Table 3.21, Fig. 3.40).

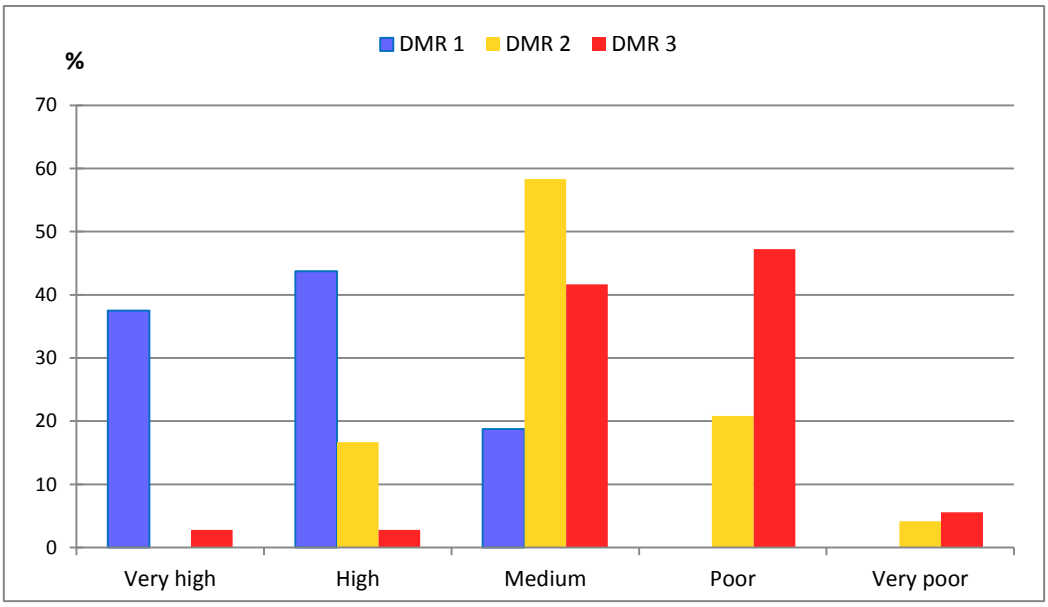


Fig. 3.39 Intermodal transport quality in countries by MRs ranked by providers

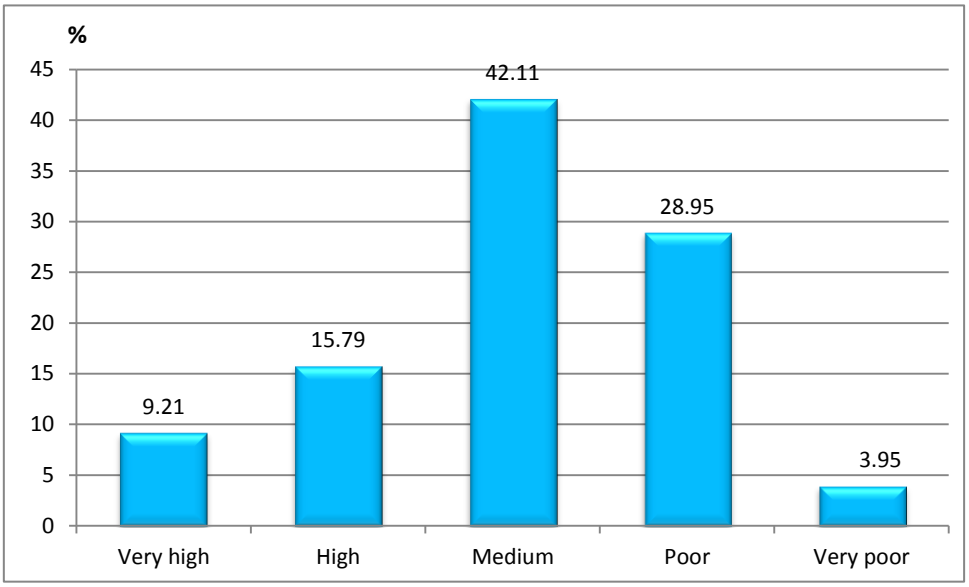


Fig. 3.40 Intermodal transport quality in countries ranked by providers

Intermodal transport quality on corridors

IT services quality is the best rated in Czech Republic and Slovenia ant the worst rated in Moldova and Romania (Table 3.22). The most part of providers is not familiar with the quality of services on corridors, primarily in Ukraine and Bulgaria, Romania and Hungary.

Analysis of IT services quality across MRs do not vary between MR2 and MR3 where the most answers are „unfamiliar". Providers in MR1 rated as average and high, in

MR2 as average and in MR3 as average and low (Table 3.22, Fig. 3.41). In DR, quality was rated mainly as average and low (Table 3.22, Fig. 3.42).

Table 3.22 Intermodal transport quality on corridors by rated providers

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
High	25.0	32.0	38.8	44.0	20.0	23.3	5.7	0.0	0.0	10.0	3.3	10.0	4.2	12.1	33.7	19.0	9.4	17.6
Medium	45.8	44.0	38.8	40.0	50.0	26.7	14.3	0.0	25.0	20.0	50.0	37.5	45.8	25.3	41.8	29.9	32.9	33.9
Low	12.5	12.0	20.4	16.0	20.0	16.7	20.0	0.0	33.3	20.0	36.7	32.5	45.8	22.2	16.3	19.0	28.6	23.0
Not in use	16.7	12.0	2.0	0.0	10.0	33.3	48.6	100.0	41.7	50.0	10.0	12.5	4.2	31.3	8.2	29.2	23.5	21.9
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	11.4	0.0	0.0	0.0	0.0	7.5	0.0	9.1	0.0	2.9	5.6	3.6
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

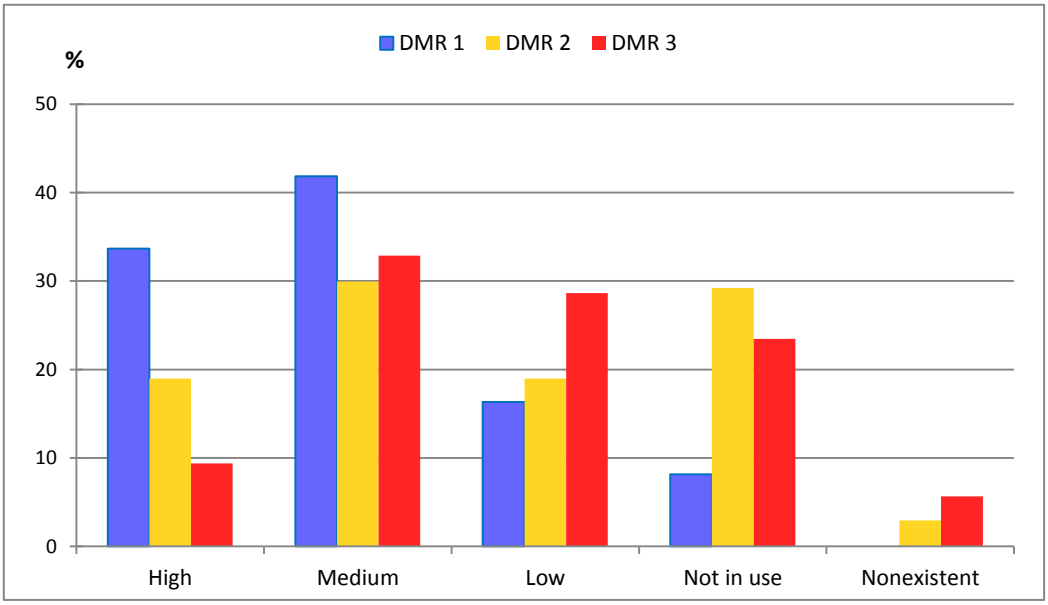


Fig. 3.41 Intermodal transport quality on corridors in MRs by rated providers

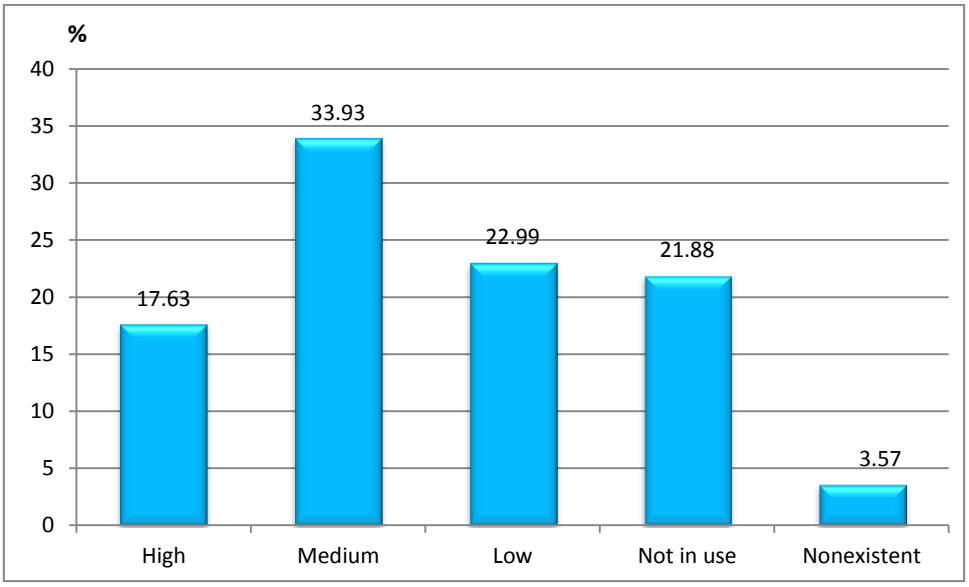


Fig. 3.42 Intermodal transport quality on corridors in Danube region by rated providers

The providers in Austria estimated that the highest level of quality of intermodal service is on the corridor to Prague (the rating is between „high" and „medium"). The corridor to the Dunajska Streda offers the same quality of intermodal service, but half of providers did not use this corridor. The corridors to Ceska Trebova, Ljubljana and Sopron are estimated with an average rating as „medium". The most unfavorable quality of intermodal service is on the corridor to Zagreb (mostly „low").

In Germany, by the providers the highest rating is given to the corridors to Northern European ports („high" level of quality). The corridors to Czech Republic and Slovakia offer slightly higher quality (the average rating is between „high" and „medium") than the corridors to the Adriatic ports (primarily Koper) and Budapest, which are assessed predominantly as „medium". Corridors with destinations in Serbia do not use 40% of prviders. Other prviders estimate the quality of service in this corridor as „low" .

In Slovenia, the most favorable ratings are characteristic for the corridors to Munich (the rating is predominantly „high") and Graz (the average rating tends to „high"). The average rating for the corridors to Dunajska Streda, Budapest, Furnitc ranges from level between „high" and „medium" to „medium", respectively. A slightly higher dispersion of results is noticeable for the corridor to Dunajska Streda. The corridors to Zagreb, and especially to Belgrade, are much lower estimated; the average rating is at a level between the „low" and „medium" for corridor to Zagreb and the "low " for corridor to Serbia.

The providers in Czech Republic gave the highest rating for the corridors to the Northern European ports. The corridors to Munich, to Slovakia and Hungary (via the Dunajska Streda) are estimated with average rating that tends „high" level. The corridors to Austria (Krems and Salzburg) are estimated with an average rating closer to the „medium" level than the „low" level.

In Slovakia, the most favorable rating of the quality of intermodal service is given to the corridors to Ceska Trebova and Adriatic ports (primarily Kopar, Rijeka). The

corridors to Krems and Budapest are predominantly rated as „medium". The providers indicated that the quality of intermodal service on the corridor to Chop in Ukraine was predominantly low, while 30% indicated that they did not use this corridor.

In Hungary, service providers rated the corridors to Munich, Koper, Vienna Streda and Arad with a score that is between „high" and „medium". It should be emphasized that the corridor to Arad is not used by 60% of surveyed providers. The quality of service on the corridors to Chop and Serbia (Novi Sad and Belgrade) is a „low" . Also, 60% of surveyed providers do not use this corridor.

In Romania, service providers marked the corridor to Budapest as the most favorable from the standpoint of the quality of intermodal service(the average rating is higher than the „medium" level). The orridors to Bulgaria (Varna, Burgas and Stara Zagora) are similarly assessed (the average rating tends to „medium" level). Only 20% of surveyed providers use the corridor to Chisinau, which is rated as „low" . Over 80% of surveyed providers do not use corridors to Belgrade, Chop, Ilicevska and Chisinau, while 20% of the providers have indicated that these corridors do not exist, except the corridor to Chisinau.

According to the poor data received from the providers in Ukraine, one provider indicated that he did not use any of the offered corridors (to Hungary, Slovakia, Romania and Moldova).

According to the poor data for Moldova, the two providers marked the corridors to Constanta and Odessa/Ilichevsk as the most favorable rating („medium" level of quality); one provider does not use the corridor to Odessa/Ilicevsk. One provider rated the corridors to Ukraine (Chop and Kiev) and Romania (Bacakau, Rastolita and Suekava) as „low" and second provider not use these corridors.

The providers in Bulgaria rated the quality of intermodal service as „medium" on the corridors to Constanta, Bucharest/Ploiesti with (a higher dispersion of results is expressed). The providers in Bulgaria do not use the corridors to Belgrade and Pristina.

In Bosnia and Herzegovina, all providers marked the corridor to Koper and Rijeka with a „medium" rating. The quality of intermodal service on the corridors to Zagreb and Ljubljana are estimated as slightly higher than the „medium" level. About 17% of providers do not use corridors to Koper, Rijeka, Belgrade and Bar. The providers which using the corridors to Belgrade and Ploče have evaluated these corridors with a score between „medium" and „low" . All providers which using the corridor to Bar rated this corridor with the quality of intermodal service as „low" .

In Croatia, the most favorable estimated corridors by the providers are the corridors to Budapest and Ljubljana (average rating is „medium"). The quality of intermodal service on the corridors to Belgrade, Banja Luka and Sarajevo are predominantly rated as „low" . 40% of surveyed providers in Croatia do not use corridors with a destination in Bosnia and Herzegovina.

The providers in Montenegro rated all offered corridors (to Belgrade, Pristina, Adriatic ports and Sarajevo) with an average score between the „medium" and „low" levels. Deviations among ratings in relation to all corridors are negligible.

In Serbia, The providers marked, as the most favorable corridors, the connections to Koper, Ljubljana, Rijeka, Budapest and Thessaloniki (the average rating is slightly higher than the „medium" level of quality). In that, from 30% to 50% of the surveyed providers do not use the mentioned corridors. Over 50% of surveyed providers do not use corridors to Bulgaria, Bosnia and Herzegovina and Romania (Constanta). Other providers estimated the quality of the intermodal service of these three corridors as predominant "low." The all results are characterized by a high dispersion.

Lead time on intermodal transport corridors

Lead time is the best rated by providers in Slovenia, Germany and Czech Republic. The worst rates are in Montenegro and Croatia and in Bosnia & Herzegovina (Table 3.23).

Results of analysis of lead time showed that differences are not that big differences. The most part of providers in MR1 and MR2 rated as short and average while in MR3 was rated as average and long with the notable number of „unfamiliar with" responses (Table 3.23, Fig. 3.43). In the whole DR, lead time was rated as average (Table 3.23, Fig. 3.44).

Table 3.23 Lead time on intermodal transport corridors rated by providers

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Very short	4.2	12.0	30.6	12.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	3.0	19.4	4.4	2.3	6.7
Short	41.7	56.0	18.4	32.0	40.0	23.3	2.9	0.0	0.0	20.0	10.0	2.5	12.5	14.1	33.7	20.4	11.7	19.2
Medium	25.0	12.0	34.7	44.0	43.3	26.7	25.7	0.0	58.3	15.0	30.0	37.5	33.3	18.2	26.5	35.0	24.9	28.3
Long	8.3	8.0	12.2	12.0	6.7	6.7	2.9	0.0	0.0	10.0	26.7	25.0	41.7	19.2	10.2	5.8	23.0	15.0
Very long	0.0	4.0	2.0	0.0	0.0	3.3	8.6	0.0	0.0	0.0	10.0	12.5	12.5	5.1	2.0	2.9	7.5	4.9
Not in use	20.8	8.0	0.0	0.0	10.0	30.0	48.6	100.0	41.7	55.0	23.3	15.0	0.0	36.4	7.1	28.5	28.2	23.7
Nonexistent	0.0	0.0	2.0	0.0	0.0	0.0	11.4	0.0	0.0	0.0	0.0	2.5	0.0	4.0	1.0	2.9	2.3	2.2
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

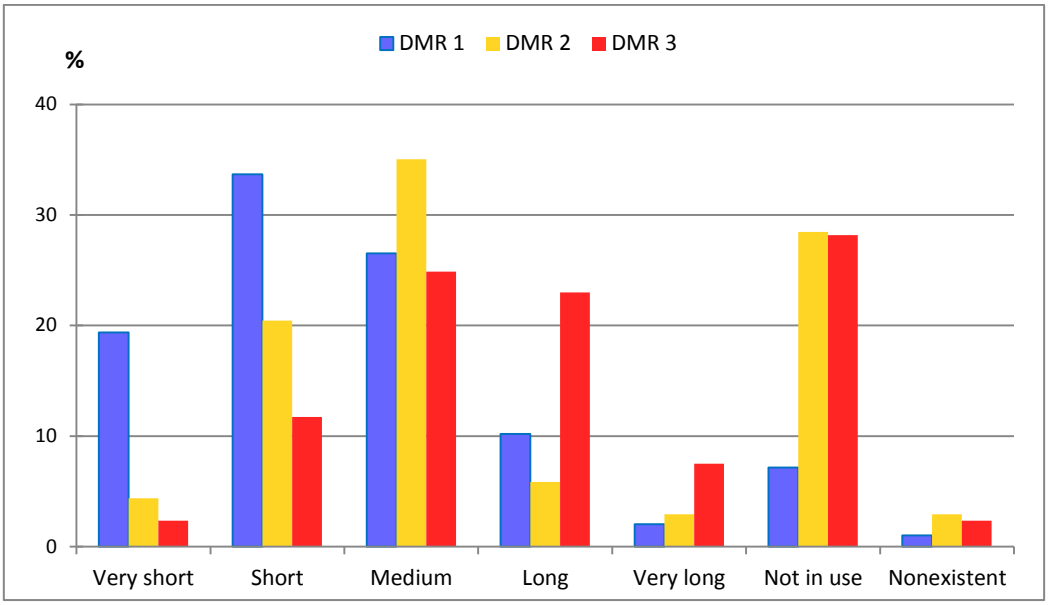


Fig. 3.43 Lead time on intermodal transport corridors in MRs rated by providers

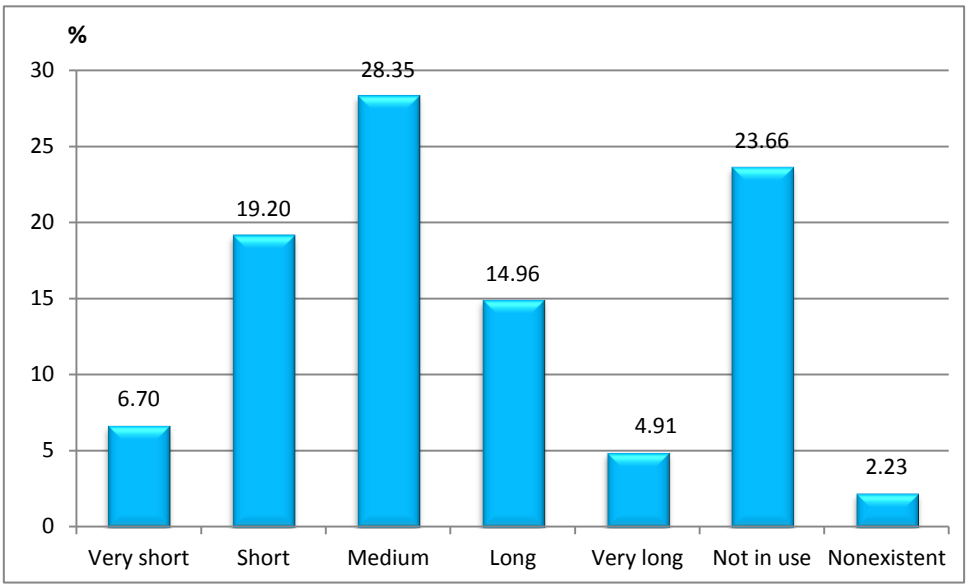


Fig. 3.44 Lead time on intermodal transport corridors in Danube region rated by providers

In Austria, the providers marked three corridors with an average rating as „short". These are the corridors to Adriatic ports, and the destinations in Czech Republic (Prague and the Ceska Trebova). The corridor to Sopron are rated in average as „medium" while 50% of the providers identified the corridor to the Dunajska Streda as a corridor with an average rating of delivery time between „medium" and „short" (the other half does not use this corridor). The corridor to Zagreb was marked by half the donor with an average rating between „medium" and „long" while the other half does not use this corridor.

In Germany, providers point out the corridors to Northern European ports with the best delivery times. For corridors to Budapest, all surveyed providers rated the

delivery time as „short". The slightly more unfavorable delivery time is on the corridors to the Adriatic ports and destinations in the Czech Republic and Slovakia (the rating tends to the level „short"). The most unfavorable average rating is on the corridor toZagreb (the delivery time is at the „long" level).

In Slovenia, the providers marked a few corridors with most favorable delivery times. These are the corridor to Munich, Dunajska Streda, Graz and Budapest (the average rating is a „short"; more of than 40% of providers rated the delivery time as „very short"). For the other three corridors (to Belgrade, Zagreb and Furnizt), the average rating of delivery time tends to „medium" level).

In Czech Republic, the corridors to the Northern European ports are marked as the most favorable corridors in terms of delivery times. The corridors to Slovakia and Hungary (via the Dunajska Streda) are also marked with a favorable rating; 80% of the providers indicate the delivery time as „short". The corridors to Munich and Austria (Krems and Salzburg) have slightly more unfavorable rating of delivery times. The average score for the corridor to Munich tends to be between „medium" and „short". The average rating for both corridors to Austria is even lower, and it is „medium" and between „medium" and „long" for Salzburg and Krems respectively.

In Slovakia, in terms of delivery time, the corridors to Krems and the Ceska Trebova are marked as the most favorable by providers (average rating is above the „medium" level). The other corridors to Adriatic ports, Budapest and Chop are rated in average as „medium".

In Hungary, the providers estimated that the corridor to Munich offers a predominantly short delivery time. The corridors to Koper and Dunajska Srtreda, have a longer delivery time that tends to level „medium". 40% of the providers using the corridors to Belgrade (rating of delivery time is a „long") or to Chop (rating of delivery time is between „medium" and „short"). Also, 40% of the providers using the corridor to Arad estimated delivery time on this corridor as „short".

The surveyed providers in Romania use only three corridors of the seven offered for evaluating. The corridors to Budapest, Stara Zagora and Burgas are rated in average as close to the „medium" level.

According to very poor data received from the providers in Ukraine, one provider indicated that he does not use any of the offered corridors (to Hungary, Slovakia, Romania and Moldova). So the delivery time cannot be estimated.

According to the poor data for Moldova, one provider indicated the corridors to Ukraine (Odessa/Ilicevsk and Kiev) and Romania (Constanta, Bacau, Rastolita and Suecava) with a „medium" rating, while the second provider does not use these corridors. The corridor to Constata is marked from both providers with a „medium" rating.

The surveyed providers in Bulgaria use only two of the all offered corridors. The corridor to Romania (Bucharest/Ploiesti) is rated as slightly better than the corridor to Constanta in terms of delivery time. These ratings are between „medium" and „short" (for the corridor to Bucharest/Ploiesti) and „medium" (for the corridor to Constanta).

In Bosnia and Herzegovina, the providers are rated the corridor to Adriatic ports as „medium" in terms of delivery time. Slightly more favorable delivery time is on the corridor to Ljubljana. The average score for the corridors to Ploče, Belgrade and Bar is similar, ie, at the „long" level.

The providers rated the delivery time as predominantly „medium" for the corridors to Budapest and Ljubljana. For corridors to Belgrade and destinations in Bosnia and Herzegovina, the delivery time is generally marked as „long" . The results of estimated delivery time of all corridors are characterized by a high dispersion.

Providers in Montenegro, as the most favorable corridor by the delivery time, marked the corridor to Adriatic ports (the predominant rating is „medium"). Delivery time for corridors to Belgrade, Pristina and Sarajevo tends between „long" and „medium". The all results are characterized by a high dispersion.

According to the surveyed providers, the delivery time in Serbia is most favorable on the corridors to Koper, Rijeka and Ljubljana. For these three corridors, with fewer deviations, the average rating is between „short" and „medium". On corridors to Thessaloniki, Bulgaria, Bosnia and Herzegovina, providers estimated that the delivery time was slightly more unfavorable than the previous three corridors (the average rating tends between „long" and „medium"). The most unfavorable is the corridor to Bar, for which the delivery time is at a level between „long" and "very long".

When it comes to connectedness of business center in Danube Region, providers singled out different corridors with accordance with their demans and users needs (Table 3.24). It could be seen that providers in MR1 as a problems standed out missing or inadequate links with southen and eastern DR countries, and those in MR3 standed out links within country.

Table 3.24 Missing links of business centers in intermodal transport in Danube Region

Zemlja	Nedostajuće veze
Austria	Vienna-Koper, Beograd, Arad
Germany	Munich-Belgrade; Munich-Arad; veze sa istočnim zemljama Dunavskog regiona
Slovenia	Beograd, Podgorica, Sarajevo, Bukurešt, Arad
Czech Republic	Prague-Ljubljana-Koper; veze sa Bugarskom, Srbijom, Rumunijom
Slovakia	Kosice-Koper; Beograd, Arad
Hungary	Munich, Salzburg, Graz, Ljubljana, Ploiesti, Arad, Belgrade, Chop
Romania	Beograd, Zagreb, Koper, Bukurešt, veze sa Ukrajinom
Ukraine	-
Moldova	Veze na nacionalnom nivou; Chisinau-Giurgiulesti; Chisinau-Odessa
Bulgaria	Sofija-Bukurešt; Beograd, Zagreb, Ljubljana, Bar, Budimpešta
Bosnia & Herzegovina	Veze na nacionalnom nivou; Luka Ploče, Vukovar, Novi Sad
Croatia	Veze na nacionalnom nivou; Rijeka-Budimpešta; Luka Rijeka-koridor Rajna-Dunav; Beč, Bratislava
Montenegro	Veze na nacionalnom nivou; Podgorica-Nikšić-Sarajevo; veze sa Srbijom, Slovačkom
Serbia	Veze na nacionalnom nivou; rečni transport sa centrima na Dunavu; Bar, Koper; veze sa Slovačkom, Nemačkom

Place for loading/unloading of intermodal unites

The nearest intermodal terminal as a dominant place is singled out by providers in Slovenia, which is opposite from users' answers (Table 3.25). in MR1 and MR2 consignor/consignee's premises are identified as the main palce. The most part of MR3 (2/3 of respondents) has not been clear regarding this matter and only in Bosnia & Herzegovina premises are the main ansswer (Table 3.25, Fig. 3.45). In DR , above half of repondents did not mention place of discharge/charge and only 11% of them identified the nearest terminal (Table 3.25, Fig. 3.46).

Table 3.25 Place for loading/unloading of intermodal unites rated by providers

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
At company's premises	75.0	80.0	0.0	20.0	50.0	80.0	40.0	0.0	100.0	0.0	83.3	0.0	33.3	18.2	43.8	50.0	25.0	36.8
It depends	25.0	20.0	57.1	80.0	50.0	0.0	40.0	100.0	0.0	80.0	16.7	75.0	66.7	81.8	37.5	41.7	66.7	52.6
At intermodal terminal	0.0	0.0	42.9	0.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0	25.0	0.0	0.0	18.8	8.3	8.3	10.5
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

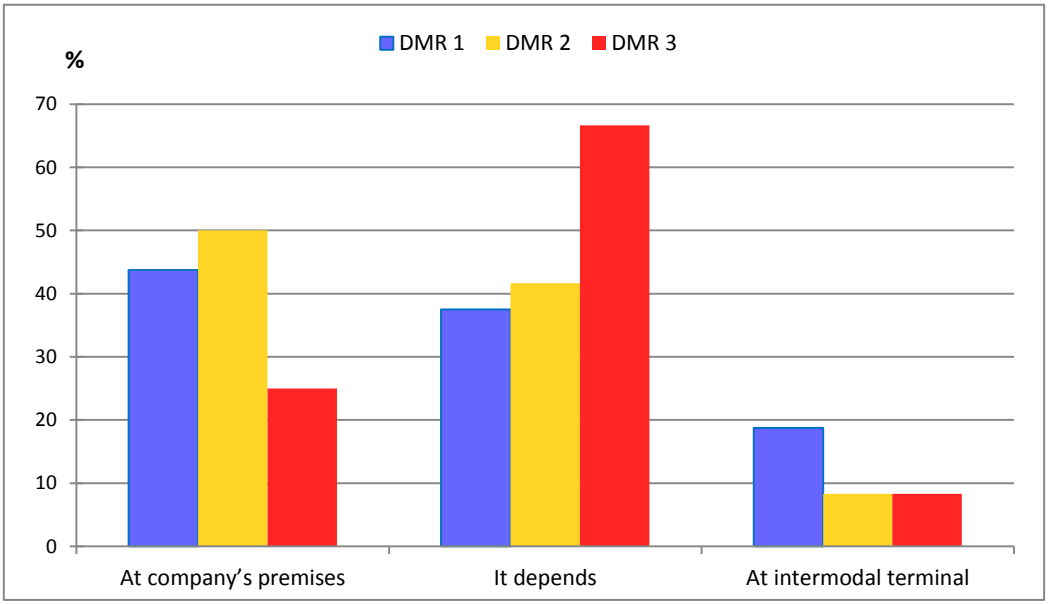


Fig. 3.45 Place for loading/unloading of intermodal unites in MRs rated by providers

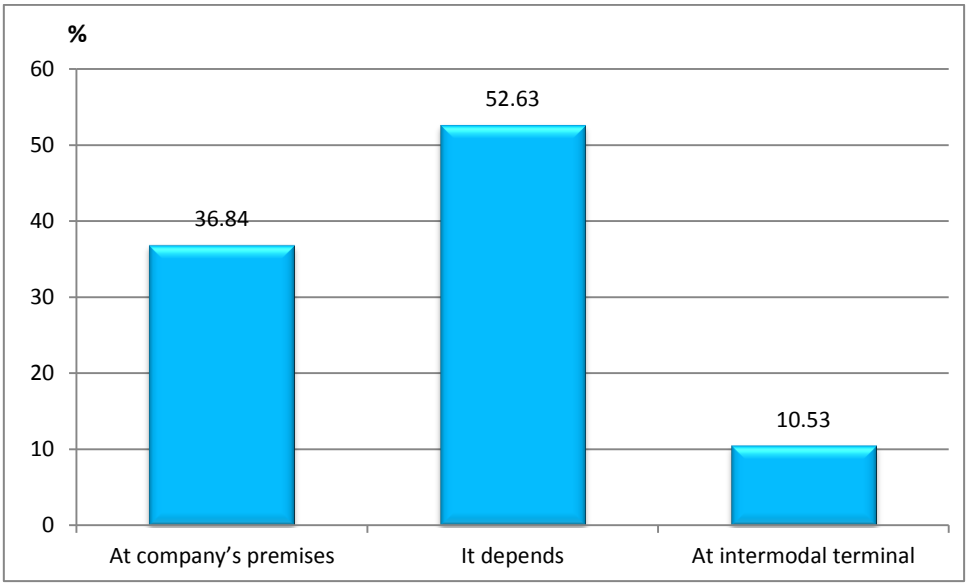


Fig. 3.46 Place for loading/unloading of intermodal unites in Danube region rated by providers

Using of intermodal transport technologies – conteiner technology

Providers rated as a very high level of use, especialy in Germany and Austria, Slovenia and Czech Republic and in Ukraine (100%). Although, third of respondents in Bosnia & Herzegovina and in half of them in Montenegro rated as low (Table 3.26).

When it comes to MRs, there is a difference among them. In MR1, from all repondents, use of this technology is rated as high, in MR2 opinians are devided between high and average while in MR3 the variations are the biggest ones with the most common answer as average (Table 3.26, Fig. 3.47). In DR level of use of container technology is rated as low by only 13% of providers and only in countries from MR3 (Table 3.26, Fig. 3.48).

Table 3.26 Level of use of container technology rated by providers

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
High	100.0	100.0	100.0	100.0	50.0	80.0	40.0	100.0	0.0	40.0	0.0	0.0	0.0	9.1	100.0	62.5	8.3	44.7
Medium	0.0	0.0	0.0	0.0	50.0	20.0	60.0	0.0	100.0	60.0	33.3	62.5	50.0	72.7	0.0	37.5	58.3	39.5
Low	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	66.7	25.0	50.0	9.1	0.0	0.0	27.8	13.2
Not in use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5	0.0	9.1	0.0	0.0	5.6	2.6
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

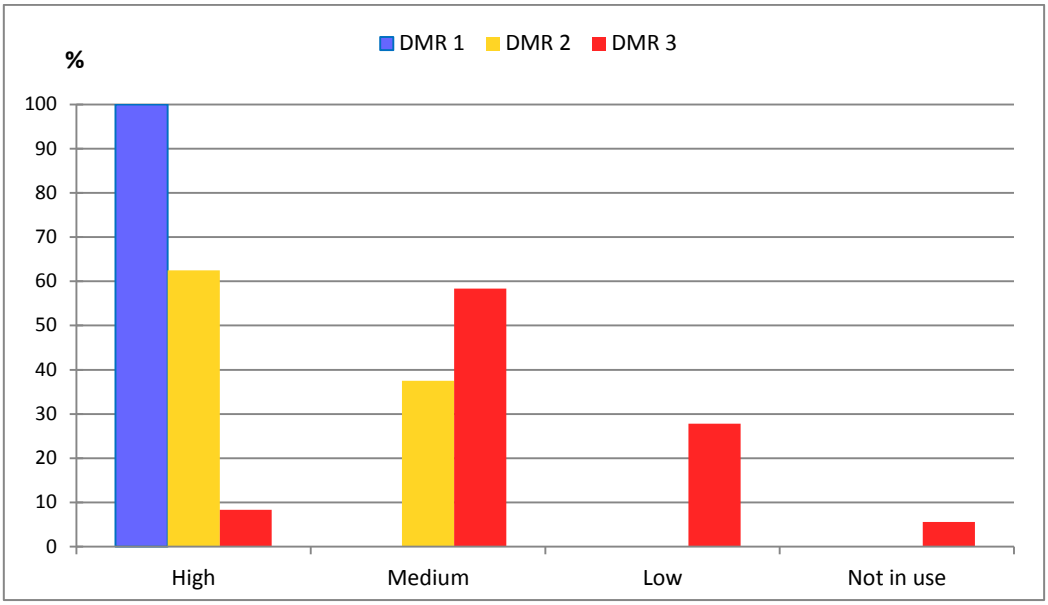


Fig. 3.47 Level of use of container technology in MRs rated by providers

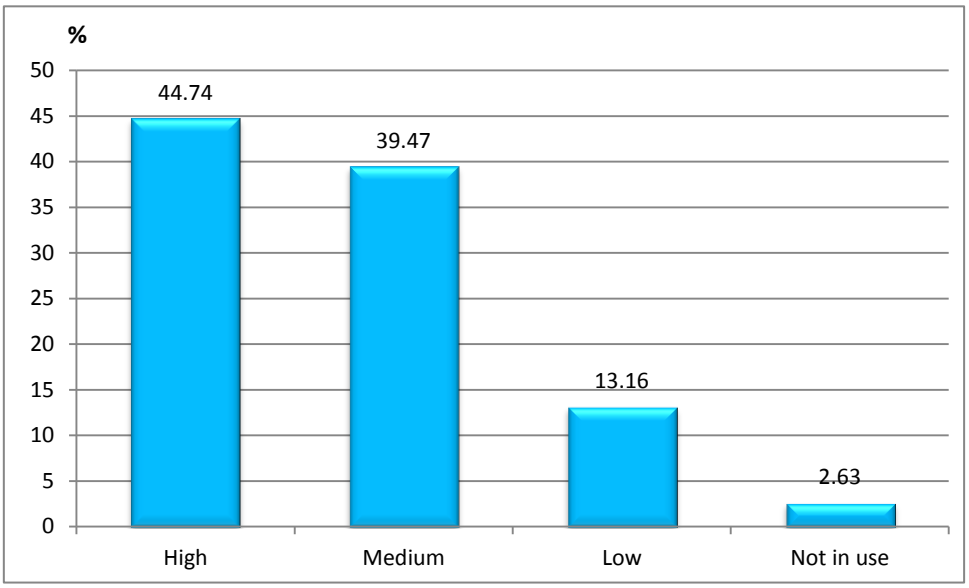


Fig. 3.48 Level of use of container technology in Danube region rated by providers

Using of intermodal transport technologies – hucke pack technology

Providers rated level of use of this technology as low, mainly in Czech Republic, Croatia and Hungary. Situation in Germany, Austria and Ukraine is the best rated. In the Slovakia, Moldova and Romania the most part of providers is not familiar with this technology (Table 3.27).

When it comes to MRs there is a significant difference betwen MR1 and remaining MRs. On the other hand, difference betwee MR2 and MR3 does not exist (Table 3.27, Fig. 3.49). Stepen primene drumsko-železničke tehnologije intermodalnog transporta na nivou Danubeskog regiona ocenjen je kao nizak od strane 50% ispitanih davaoca usluga (Table 3.27, Fig. 3.50).

Table 3.27 Level of use of hucke pack technology rated by providers

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
High	50.0	60.0	28.6	0.0	0.0	20.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	43.8	8.3	0.0	11.8
Medium	50.0	40.0	14.3	20.0	16.7	0.0	20.0	0.0	0.0	60.0	16.7	0.0	0.0	18.2	31.3	12.5	16.7	18.4
Low	0.0	0.0	57.1	80.0	33.3	60.0	40.0	0.0	50.0	40.0	50.0	75.0	66.7	54.5	25.0	50.0	58.3	48.7
Not in use	0.0	0.0	0.0	0.0	50.0	20.0	40.0	0.0	50.0	0.0	33.3	25.0	33.3	27.3	0.0	29.2	25.0	21.1
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

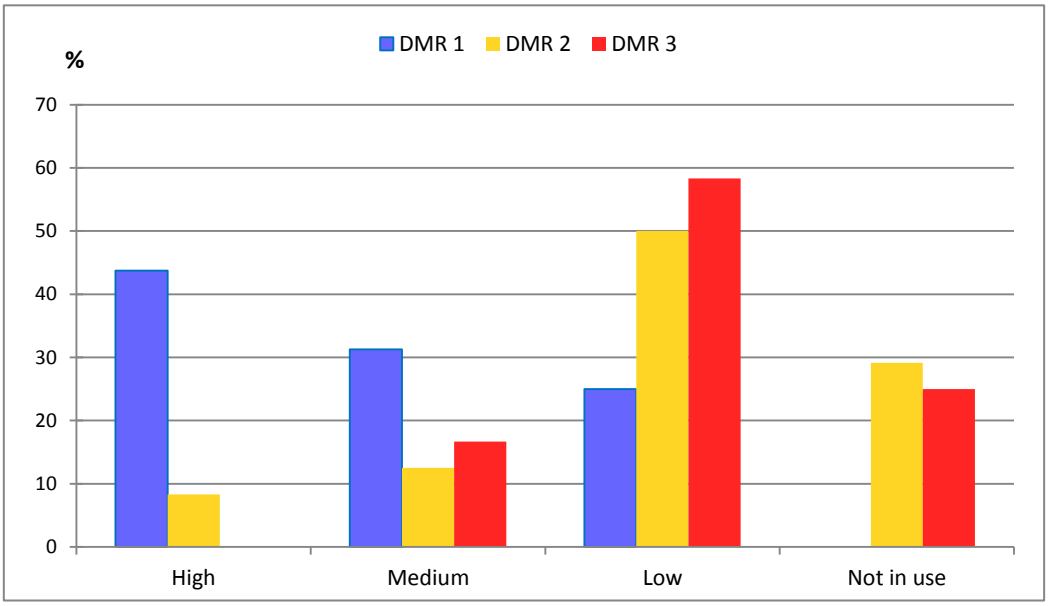


Fig. 3.49 Level of use of hucke pack technology in MRs rated by providers

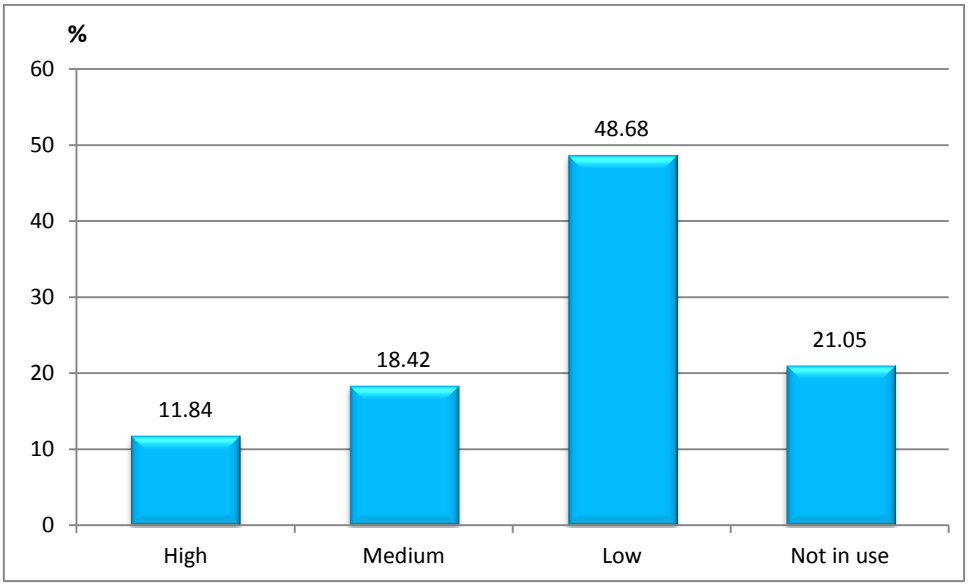


Fig. 3.50 Level of use of hucke pack technology in Danube region rated by providers

Using of intermodal transport technologies – semi-rail technology

Use of bimodal technology, semi-rail intermodl technology, with the large number of "not familiar with" responses. Implementation of this technology is rated as average only in Germany and Ukraine with a couple of providers from Slovakia (Table 3.28).

Among MRS there is a notable difference between MR1 and remaining countries from DR. In MR1 use of this technology is ranked as average but, one third of respondetns awas not familiar with this matter. In MR2 and MR3 use is ranked as low and share of unfamiliar respondents is greater than in previuos one (Table 3.28, Fig. 3.51). Finally, in DR use of this technology is low with the great participation of "unfamiliar with" (Table 3.28, Fig. 3.52).

Table 3.28 Level of use of semi rail technology rated by providers

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
High	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	0.0	0.0	1.3
Medium	0.0	60.0	42.9	0.0	0.0	0.0	0.0	100.0	0.0	20.0	0.0	0.0	0.0	9.1	37.5	4.2	5.6	11.8
Low	50.0	20.0	14.3	0.0	66.7	20.0	40.0	0.0	50.0	80.0	66.7	37.5	66.7	45.5	25.0	33.3	55.6	42.1
Not in use	50.0	0.0	42.9	100.0	33.3	80.0	60.0	0.0	50.0	0.0	33.3	62.5	33.3	45.5	31.3	62.5	38.9	44.7
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

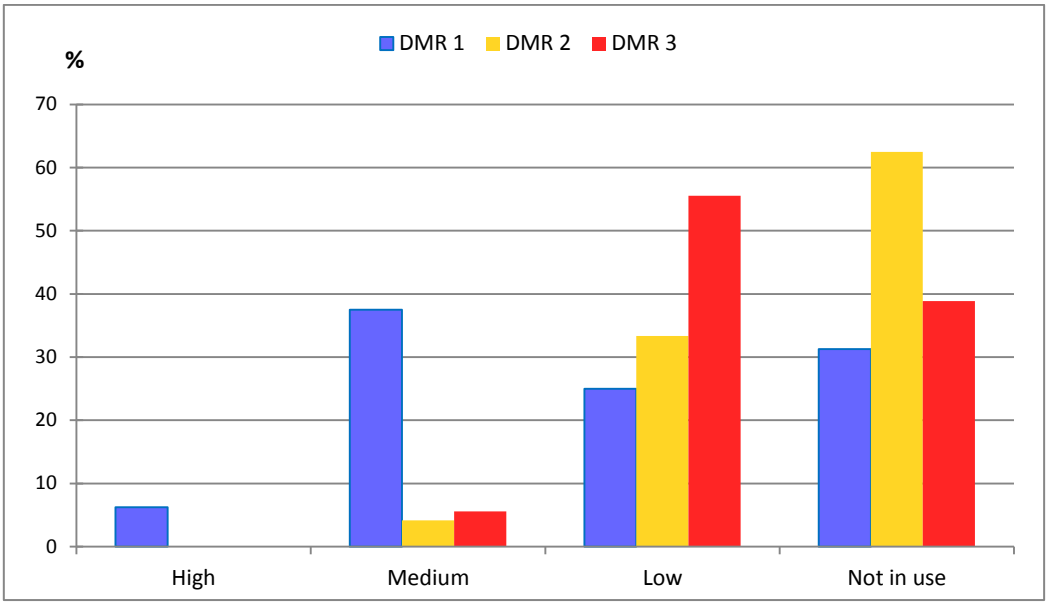


Fig. 3.51 Level of use of semi rail technology in MRs rated by providers

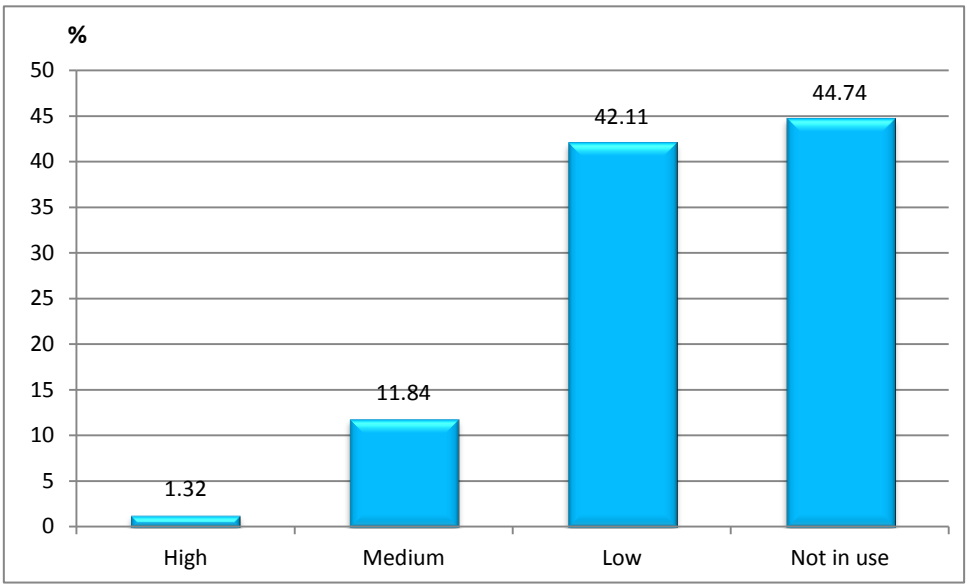


Fig. 3.52 Level of use of semi rail technology in Danube region rated by providers

Using of intermodal transport technologies – Ro-Ro technology

Providers rated use of this technology as low with the notable number of "unfamiliar with" responses. Implementation of this technology is rated as significant only in Ukraine and Slovenia (Table 3.29).

There is no big difference among MRS. Average rating is decreasing from MR1 to MR3 where providers that were not familirar with it account for two thirds (Table 3.29, Fig. 3.53). When it comes to whole DR, level is mostly rated as low with 40% of providers that are not familiar with it (Table 3.29, Fig. 4.54).

Table 3.29 Level of use of Ro-Ro technology rated by providers

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
High	0.0	20.0	57.1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	31.3	4.2	0.0	7.9
Medium	0.0	0.0	28.6	0.0	0.0	0.0	80.0	0.0	0.0	80.0	0.0	12.5	0.0	18.2	12.5	16.7	19.4	17.1
Low	25.0	80.0	14.3	0.0	16.7	40.0	20.0	0.0	0.0	20.0	83.3	62.5	66.7	18.2	37.5	16.7	47.2	35.5
Not in use	75.0	0.0	0.0	100.0	83.3	60.0	0.0	0.0	100.0	0.0	16.7	25.0	33.3	63.6	18.8	62.5	33.3	39.5
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

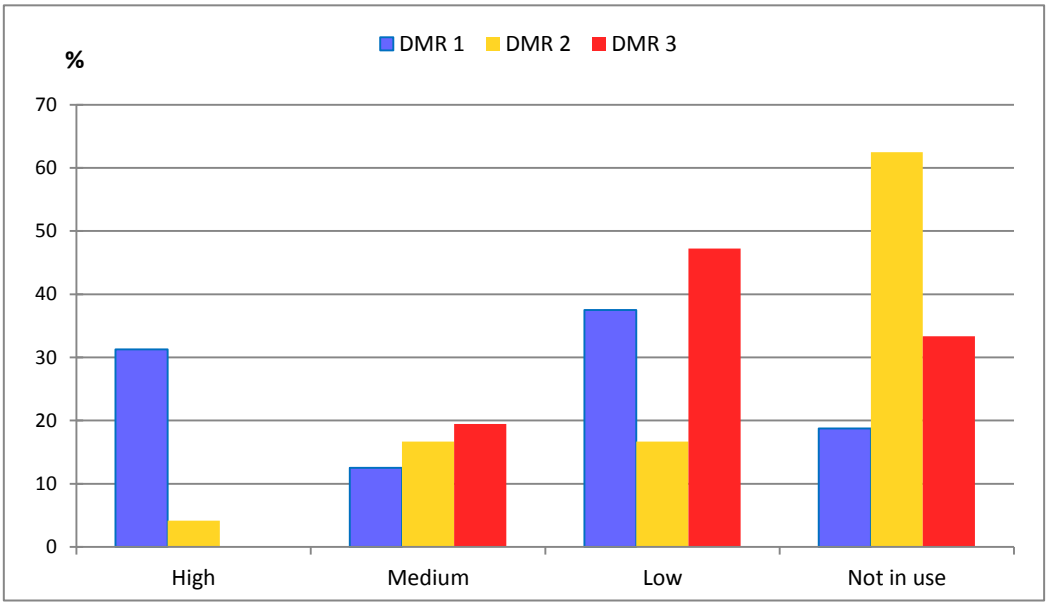


Fig. 3.53 Level of use of Ro-Ro technology in MRs rated by providers

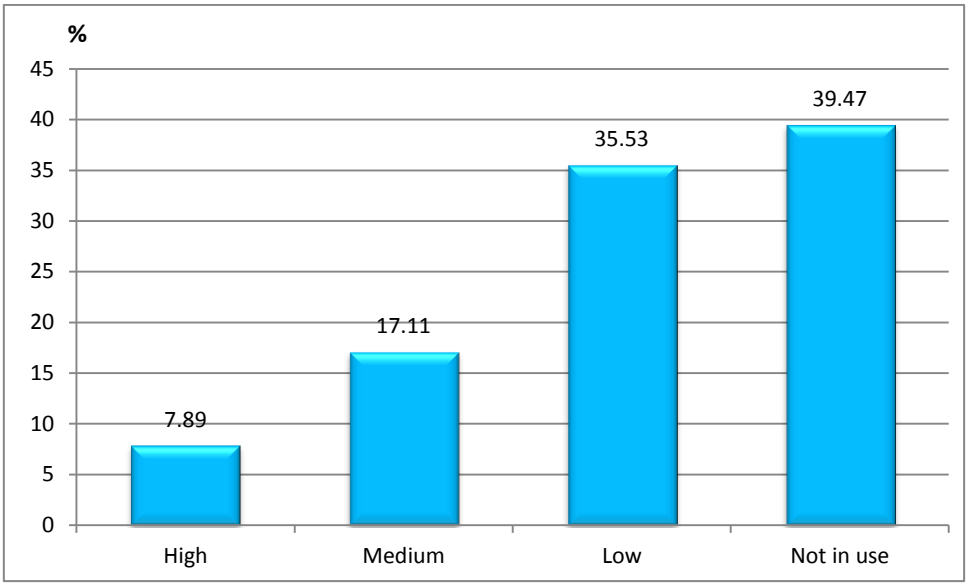


Fig. 3.54 Level of use of Ro-Ro technology in Danube region rated by providers

Using of intermodal transport technologies – river - maritime technology

Level of use of this technology is dominantly not know to providers. It was rated as average only in Ukraine (Table 3.30).

On the level of MRs, there is no difference and it was rated as low (Table 3.30, Fig. 3.55). In DR ¾ of respondents were unfamiliar with this matter (Table 4.30, Fig. 3.56).

Table 3.30 Level of use of river-maritime technology rated by providers

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
High	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6
Medium	25.0	20.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5	4.2	0.0	1.3
Low	0.0	40.0	14.3	0.0	0.0	20.0	40.0	0.0	50.0	0.0	33.3	37.5	33.3	27.3	18.8	16.7	27.8	25.0
Not in use	75.0	40.0	85.7	100.0	100.0	80.0	60.0	0.0	50.0	100.0	66.7	62.5	66.7	72.7	68.8	79.2	72.2	71.1
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

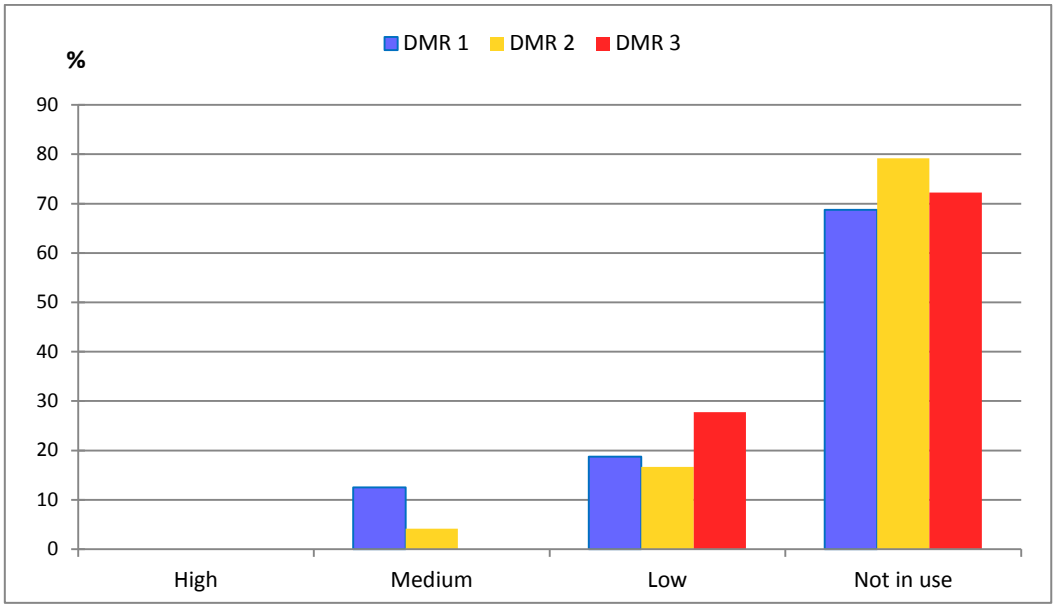


Fig. 3.55 Level of use of river-maritime technology in MRs rated by providers

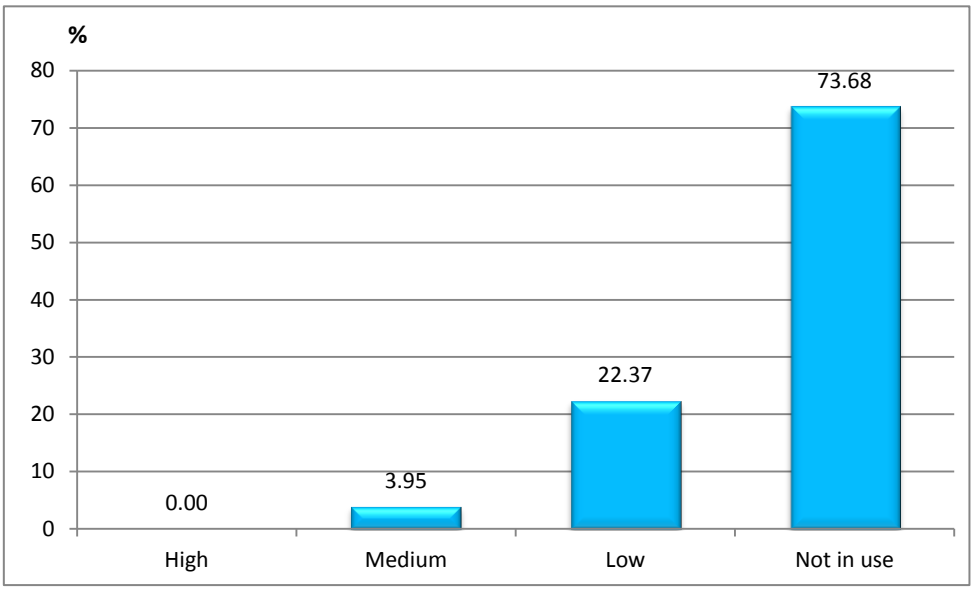


Fig. 3.56 Level of use of river-maritime technology in Danube region rated by providers

Examples of good business practice

As an example of good practice providers chose intermodal chains mentioned in Table 3.31. In following examples chains realized via port Koper to Austria (Villach, Gratz) and Germany (Munich), Czech Republic (Vratimov) and Slovkaia (Bratislava, Žilina) and Romania (Arad).

In examples of good practice reliability and delivery time were singled out (mainly in MR1) and organization and costs (mainly in MR3) (Table 3.32, slike 3.57 i 3.58).

Table 3.31 Examples of good pratice in intermodal chains

Zemlja	Primeri dobre prakse
Austria	Villach-Koper; Graz-Koper; Salzburg-Prague
Germany	Munich-Ljubljana; Munich-Koper; Munich-Bulk (Budapest); Duisburg-Ljubljana
Slovenia	Maribor-Wels (Ro-La); Koper-Ljubljana-Maribor and Koper-Budapest (shuttle container trains); Koper-Vienna-consignee; Far East-Koper-Budapest; Curtici (Rail Port Arad), Deva (RO)
Czech Republic	Prague-Hamburg; Vratimov-Koper; Ceska Trebova-Dunajska Streda
Slovakia	Bratislava-Koper; Žilina-Koper; Dunajska Streda-Ceska Trebova
Hungary	Budapest-Koper
Romania	Arad-Budapest
Ukraine	-
Moldova	Constanta-Giurgiulesti International Free Port- consignee
Bulgaria	Sofia-Romania-Budapest-Neuss-Koeln
Bosnia & Herzegovina	Luka Brčko-Beograd-Konstanca; Luka Ploče-Mostar-Sarajevo-Tuzla-Brčko; Luka Rijeka-Banja Luka-Lukavac
Croatia	Kontejnerski terminal Zagreb-Luka Rijeka-primalac; Luka Rijeka-Terminal Leget (Sremska Mitrovica)
Montenegro	-
Serbia	Luka Rijeka-Terminal Leget (Sremska Mitrovica); Luka Pirej-Terminal Nelt (Beograd); Malezija/Indonezija (mesto utovara)-Singapur (mesto pretovara)-Luka Burgas (mesto pretovara)-Pirot (mesto istovara)

Table 3.32 Highlighted parameters of intermodal service in examples of good practice by providers

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Lead time	50.0	100.0	71.4	60.0	66.7	80.0	40.0	100.0	50.0	20.0	50.0	12.5	50.0	54.5	75.0	62.5	38.9	53.9
Reliability	100.0	100.0	85.7	60.0	66.7	80.0	20.0	100.0	50.0	20.0	50.0	37.5	16.7	45.5	93.8	58.3	36.1	55.3
Costs	25.0	40.0	100.0	60.0	66.7	40.0	40.0	100.0	100.0	20.0	66.7	50.0	16.7	63.6	62.5	58.3	47.2	53.9
Organization	100.0	60.0	42.9	60.0	50.0	60.0	20.0	0.0	50.0	20.0	100.0	62.5	50.0	45.5	62.5	45.8	55.6	53.9
Technology	100.0	40.0	0.0	60.0	33.3	20.0	20.0	0.0	50.0	0.0	50.0	0.0	0.0	18.2	37.5	33.3	13.9	25.0
IT solutions	50.0	20.0	28.6	40.0	33.3	40.0	20.0	0.0	0.0	20.0	50.0	0.0	16.7	27.3	31.3	29.2	22.2	26.3
Services	50.0	40.0	0.0	20.0	33.3	40.0	20.0	0.0	0.0	0.0	66.7	12.5	16.7	0.0	25.0	25.0	16.7	21.1
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1	0.0	0.0	2.8	1.3

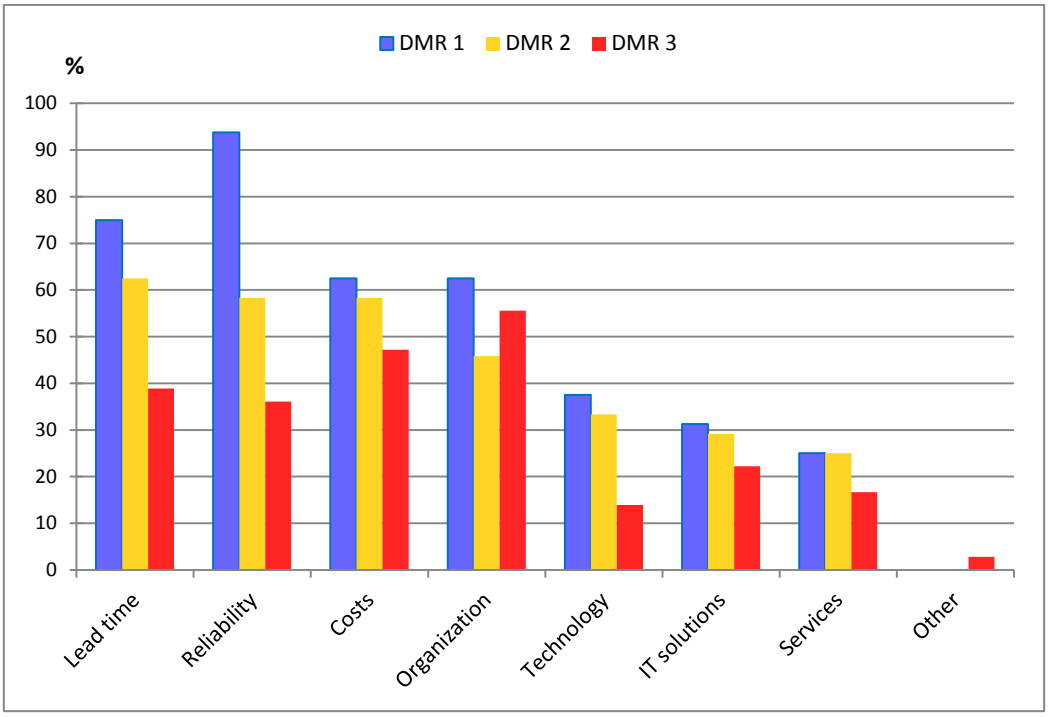


Fig. 3.57 Highlighted parameters of intermodal service in examples of good practice in MRs by providers

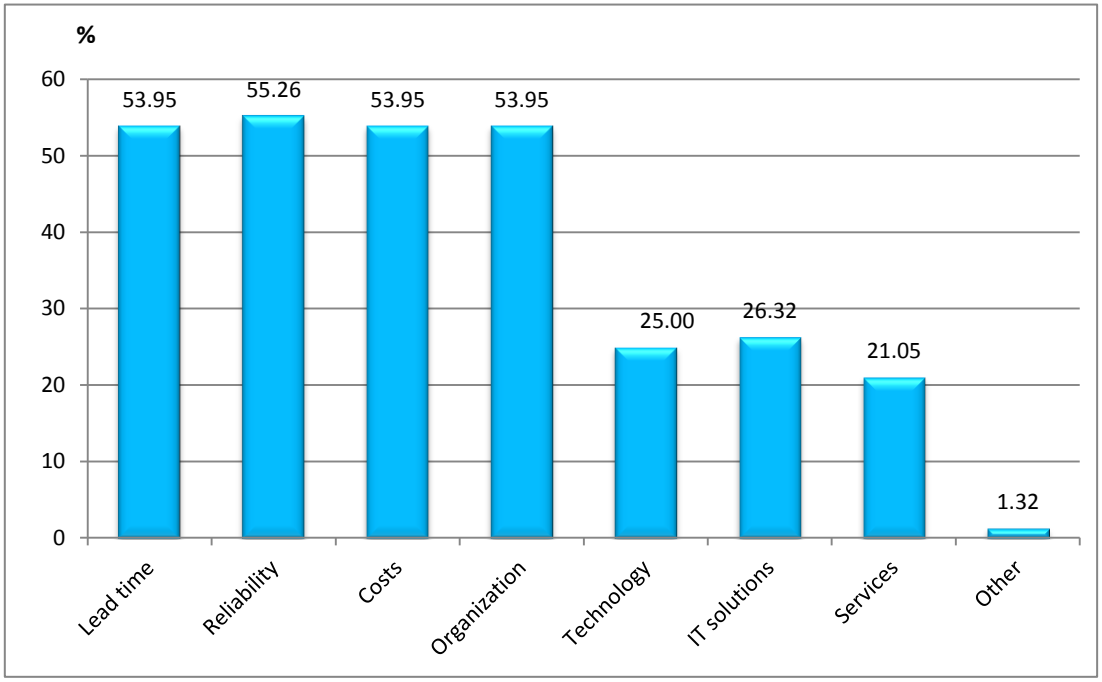


Fig. 3.58 Highlighted parameters of intermodal service in examples of good practice in Danube region by providers

Main problems of intermodal transport development

Opinion regarding this matter differ in countries (Table 3.33). In Germany and Austria, half of provided in list was identified while in Czech Republic and Slovenia respondents were more precise.

Table 3.33 Main problems of intermodal transport development by providers

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Terminals	0.0	20.0	28.6	60.0	83.3	80.0	80.0	0.0	100.0	80.0	83.3	75.0	33.3	72.7	18.8	75.0	69.4	60.5
Infrastructure	0.0	40.0	85.7	100.0	100.0	100.0	100.0	100.0	100.0	80.0	0.0	0.0	0.0	0.0	50.0	100.0	11.1	47.4
ITU	50.0	0.0	14.3	20.0	16.7	40.0	80.0	0.0	50.0	80.0	0.0	0.0	0.0	0.0	18.8	37.5	11.1	21.1
IM technology	100.0	0.0	14.3	0.0	16.7	20.0	20.0	0.0	50.0	20.0	83.3	37.5	33.3	45.5	31.3	16.7	44.4	32.9
Trans. means	25.0	0.0	14.3	20.0	50.0	60.0	60.0	0.0	50.0	80.0	66.7	37.5	33.3	63.6	12.5	45.8	55.6	43.4
Organization	50.0	40.0	14.3	60.0	33.3	60.0	60.0	0.0	100.0	60.0	66.7	50.0	33.3	54.5	31.3	54.2	52.8	48.7
Regulations	0.0	20.0	0.0	0.0	16.7	40.0	60.0	100.0	50.0	40.0	66.7	37.5	33.3	63.6	6.3	33.3	50.0	35.5
Stim. measures	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	83.3	50.0	16.7	72.7	0.0	0.0	50.0	23.7
Investments	25.0	20.0	85.7	80.0	66.7	60.0	100.0	0.0	100.0	100.0	100.0	37.5	83.3	72.7	50.0	75.0	75.0	69.7
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	0.0	0.0	0.0	0.0	5.6	2.6

In MR1 infrastructure-related problems and unsufficient investments are singled out, especially because of Slovenia. In MR2 infrastructure represents the problem as well while in MR3 those are terminal-related and unsufficient investments (Table 3.33, Fig. 3.59) which are dominant ones for the whole DR, also (Table 3.33, Fig. 3.60).

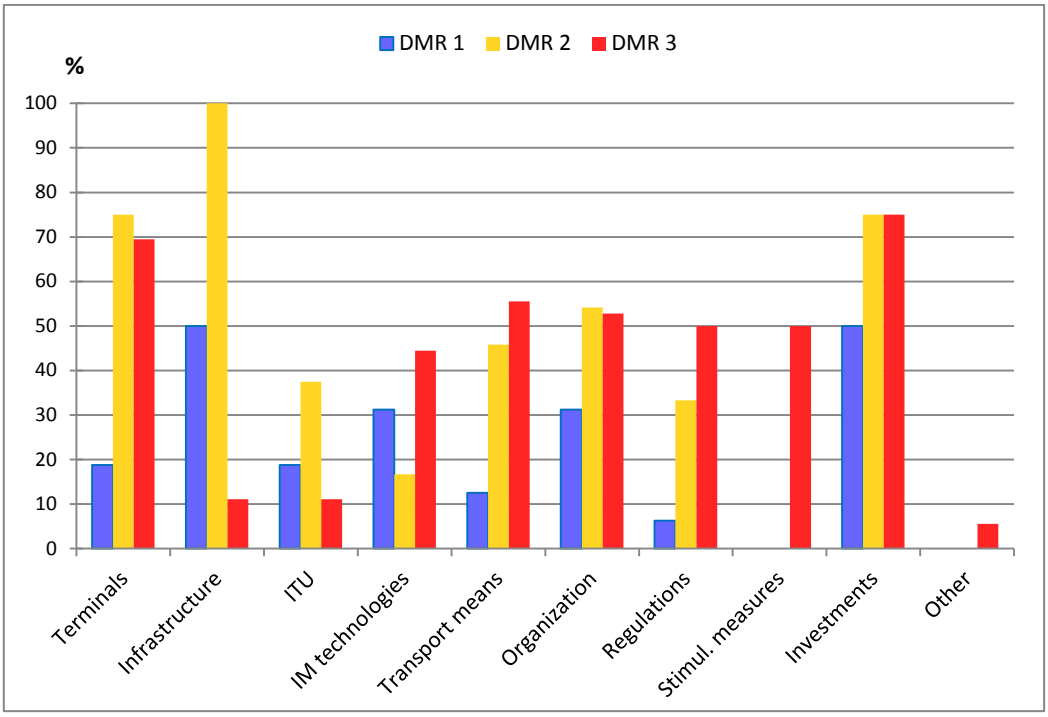


Fig. 3.59 Main problems of intermodal transport development in MRs ranked by providers

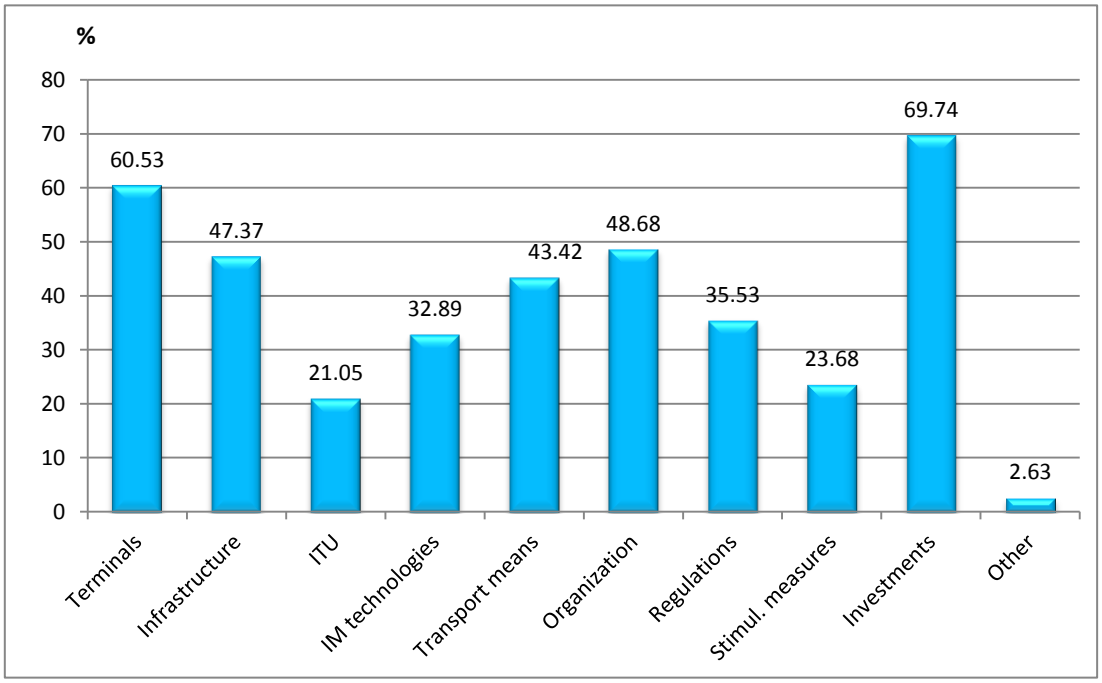


Fig. 3.60 Main problems of intermodal transport development in Danube region ranked by providers

Benefits from using intermodal transport services

There are different advatnages of IT use. Those identified in countries are not the same (Table 3.34).

Countries in MR1 identified the most important ones, for instance inclusion in international flows and markets, lower costs and delivery time as well as environment protection. In MR2 and MR3 proveders, unlike priviuos ones, identified complete and good quality service besides reliability as the most important effects (Table 3.34, Fig. 3.61). In total for DR, providers singled out as the most important inclusion in international flows and lower cost of transport and handling (Table 3.34, Fig. 3.62).

Table 3.34 Benefits from using intermodal transport services ranked by providers

Evaluation	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Connecting	100.0	100.0	71.4	100.0	100.0	100.0	100.0	0.0	100.0	100.0	100.0	62.5	83.3	72.7	87.5	95.8	80.6	86.8
Costs	100.0	100.0	71.4	80.0	100.0	100.0	100.0	100.0	100.0	100.0	66.7	50.0	50.0	100.0	87.5	95.8	75.0	84.2
Time	75.0	60.0	42.9	40.0	83.3	80.0	80.0	100.0	100.0	80.0	66.7	37.5	66.7	81.8	56.3	75.0	66.7	67.1
Quality	50.0	40.0	14.3	60.0	66.7	80.0	40.0	0.0	100.0	80.0	83.3	75.0	66.7	45.5	31.3	62.5	66.7	57.9
Reliability	25.0	40.0	14.3	40.0	33.3	60.0	40.0	100.0	50.0	60.0	83.3	25.0	50.0	36.4	25.0	45.8	47.2	42.1
Safety	25.0	20.0	28.6	20.0	33.3	40.0	40.0	0.0	0.0	40.0	83.3	12.5	33.3	36.4	25.0	29.2	38.9	32.9
Goods protect.	50.0	20.0	28.6	20.0	33.3	20.0	20.0	0.0	50.0	60.0	66.7	25.0	33.3	36.4	31.3	25.0	41.7	34.2
Environmental	100.0	80.0	28.6	80.0	83.3	80.0	60.0	0.0	0.0	100.0	66.7	50.0	33.3	63.6	62.5	66.7	61.1	63.2
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	0.0	0.0	0.0	0.0	5.6	2.6

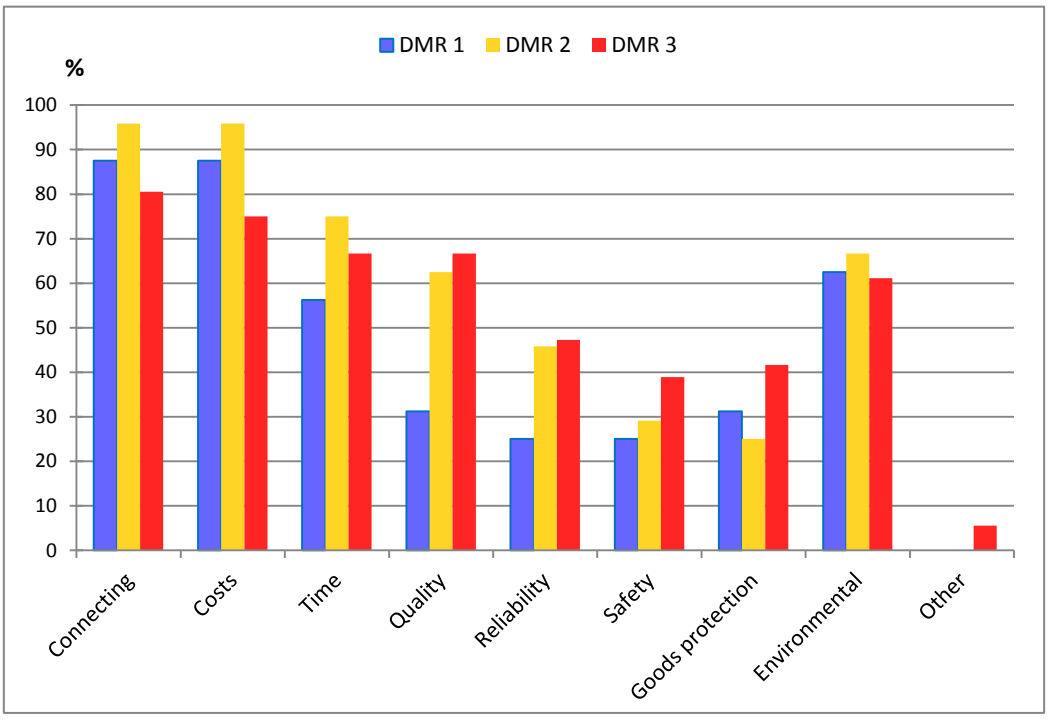


Fig. 3.61 Benefits from using intermodal transport services in MRs ranked by providers

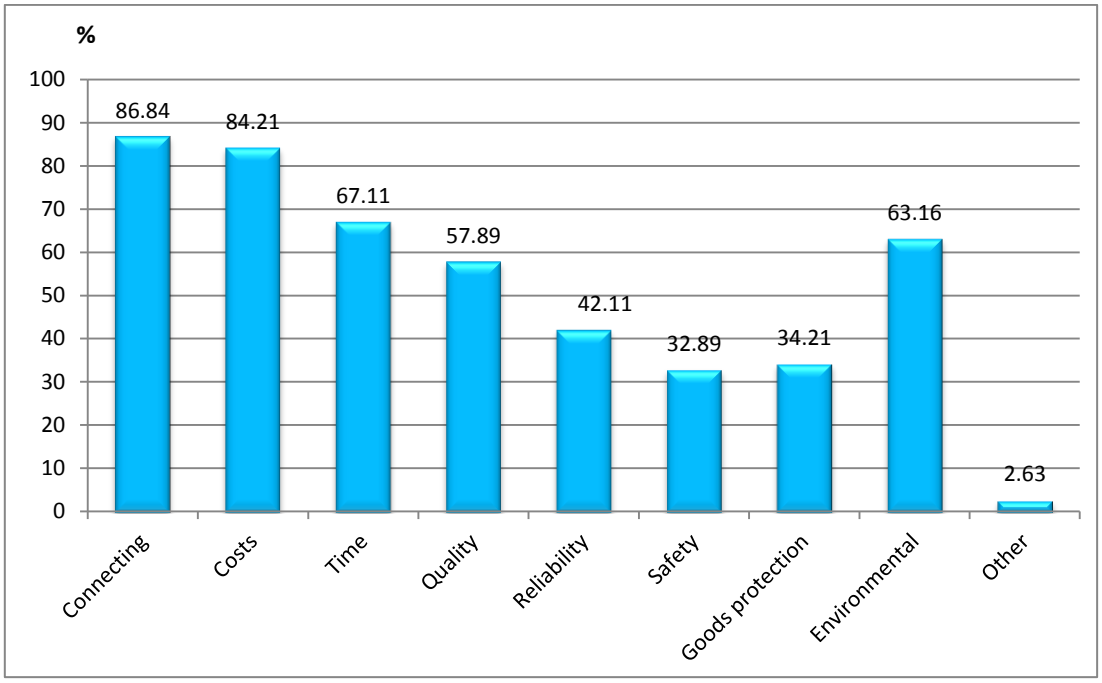


Fig. 3.62 Benefits from using intermodal transport services in Danube region ranked by providers

4 EXPERT EVALUATION OF THE INTERMODAL TRANSPORT QUALITY

Expert evaluation of the intermodal transport service evaluation in the Danube region was done based on the study of users and providers of intermodal transport services, review of literature and project team's experience.

Quality of intermodal transport

The quality of intermodal transport services is noticeably different amongst the countries of the Danube region. In Austria and Germany, it can be marked as high or very high, while in Moldova and Bosnia and Herzegovina it is significantly poorer. Research has shown that in all the countries, except for Austria and Ukraine, there are differences between the evaluation from the users and service providers. Quality of intermodal transport is mostly better rated by the service users, especially in Czech Republic and Croatia. On the other hand, the rating of the quality of intermodal transport in Slovenia, Hungary, Serbia and especially Bulgaria is higher according to the opinion of service providers rather than users. The differences are seen in the micro region level as well, and only in MR 2 quality was marked better by the service providers rather than users (table 4.1). Besides, with the drop of quality of the services greater rating variety can be seen as well (figure 4.1). Overall, on the level of the Danube region, intermodal transport service was rated mostly as „medium" and „low" (table 4.1, figure 4.2).

Table 4.1 Rating of intermodal transport service – users and service providers

Ocena	DMR 1		DMR 2		DMR 3		Danube region	
	Users (DMR 1-u)	Providers (DMR 1-p)	Users (DMR 2-u)	Providers (DMR 2-p)	Users (DMR 3-u)	Providers (DMR 3-p)	Users	Providers
Very high	46.2	37.5	5.0	0.0	2.6	2.8	11.3	9.2
High	23.1	43.8	30.0	16.7	7.9	2.8	16.9	15.8
Medium	30.8	18.8	50.0	58.3	36.8	41.7	39.4	42.1
Low	0.0	0.0	15.0	20.8	44.7	47.2	28.2	28.9
Very low	0.0	0.0	0.0	4.2	7.9	5.6	4.2	3.9
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

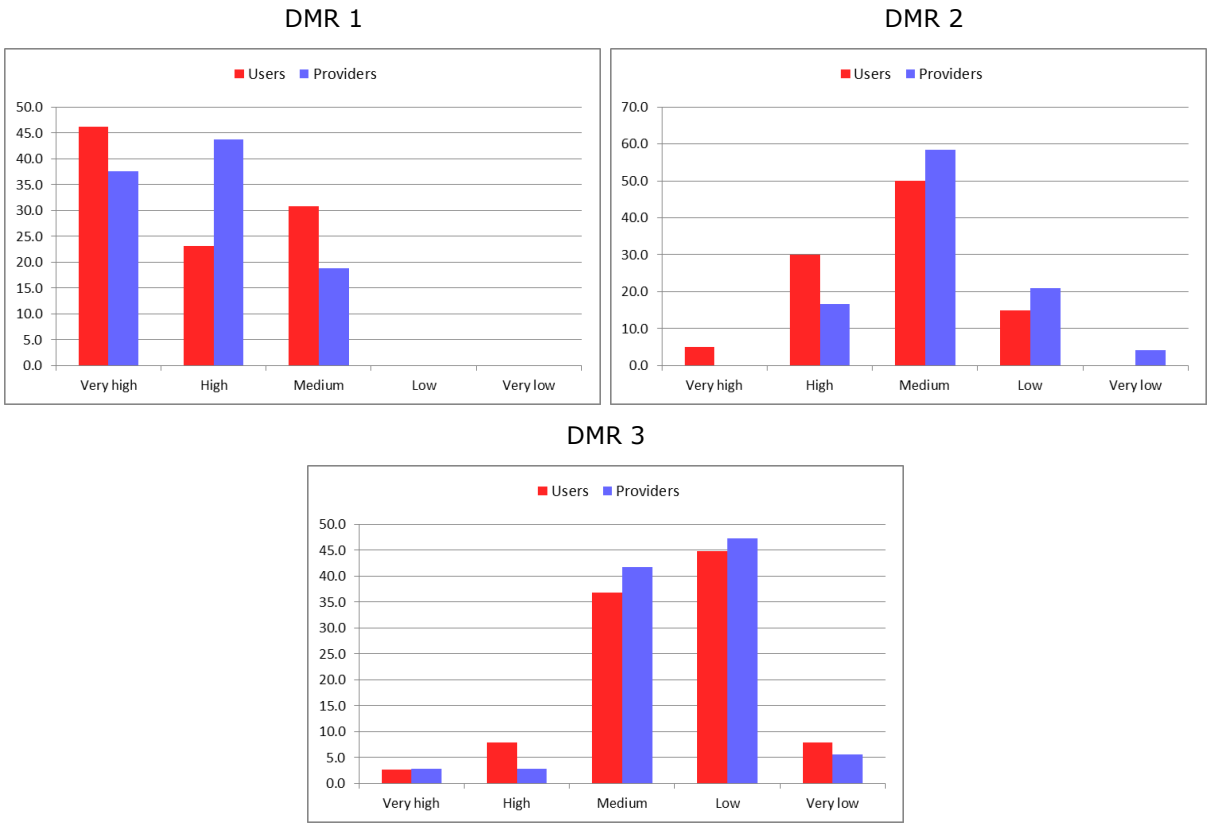


Fig. 4.1 Rating of intermodal transport service in micro regions

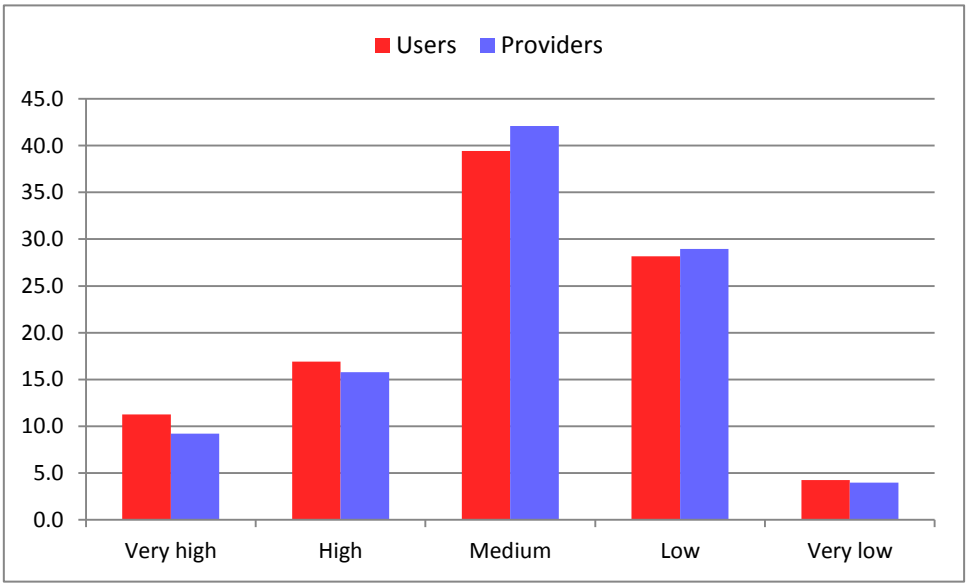


Fig. 4.2 Rating of intermodal transport service in Danube region

Development of the intermodal network and market coverage

Development of the network of terminals for intermodal transport and market coverage differs amongst the countries of the Danube region and is best rated in Germany, Austria and Czech Republic, and worst in Moldova and Bosnia and Herzegovina. Considering the network of terminals, differences between the marks

from users and service providers are noticeable as well, especially in Austria, Germany, Czech Republic and Bulgaria. In MR 1 and most of the countries of MR 3 the development of the network of terminals and market coverage are better rated by the service providers, and in the all of the countries of MR 2, except for Slovakia, by the users (table 4.2). Differences of development degree of the network of terminals are noticeable in micro regions as well and ratings drop from MR 1 to MR 3 (figure 4.3). Overall, on the level of the Danube region, development level of the network of terminals and market coverage are rated mostly as „medium" and „low" (table 4.2, figure 4.4).

Table 4.2 Rating of the development level of intermodal network and market coverage – users and service providers

Ocena	DMR 1		DMR 2		DMR 3		Danube region	
	Users	Providers	Users	Providers	Users	Providers	Users	Providers
Very high	7.7	37.5	10.0	0.0	0.0	2.8	4.2	9.2
High	53.8	31.3	10.0	12.5	7.9	0.0	16.9	10.5
Medium	23.1	18.8	55.0	58.3	23.7	44.4	32.4	43.4
Low	15.4	12.5	25.0	20.8	36.8	38.9	29.6	27.6
Very low	0.0	0.0	0.0	8.3	31.6	13.9	16.9	9.2
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

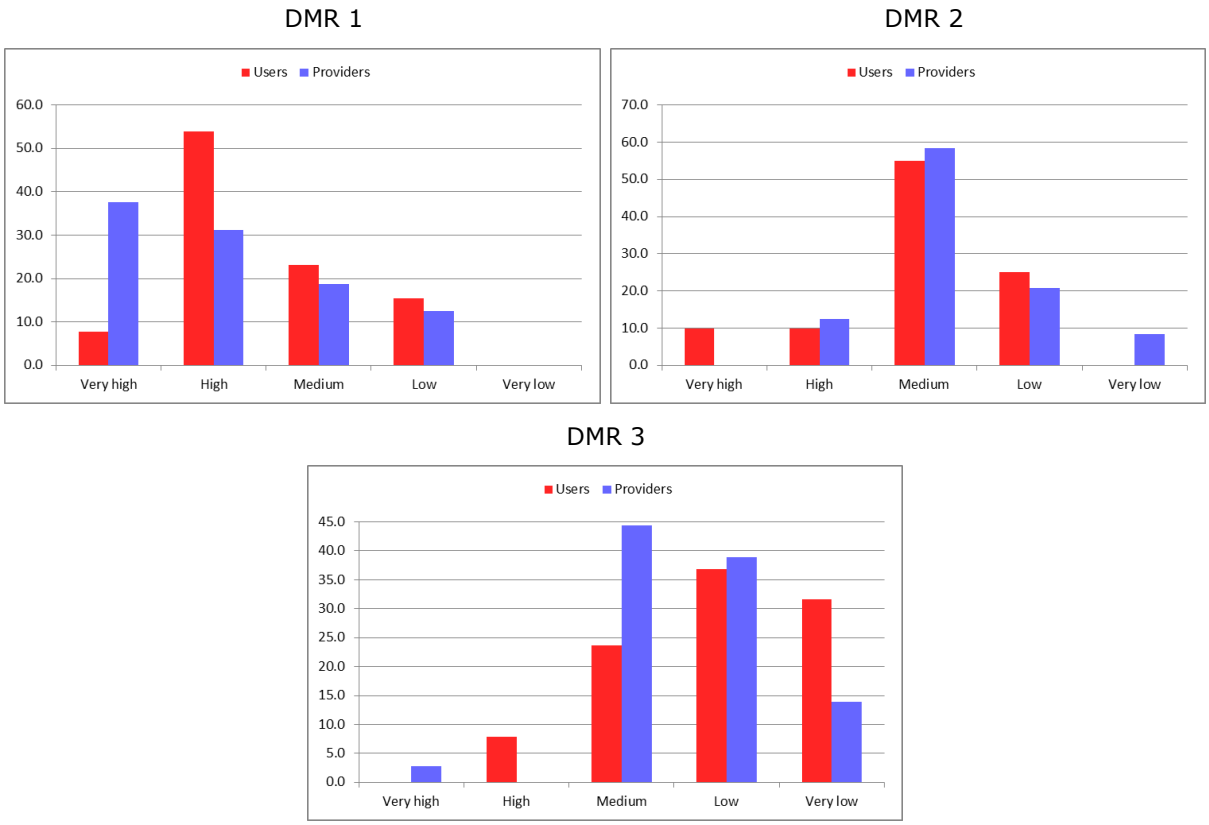


Fig. 4.3 Development level of intermodal network and market coverage in MRs

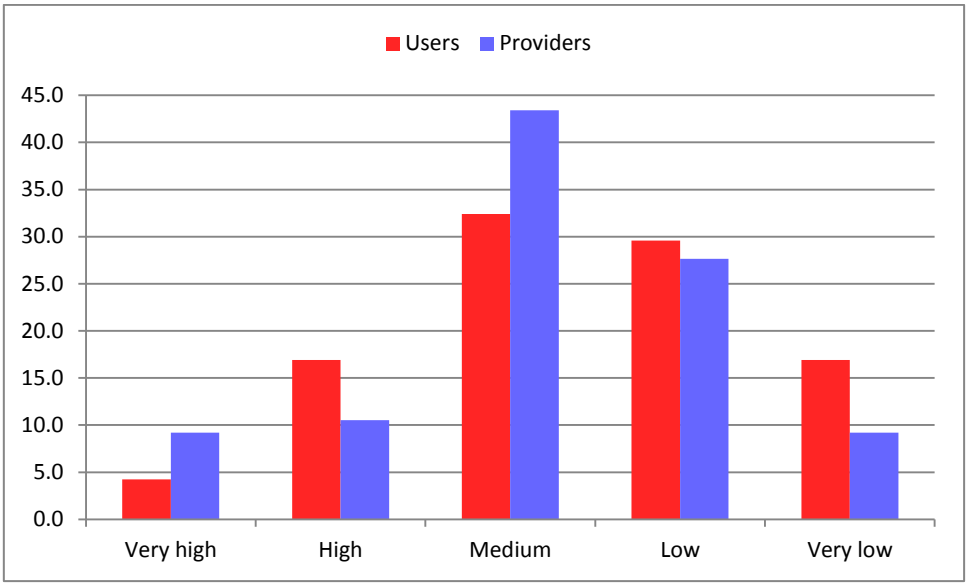


Fig. 4.4 Development level of intermodal network and market coverage in Danube region

Connection of economic canters in region with intermodal transport chains

Connection of economic centers of the regions with intermodal transport chains is mostly rated as „adequate" and „poor" (table 4.3). Satisfaction on this issue drops with the level of development of intermodal transport, and the differences between users and service providers are most prominent in MR 2 (table 4.3, figure 4.5). Given that the connection of economic canters is rated as „very good" only by the users in Slovenia and Montenegro, and by service providers in Hungary, it can be concluded that in the region there is a noticeable lack of intermodal links (figure 4.6).

Table 4.3 Rating of the connection of economic canters with intermodal transport chains – users and service providers

Ocena	DMR 1		DMR 2		DMR 3		Danube region	
	Users	Providers	Users	Providers	Users	Providers	Users	Providers
Very good	7.7	6.3	0.0	0.0	5.3	2.8	7.7	6.3
Adequate	53.8	56.3	55.0	37.5	26.3	36.1	53.8	56.3
Poor	38.5	37.5	45.0	62.5	60.5	55.6	38.5	37.5
Very poor	0.0	0.0	0.0	0.0	7.9	5.6	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

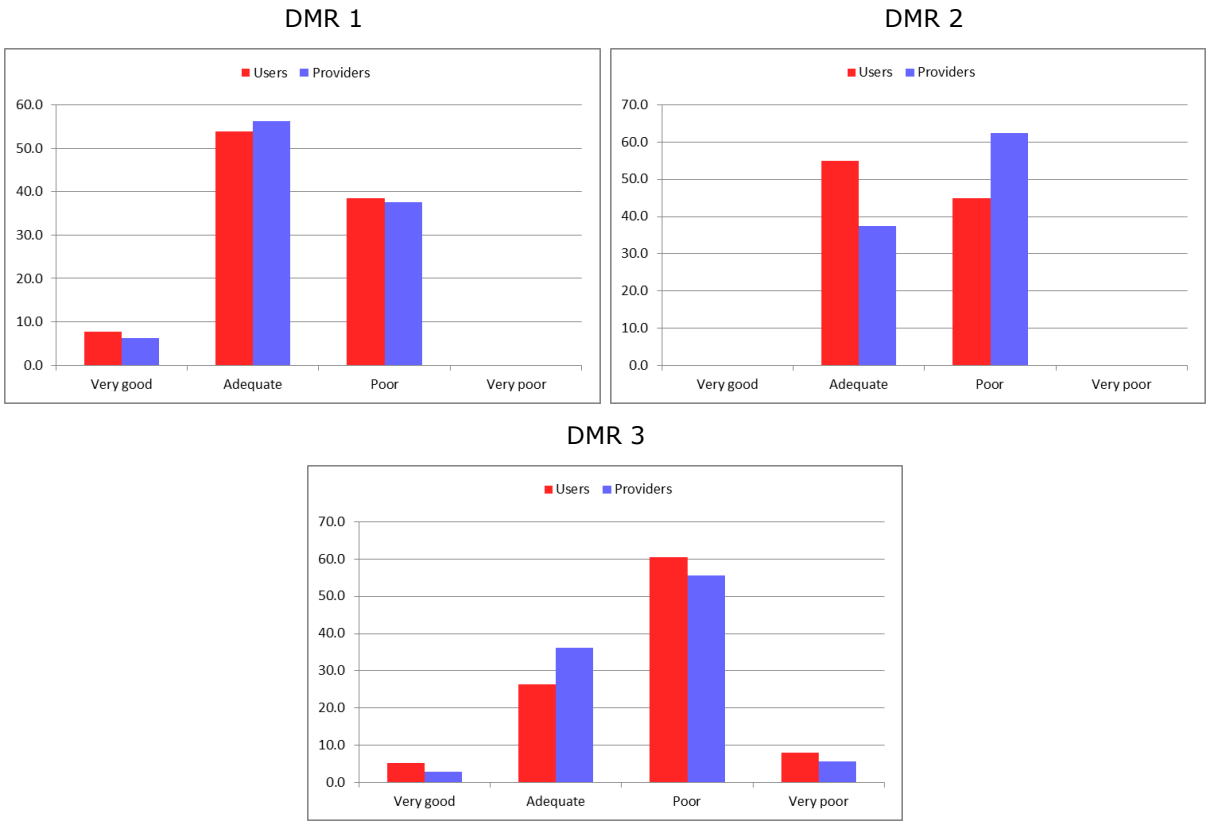


Fig. 4.5 Connection of economic canters in MRs with intermodal transport chains

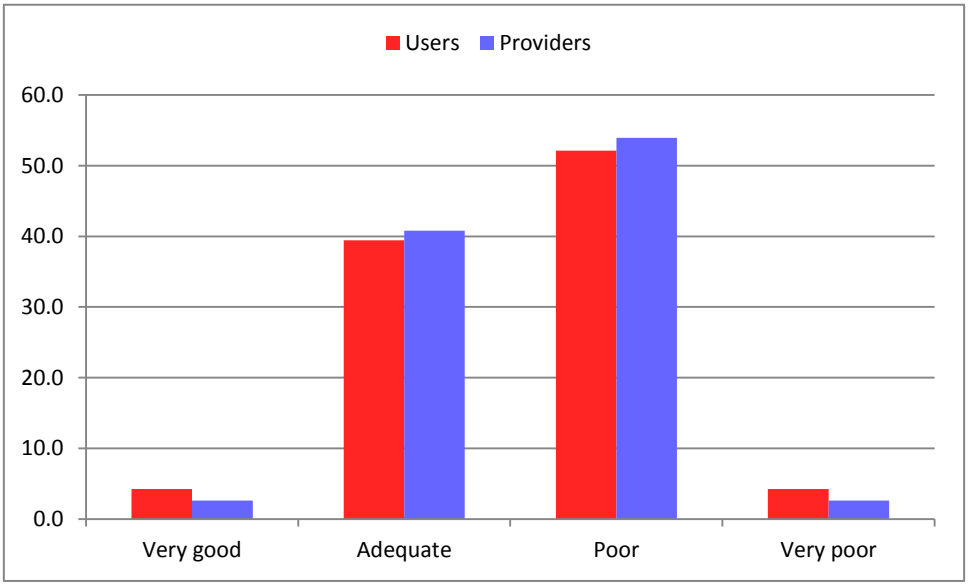


Fig. 4.6 connection of economic canters in Danube region with intermodal transport chains

Quality of the intermodal transport services on corridors

Quality of the intermodal transport services by corridors, routes, was the best rated in Czech Republic, Germany and Slovenia, and worst in Moldova, Romania and Croatia. Generally, service providers were more satisfied by the service quality than

the users, and a significant number of both were not familiar with the actual situation, especially in MR 2 and MR 3 (table 4.4, figure 4.7). On the level of the Danube region, the quality of the services in the corridors was rated mostly as „average"and „poor"(figure 4.8).

Table 4.4 Rating of the service quality of intermodal transport on corridors – users and service provider

Ocena	DMR 1		DMR 2		DMR 3		Danube region	
	Users	Providers	Users	Providers	Users	Providers	Users	Providers
High	27.9	31.9	10.7	15.5	7.0	7.9	13.0	16.3
Medium	45.8	42.9	25.8	26.0	27.5	35.7	30.7	33.1
Low	10.0	15.0	26.3	17.7	36.1	31.4	26.3	22.0
Not in use	15.4	10.2	37.2	38.9	26.3	21.6	28.6	26.6
Nonexistent	1.0	0.0	0.0	1.9	3.2	3.3	1.3	2.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

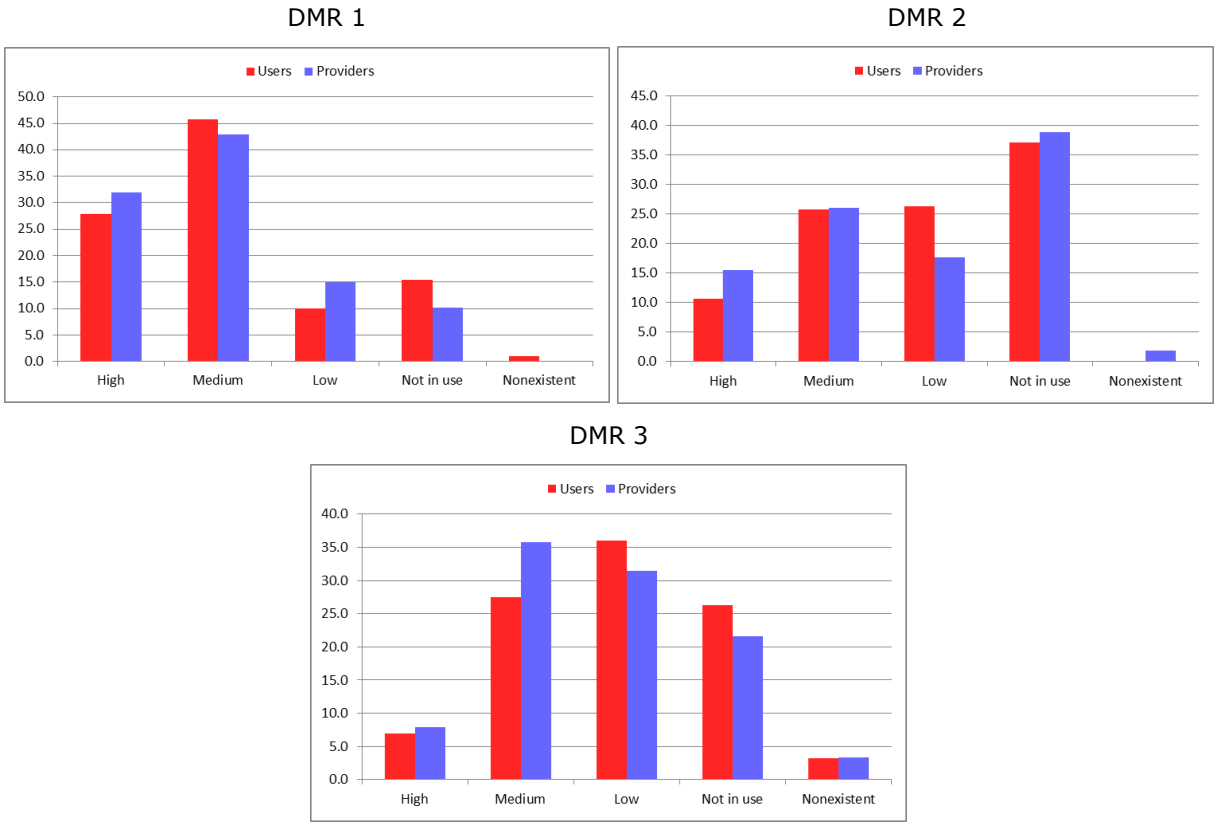


Fig. 4.7 Service quality of intermodal transport on corridors in MRs

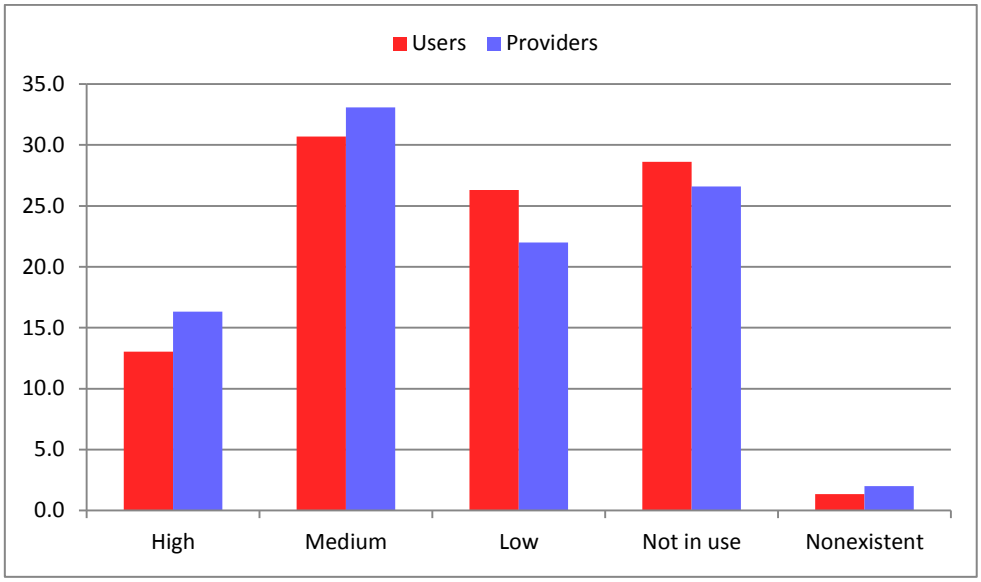


Fig. 4.8 Service quality of intermodal transport on corridors in Danube region

In Austria, the service users and providers similarly assessed the quality of intermodal service on the corridors to Prague, Ceska Trebova and Sopron, predominantly the „medium" level of service. Small differences are present for the corridors to the Adriatic ports, Zagreb and Dunajska Streda: Users rated the higher quality of service than the providers for the first two aforementioned corridors, while only the Corridor to Dunajska Streda was better rated by the users. The conclusion is that the users give the same or mainly a slightly higher quality of intermodal transport quality on the corridors in Austria than the service provider.

In Germany, service providers have given better ratings only for corridors to Northern European ports. For all other offered corridors, users gave higher ratings than providers. Major differences are present for the corridors to the Adriatic ports and corridors with destinations in Serbia and Croatia, with the remark that the corridors to Serbia and Croatia are used by a small number of users and providers. For corridors to Budapest and Slovakia, users gave a slightly more favorable assessment of the quality of intermodal transport. The conclusion is that in Germany users mainly assign a higher assessment of quality of intermodal transport on corridors that are within the Danube Region.

In Slovenia, service providers have given more favorable estimates for the corridors to Furnitc, Dunajska Streda and Munich. Approximately the same estimates were assigned to the corridors to Budapest, Graz, Belgrade and Zagreb. The conclusion is that providers in Slovenia assign mainly a higher assessment of quality of intermodal transport. This is particularly true for corridors that are more favorably assessed by users and providers.

In the Czech Republic, service providers were more favorably evaluating the offered corridors than the users. The deviations are greatest for the corridor to Dunajska Streda and equally smaller for all other corridors. Therefore, the conclusion is that the providers assign a higher assessment of quality of intermodal transport than users on all corridors in the Czech Republic.

In Slovakia, the corridor to Krems it is slightly more favorably evaluated by the service provider. For the corridor in Bucharest, the evaluation is reversed. Other corridors other than the corridor to Chop (this corridor is used only by providers) are equally evaluated. The conclusion is that the corridors in Slovakia are approximately the same estimated by the providers and users of the standpoint of quality of intermodal transport.

Service providers in Hungary more favorably evaluated all offered corridors than users. Biger differences in the ratings are present especially for the corridor to Arad. It should be emphasized that only the providers use the corridor to Chop. The conclusion is that service providers in Hungary clearly assign a higher ratings in terms of quality of intermodal service on the offered corridors than the service users.

In Romania, service providers gave significantly higher ratings from users for corridors to Budapest and Stara Zagora. For other corridors, the differences are less. The corridor to Belgrade is rated by the users while the providers do not use this corridor. The conclusion is that service providers in Romania assign better ratings to the quality of intermodal transport on the corridors than service users.

Due to the poor data obtained for Ukraine, it is not possible to conclude how the corridors were evaluated by the providers and users in terms of the quality of intermodal transport.

Poor data for Moldova point to the conclusion that the providers and users approximately estimate the quality of intermodal transport on the offered corridors.

In Bulgaria, providers and service users use only two of the four offered corridors (to Bucharest/Ploiesti and Constanta). It can be concluded that the providers assign a higher assessment of quality of intermodal transport than the service users.

In Bosnia and Herzegovina, service users gave significantly higher ratings than service providers on the corridors to Ploče, Koper and Rijeka. Differences are less for the corridors to Belgrade and Bar. Corridor to Ljubljana is the similarly rated by service providers and users. The conclusion is that users in Bosnia and Herzegovina assign better ratings to the quality of intermodal transport on corridors than service providers.

In Croatia, service providers gave a significantly higher rating than users for the corridors to Budapest and Ljubljana. For other corridors (to Belgrade, Sarajevo and Banja Luka), the providers also gave a higher quality assessment than the users, but this is less pronounced compared to the previous two corridors. The conclusion is that service providers in Croatia assign predominantly higher ratings of intermodal transport quality than users for all corridors.

In Montenegro, only on the corridor to Belgrade, the users evaluate the quality as a slightly more favorable rating than the service provider. For other corridors, in average, the estimates from providers and users are same or providers gave them some more favorable ratings than users. The conclusion is that in Montenegro, users and service providers approximately estimate the quality of intermodal transport on offered corridors.

For Serbia, it is characteristic that users gave more favorable estimates only for two corridors than the providers: corridor to Bar and the corridor to Bosnia and

Herzegovina/although it should be noted that the estimates are generally low for both mentioned corridors and the corridor to Sarajevo is very little used. For corridors to Ljubljana, Koper, Rijeka, Thessaloniki and Bulgaria, service providers assign more favorable ratings than users. The conclusion is that service providers in Serbia assign more ratings to the quality of intermodal transport on the corridors than service users.

Lead time on intermodal transport corridors

Lead time on intermodal transport corridors, routes is best rated in Germany and Czech Republic, and worst in Croatia, Montenegro and Bosnia and Herzegovina. It is interesting to note here that the users in some countries, like Slovenia and Montenegro, have rated the quality of intermodal transport in corridors better than the lead time, as a quality parameter, and users in Hungary rate the delivery time better than the service quality. Generally, lead time is better rated by service providers than the users, and the differences in the lead times are clearer than the overall rating of the service quality in corridors by micro regions (table 4.5, figure 4.9). On the level of the Danube region, lead time on intermodal transport corridors is „average" (figure 4.10).

Table 4.5 Rating of lead time on intermodal transport corridors – users and service providers

Ocena	DMR 1		DMR 2		DMR 3		Danube region	
	Users	Providers	Users	Providers	Users	Providers	Users	Providers
Very short	1.7	15.6	0.0	3.7	1.2	1.6	0.8	5.5
Short	30.4	38.7	13.4	16.4	5.8	11.8	14.3	19.5
Medium	29.6	23.9	37.8	33.0	25.0	26.8	31.5	28.8
Long	10.5	9.5	9.1	4.7	30.6	24.5	17.1	12.8
Very long	11.4	2.0	1.9	2.0	9.7	8.0	6.7	4.1
Not in use	15.4	9.6	37.9	38.4	24.9	25.9	28.4	27.8
Nonexistent	1.0	0.7	0.0	1.9	2.9	1.3	1.2	1.4
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

In Austria, the delivery times on the corridors to the Adriatic ports, to Ceska Trebova and Sopron are more favorably assessed by service providers. The differences are not big. The corridors to Prague and Dunajska Streda are about the same estimated by the users and service providers. The conclusion is that providers and service users in Austria are about the same estimated the delivery time on the offered corridors.

Service providers in Germany rated all corridors more favorable than users other than corridors to destinations in Croatia and Serbia. More sensitive differences are present for corridors to Northern European ports, Budapest and destinations in the Czech Republic and Slovakia. The conclusion is that service providers in Germany assign clearer estimates from service users when evaluating the delivery time on the offered corridors.

In Slovenia, service providers more favorably rated the delivery time on almost all offered corridors than service users. The larger differences are present for the

corridors to Budapest, Graz, Dunajska Streda and Munich. For other corridors, the differences are slightly less. The conclusion is that service providers in Slovenia considerably more favorably assess the delivery time on the offered corridors than the service users.

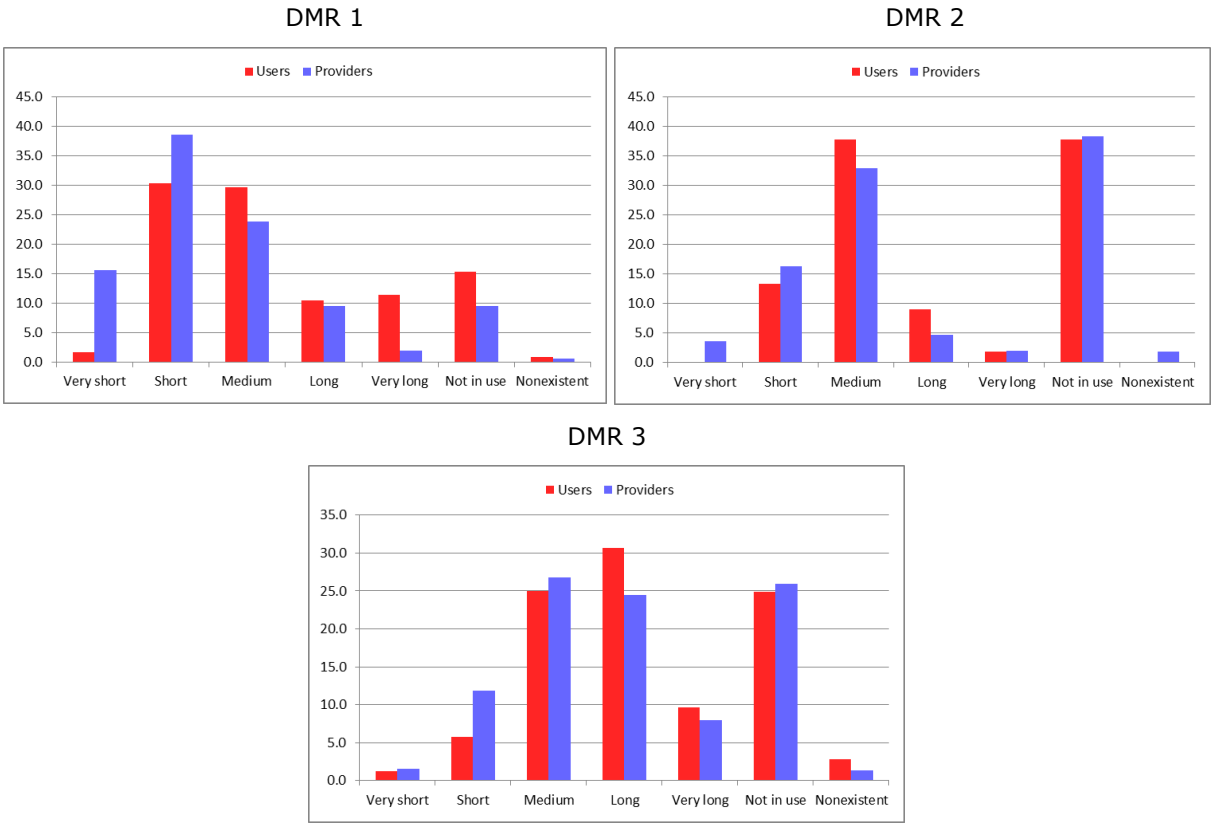


Fig. 4.9 Lead time on intermodal transport corridors in MRs

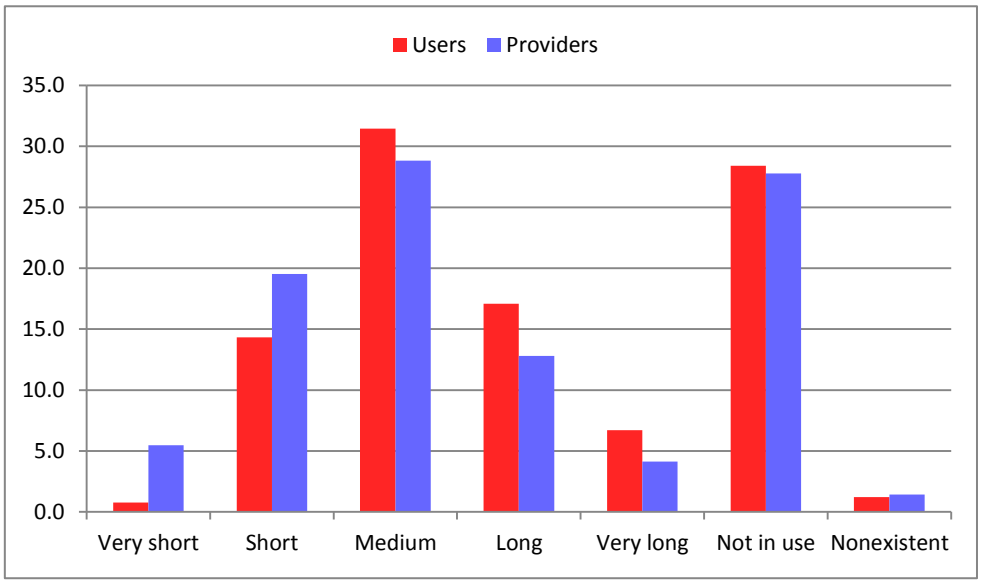


Fig. 4.10 Lead time on intermodal transport corridors in Danube region

In the Czech Republic, service users better rated the corridors to Krems and Salzburg, while providers significantly appreciated the corridors to the Northern European ports. Other corridors are about the same estimated. The conclusion is that users and service providers in Czech Republic, are similarly evaluated delivery times on the offered corridors (within the Danube Region).

In Slovakia, service users have better assessed only the corridor to the Adriatic ports of than service providers. In all other cases, service providers more favorably assess the delivery time than the users. Larger differences are characteristic for the corridors to Krems and Ceska Trebova. The conclusion is that service providers in Slovakia assess a more favorable delivery time on the offered corridors than the service users.

In Hungary, delivery times were more favorably assessed by service providers on corridors to Koper, Dunajska Streda, Munich and Arad. On the other hand, users have more favorably assessed the corridor to destinations in Serbia, but this corridor is very slightly used by the providers and users. The conclusion is that service providers in Hungary more favorably assess the delivery time on offered corridors than service users.

For Romania, it can be concluded that providers and service users similarly assess the delivery times for the corridors they use (to Budapest, Burgas and Stara Zagora).

Due to the poor data obtained for Ukraine, it is not possible to conclude how the corridors were evaluated by service providers and users, from the standpoint of delivery time.

Based on poor data for Moldova, it can be concluded that the providers and users similarly estimate the delivery time on the offered corridors.

For Bulgaria, it can be concluded that the providers assess the more favorable delivery time for the corridor to Bucharest/Ploiesti than the users.

In Bosnia and Herzegovina, service users more favorably assess the delivery time on all corridors (to Ploče, Koper, Rijeka, Ljubljana, Belgrade, Bar). The differences are more significant for the corridor to Ljubljana. The conclusion is that service users more favorably evaluate the delivery time on the offered corridors than the service providers.

In Croatia, service providers have given a more favorable estimate of the delivery time than users for corridors to Budapest and Ljubljana. Similarly to the quality of service, the providers were more favorably assessed by the users of the corridors to Belgrade, Sarajevo and Banja Luka, but the differences are less pronounced. The conclusion is that service providers in Croatia more favorably assess the delivery time than users for all corridors other than the corridor to Budapest.

In Montenegro, service users and providers have equally estimated delivery time on the corridor to Belgrade. The corridor to the Adriatic ports was more favorably assessed by the providers and the corridor to Sarajevo was more favorably assessed by the users. Given the analyzed data, a general conclusion cannot be made, given the relatively small number of offered corridors and the fact that the answers are the opposite if the corridors are compared to one another.

In Serbia, the providers significantly favorably estimated the delivery time on the corridors to Ljubljana and Koper. Other corridors are also more favorably assessed, but the differences are less. The conclusion is that service providers in Serbia more favorably assess the delivery time on the offered corridors than the users.

Place for loading/unloading of intermodal units

The closest intermodal terminal as the dominant place for loading/unloading of units in intermodal chains has been noted only by the users in Romania, and by the service providers in Slovenia. Complex of sender/recipient is identified as the dominant place for loading/unloading of units in all micro regions other than by the service providers in MR 3 (table 4.6, figure 4.11). The difference considering the users and service providers is the biggest in MR 3, and the reason should primarily be looked for in the activity and type of goods with which the companies included in the study are operating with (bulk cargo). With the start and the end of the chain being in the closest intermodal terminal of the sender, i.e. recipient there is a loss of benefits of the door to door delivery, and the time and cost of the realization of the chain are increased. On the level of the Danube region, over half of the users note the complex of sender/recipient as the dominant place for loading/unloading, but this is a situation different from that of the service providers, who are aware that this is one of the problems of intermodal transport (figure 4.12).

Table 4.6 Place for loading/unloading of intermodal units

Ocena	DMR 1		DMR 2		DMR 3		Danube region	
	Users	Providers	Users	Providers	Users	Providers	Users	Providers
At company's premises	61.5	43.8	45.0	50.0	60.5	25.0	56.3	36.8
It depends	30.8	37.5	35.0	41.7	31.6	66.7	32.4	52.6
At intermodal terminal	7.7	18.8	20.0	8.3	7.9	8.3	11.3	10.5
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

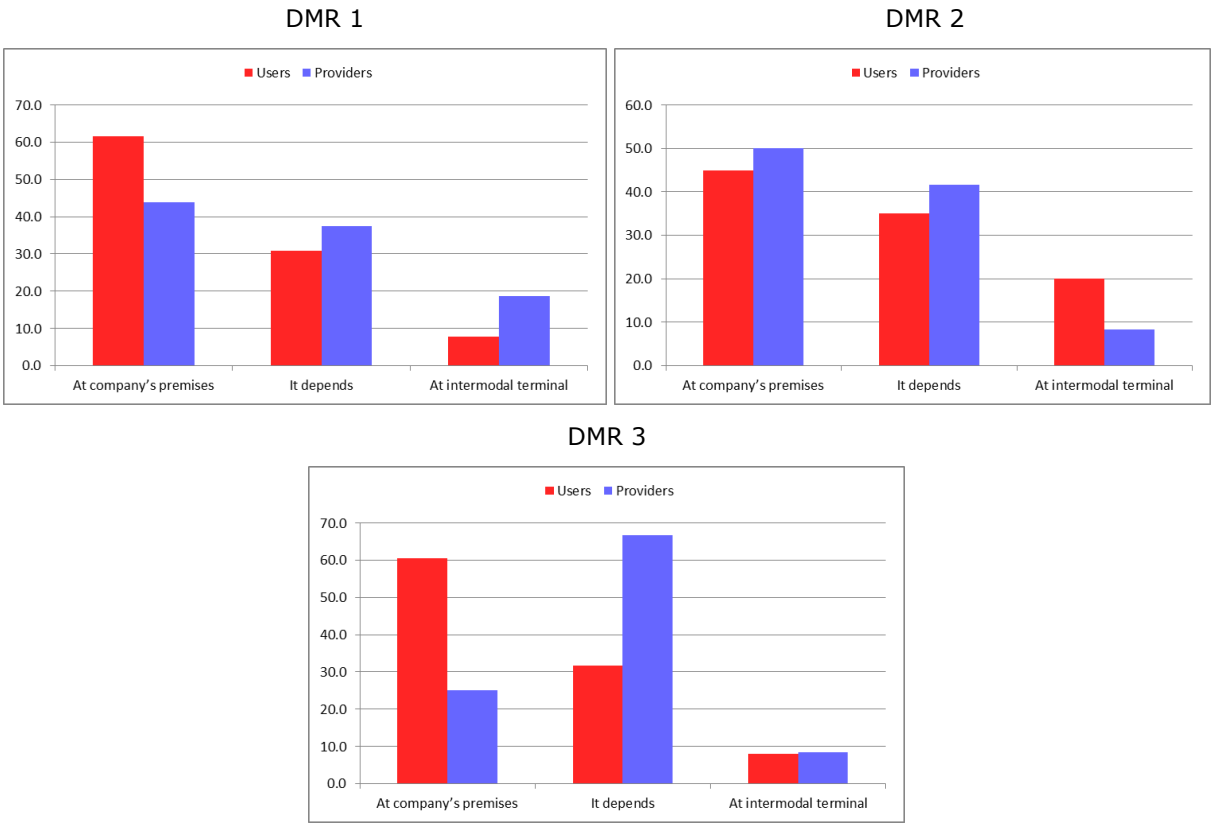


Fig. 4.11 Place for loading/unloading of intermodal units in MRs

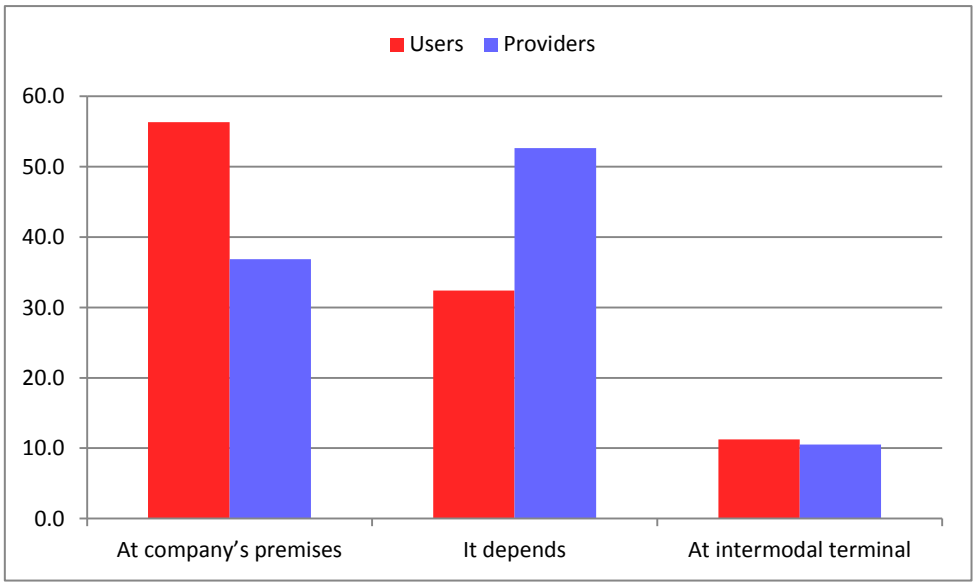


Fig. 4.12 Place for loading/unloading of intermodal units in Danube region

Benefits from using intermodal transport services

Studies that have taken place showed that identification of IT use effects depends on level of development. As a dominant factor involvment in international flows and markets as well as lower costs in chains are have been singled out. Besides, in more developed countries (MR1), average is given to environment protection and time

delivery (Table 4.7, Fig. 4.13). As the level of development descends, difference among expected effect gets less and less. Thus, in countries of MR2, lead is given to complete (full) and good quality service (Table 4.7, Fig. 4.15). In total, service providers understood better the advantages and effects of use of IT than IT users (Table 4.7, Fig 4.16).

Table 4.7 The most important benefits from using intermodal transport ranked by sevice users and providers

Ocena	DMR 1		DMR 2		DMR 3		Danube region	
	Users	Providers	Users	Providers	Users	Providers	Users	Providers
Connecting	76.9	87.5	85.0	95.8	68.4	80.6	74.6	86.8
Costs	69.2	87.5	80.0	95.8	57.9	75.0	66.2	84.2
Time	69.2	56.3	45.0	75.0	55.3	66.7	54.9	67.1
Quality	46.2	31.3	35.0	62.5	71.1	66.7	56.3	57.9
Reliability	46.2	25.0	45.0	45.8	60.5	47.2	53.5	42.1
Safety	38.5	25.0	20.0	29.2	50.0	38.9	39.4	32.9
Goods protect.	23.1	31.3	20.0	25.0	36.8	41.7	29.6	34.2
Environmental prot.	76.9	62.5	60.0	66.7	44.7	61.1	54.9	63.2
Other	7.7	0.0	5.0	0.0	0.0	5.6	2.8	2.6

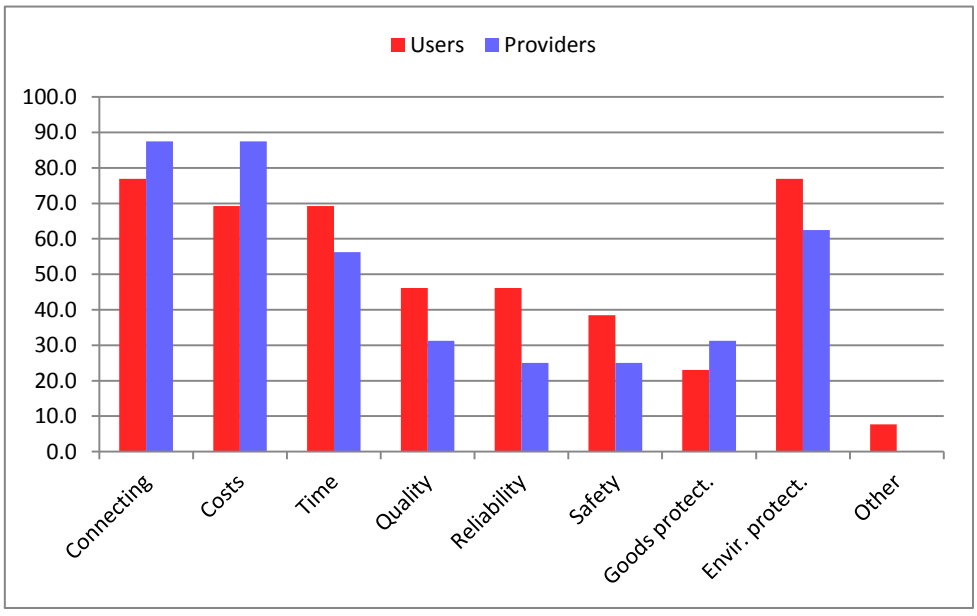


Fig. 4.13 Benefits from using intermodal transport – MR 1

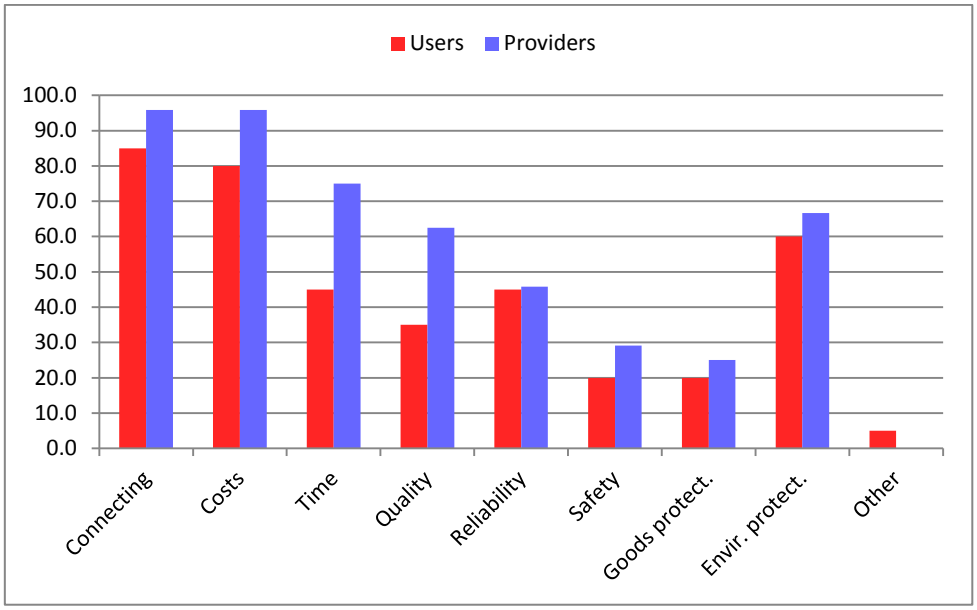


Fig. 4.14 Benefits from using intermodal transport – MR 2

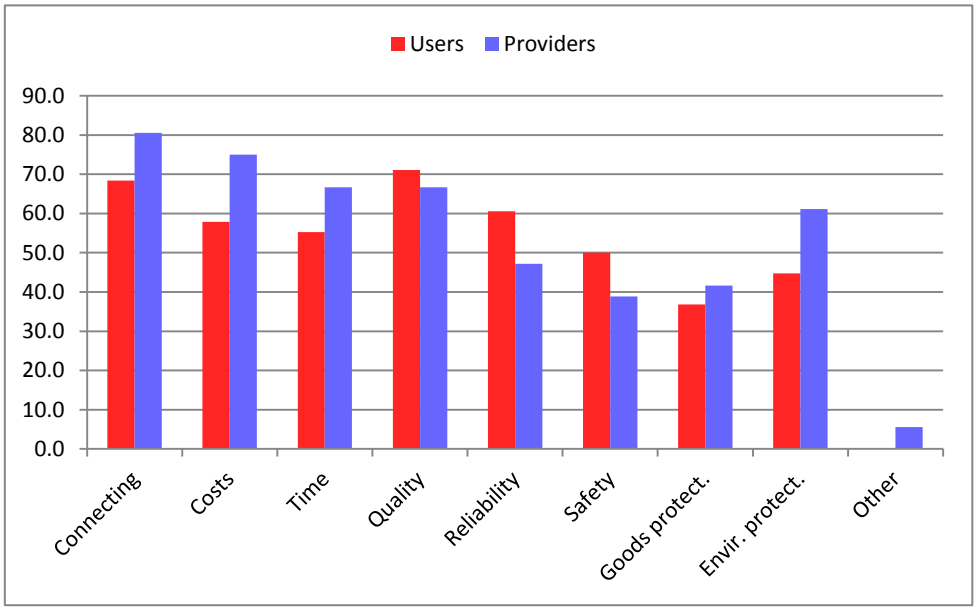


Fig. 4.15 Benefits from using intermodal transport – MR 3

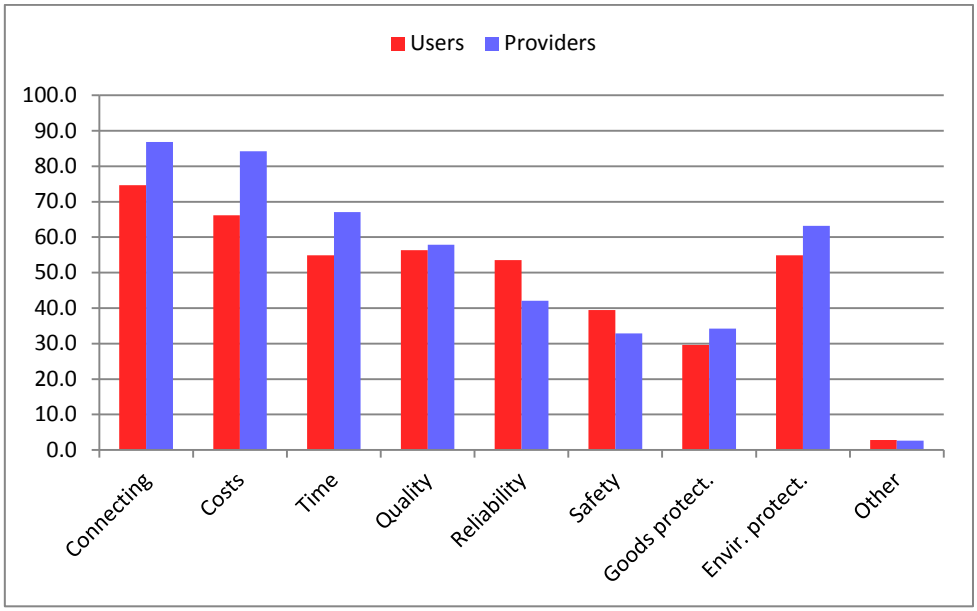


Fig. 4.16 Benefits from using intermodal transport in Danube region

4.1 Rating of the intermodal transport service quality

By analyzing responses from questioneriees, ranking of quality of IT and certain service parameters are obtained. Rank is between 0 and 10 by pondering answers (Table 4.8). In some cases there are significant differences between seeable quality of whole service provided and qualite of certain service parameters. Users in Austria and Germany, Czech Republic and Croatia gave an higher score for the a whole service than for certain parameters of service. Users in Bosnia & Herzegovina, Serbia and Hungary, Bulgaria and Moldova ranked similar. In total, in MR1 quality of IT service is better ranked and in MR3 worse than some parameters of service.

Given that all the parameters of service do not have the same weights when estimating quality of IT service, pondering of ranking of parameters has been done. Weights of the parameter is defined upon the answers from users regarding expected effects of IT use. In this manner, following were obtained: 1.2 – delivery time and prices of services, intermodal connectedness of business centers; 1.0 – quality of service on corridors and 0.8 – offer of services and intermodal network of terminals, avaiability of services and door – to – door service. Weightining criteria numbers given in Table 4.9 are acquired. As it can be seen, difference between the rank of qualty of IT service and parameters of service is pretty much the same.

Taking into consideration priviously mentioned, average score for the quality of IT service from the users point of view can be obtained as a mean ranking of quality of IT and parameters of service. Basing on this scores ranking of countries and division into MRs was done (Table 4.10). In this manner, all countries can be devided into four MRs: MR1 – Germany and Austria; MR2: Czech Republic and Slovakia; MR3 – Slovenia and Hungary, Croatia and Ukraine, Montenegro, Bulgaria and Romania; MR4 – Serbia and Moldova, Bosnia & Herzegovina.

Table 4.8 Quality of intermodal transport service and parameters of service ranked by users

Criteria	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Quality of IT	**9.4**	**9.4**	**6.0**	**8.3**	**6.7**	**5.6**	**5.1**	**5.6**	**4.4**	**5.0**	**3.6**	**6.0**	**5.6**	**4.0**	**8.1**	**6.1**	**4.5**	**5.6**
Offered services	8.1	10.0	6.3	9.1	6.3	8.1	5.5	6.3	4.4	4.4	5.1	7.0	6.9	5.1	8.0	6.8	5.6	6.4
Lead time	8.3	8.3	5.1	7.8	6.7	6.7	3.8	7.8	3.3	5.0	5.1	5.1	5.6	4.2	7.1	5.9	4.9	5.6
Service price	5.3	7.2	6.3	7.2	8.1	5.3	5.5	6.3	4.4	6.3	6.6	6.3	3.1	7.7	6.3	6.3	6.4	6.3
IT connections	5.9	6.5	6.7	6.5	5.9	6.5	5.6	7.1	4.7	4.7	5.8	5.2	5.9	5.1	6.4	6.0	5.4	5.7
IT terminals	7.2	7.8	5.6	7.8	4.4	6.7	5.1	5.6	3.3	5.6	2.4	4.2	4.1	3.2	6.8	5.7	3.5	4.7
Availability of IT	10.0	8.1	5.5	6.3	6.3	6.3	5.5	6.3	4.4	6.3	4.0	4.0	5.0	4.2	7.7	5.9	4.5	5.5
IT on corridors	7.2	7.9	6.1	6.8	6.7	5.4	3.5	0.0	3.4	5.0	5.7	3.4	4.8	5.1	6.9	5.4	4.9	5.5
Lead time on corr.	6.5	6.9	3.6	6.4	6.0	5.7	4.4	0.0	4.7	4.8	4.9	3.5	4.0	4.7	5.2	5.6	4.5	4.9
Door to door serv.	7.2	8.1	9.3	8.1	8.1	7.2	4.8	6.3	10.0	6.3	9.3	7.8	6.9	8.8	8.3	7.2	8.2	7.9
Overall estimation	**7.3**	**7.9**	**6.0**	**7.3**	**6.5**	**6.4**	**4.9**	**5.0**	**4.7**	**5.4**	**5.4**	**5.2**	**5.1**	**5.3**	**6.9**	**6.1**	**5.3**	**5.8**
Difference	**2.1**	**1.6**	**0.0**	**1.0**	**0.2**	**-0.9**	**0.3**	**0.5**	**-0.3**	**-0.4**	**-1.9**	**0.8**	**0.4**	**-1.3**	**1.2**	**0.0**	**-0.8**	**-0.2**

Table 4.9 Weighted rankings of quality of intermodal transport service and parameters of service – users

Criteria	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Quality of IT	**9.4**	**9.4**	**6.0**	**8.3**	**6.7**	**5.6**	**5.1**	**5.6**	**4.4**	**5.0**	**3.6**	**6.0**	**5.6**	**4.0**	**8.1**	**6.1**	**4.5**	**5.6**
Offered services	6.5	8.0	5.0	7.3	5.0	6.5	4.4	5.0	3.5	3.5	4.1	5.6	5.5	4.1	6.4	5.5	4.4	5.1
Lead time	10.0	10.0	6.1	9.3	8.0	8.0	4.5	9.3	4.0	6.0	6.1	6.1	6.7	5.0	8.5	7.1	5.8	6.7
Service price	6.4	8.6	7.5	8.6	9.8	6.4	6.6	7.5	5.3	7.5	8.0	7.5	3.8	9.2	7.5	7.5	7.6	7.6
IT connections	7.1	7.8	8.0	7.8	7.1	7.8	6.8	8.5	5.6	5.6	7.0	6.2	7.1	6.1	7.7	7.2	6.4	6.9
IT terminals	5.8	6.2	4.4	6.2	3.6	5.3	4.1	4.4	2.7	4.4	2.0	3.4	3.3	2.5	5.4	4.5	2.8	3.8
Availability of IT	8.0	6.5	4.4	5.0	5.0	5.0	4.4	5.0	3.5	5.0	3.2	3.2	4.0	3.4	6.2	4.7	3.6	4.4
IT on corridors	7.2	7.9	6.1	6.8	6.7	5.4	3.5	0.0	3.4	5.0	5.7	3.4	4.8	5.1	6.9	5.4	4.9	5.5
Lead time on corr.	7.8	8.3	4.3	7.7	7.2	6.9	5.2	0.0	5.7	5.8	5.8	4.2	4.8	5.6	6.2	6.7	5.4	5.9
Door to door serv.	5.8	6.5	7.4	6.5	6.5	5.8	3.8	5.0	8.0	5.0	7.4	6.2	5.5	7.1	6.6	5.8	6.6	6.4
Overall estimation	**7.2**	**7.8**	**5.9**	**7.2**	**6.5**	**6.3**	**4.8**	**5.0**	**4.6**	**5.3**	**5.5**	**5.1**	**5.0**	**5.3**	**6.8**	**6.0**	**5.3**	**5.8**
Difference	**2.3**	**1.7**	**0.1**	**1.1**	**0.1**	**-0.8**	**0.3**	**0.6**	**-0.2**	**-0.3**	**-1.9**	**0.9**	**0.5**	**-1.3**	**1.3**	**0.1**	**-0.8**	**-0.2**

Table 4.10 Ranking of countries based on score for intermodal transport quality from the users point of view

Quality Score	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia
Quality of IT	9.4	9.4	6.0	8.3	6.7	5.6	5.1	5.6	4.4	5.0	3.6	6.0	5.6	4.0
Quality of parameters	7.3	7.9	6.0	7.3	6.5	6.4	4.9	5.0	4.7	5.4	5.4	5.2	5.1	5.3
Average	**8.4**	**8.7**	**6.0**	**7.8**	**6.6**	**6.0**	**5.0**	**5.3**	**4.6**	**5.2**	**4.5**	**5.6**	**5.3**	**4.7**
Rang	2	1	5	3	4	6	11	8	13	10	14	7	9	12
Micro region	**1**	**1**	**3**	**2**	**2**	**3**	**3**	**3**	**4**	**3**	**4**	**3**	**3**	**4**

4.2 Rating of the intermodal transport system quality

By weighting response of service providers (scale 0 to 10), it is possible to see more clearly the differences between the market potential and the quality of intermodal transport in Danube Region and at the national level (Table 4.11). The potential of the market of intermodal transport in the Danube Region is extremely high. The awareness of this fact is particularly present in more developed countries such as Germany, Austria, the Czech Republic, Slovakia, but also Moldova, as a weaker developed country. On the other hand, the existing intermodal transport system in Danube Region is unable to respond adequately to existing, and especially future demands. The reasons are numerous. It should be noted that service providers in countries with high quality of the intermodal transport system are more aware of the potentials and disadvantages of intermodal transport. The difference in rating of the quality of system, on the national level and the Danube Region, is highest in Austria, Germany (a more developed system at the national level) and in Moldova (the national system is less developed than the regional one). In addition to Austria and Germany, in Slovenia, Hungary, Czech Republic and Slovakia, the national intermodal transport system has been rated by a higher rating than the intermodal transport system at the regional level.

The rating of intermodal transport system can also be carried out from the aspect of the application of different technologies (Table 4.12). The rating of the use of bimodal (semi-rail), inland-river-sea (Ro-Ro) and river-sea technologies cannot be considered as a relevant. The reason is a possible lack of knowledge of service surveyed providers about these technologies. Therefore, in rating of the level of development of the system, the rating of the application of container and road-rail (hucke pack) technology was used. According to this criteria, especially Germany and Austria stand out, followed by Czech Republic, Hungary and Bulgaria. Bearing in mind the scope of research and the method of completing of the questionnaires in Ukraine, the rating of the use of these technologies cannot be considered as a relevant in this country.

Table 4.11 The ratings of the market potential and the quality of the intermodal transport system in Danube Region

Criteria	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Potential of IT mark.	**8.3**	**9.6**	**7.5**	**9.1**	**8.5**	**7.3**	**5.6**	**7.8**	**8.9**	**7.3**	**6.7**	**6.7**	**6.3**	**7.0**	**8.3**	**7.8**	**6.8**	**7.4**
IT system - DR	5.0	5.6	4.9	4.2	5.2	5.1	4.7	7.8	5.6	6.4	4.8	6.1	5.9	5.8	5.1	5.0	5.8	5.4
IT system - national	9.4	9.1	6.8	5.6	5.6	6.9	4.2	5.6	2.2	6.4	2.6	4.7	4.4	4.3	8.2	5.3	4.5	5.5
Difference	**-4.4**	**-3.6**	**-1.9**	**-1.3**	**-0.4**	**-1.8**	**0.4**	**2.2**	**3.3**	**0.0**	**2.2**	**1.4**	**1.5**	**1.4**	**-3.1**	**-0.3**	**1.4**	**-0.1**

Table 4.12 The use of intermodal transport technologies

Technology	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Container (CO)	10.0	10.0	10.0	10.0	8.5	9.4	8.2	10.0	7.1	8.2	5.5	5.8	5.9	6.6	10.0	8.9	6.4	7.9
Hucke pack (HP)	8.5	8.8	6.6	5.2	3.6	5.2	4.0	10.0	3.2	6.1	4.1	4.0	3.7	4.3	7.8	4.6	4.4	5.1
Semi rail	3.2	7.2	4.5	1.8	3.7	2.4	2.9	7.1	3.2	5.2	3.7	2.9	3.7	3.6	5.0	3.0	3.7	3.7
Ro-Ro	2.5	5.8	8.4	1.8	2.3	2.9	6.6	10.0	1.8	6.6	4.2	4.3	3.7	3.3	6.1	3.5	4.2	4.4
River-see	3.1	4.0	2.2	1.8	1.8	2.4	2.9	7.1	3.2	1.8	2.7	2.9	2.7	2.6	3.0	2.5	2.6	2.8
All technologies	**5.5**	**7.2**	**6.3**	**4.1**	**4.0**	**4.4**	**4.9**	**8.8**	**3.7**	**5.6**	**4.1**	**4.0**	**4.0**	**4.1**	**6.4**	**4.5**	**4.2**	**4.8**
CO + HP	**9.3**	**9.4**	**8.3**	**7.6**	**6.1**	**7.3**	**6.1**	**10.0**	**5.1**	**7.2**	**4.8**	**4.9**	**4.8**	**5.5**	**8.9**	**6.7**	**5.4**	**6.5**

The rating of the quality of intermodal transport system can also be carried out on the basis of the ratings of element of system (Table 4.13). The analysis concludes that there are differences between the perceived quality of the intermodal transport system and the quality of its elements. In Austria, Germany and Slovenia, the rating of overall quality of the intermodal transport system is higher than the rating of quality of its elements. The biggest difference is in the rating of the intermodal connection between the economic centers (Germany and Austria), i.e., the system of "incoming driving-out coming driving" service. (Slovenia). In other countries, the quality of elements of the system has a higher rating than the rating of system. The difference is particularly high in Moldova and Bosnia and Herzegovina, and then in the Czech Republic, Slovakia, Romania and Serbia.

Since all elements generally do not have the same significance, in approach of rating of the quality of the intermodal transport system, weighting of the ratings of elements was carried out. The weight of a parameter is defined based on the service provider's response to the most important problems of intermodal transport. In this way, the following weight factors are defined: 1.2 - infrastructure, terminals and intermodal connection of economic centers; 1.0 - competition; and 0.8 - intermodal transport corridors, system of "incoming driving-out coming driving" and

technologies. The values obtained by extra weighting of the criteria of the service, are shown in Table 4.14. As can be seen, the difference between the rating of the quality of the intermodal transport system and the rating of its elements is still present and has almost not changed.

Table 4.13 Ratings of the quality of the system and elements of intermodal transport - service providers

Criteria	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Quality of IT system	**9.4**	**9.1**	**6.8**	**5.6**	**5.6**	**6.9**	**4.2**	**5.6**	**2.2**	**6.4**	**2.6**	**4.7**	**4.4**	**4.3**	**8.2**	**5.3**	**4.5**	**5.5**
Infrastructure	9.3	8.2	6.5	7.6	6.3	7.1	5.6	7.1	4.7	6.7	4.2	5.0	5.5	5.1	7.7	6.5	5.2	6.1
IT terminals	9.4	9.1	5.6	6.9	4.8	5.6	3.8	5.6	2.2	6.0	3.3	3.9	3.7	4.3	7.6	5.0	4.2	5.2
IT connections	6.5	7.1	5.8	5.2	6.3	5.6	5.2	7.1	4.7	6.2	4.7	5.5	5.5	5.7	6.4	5.6	5.5	5.7
Competition	10.0	10.0	8.4	7.8	8.8	7.0	5.5	6.3	2.5	7.0	2.5	5.3	5.0	5.2	9.3	6.9	5.0	6.5
IT on corridors	8.7	8.2	7.0	6.0	6.4	7.4	4.3	2.8	2.9	6.6	3.2	4.3	4.7	5.5	7.9	5.8	4.8	5.9
Door to door serv.	9.1	9.3	4.6	7.0	8.1	8.5	7.0	6.3	10.0	5.5	9.4	5.3	7.5	6.9	7.2	7.8	6.9	7.2
IT technologies	9.3	9.4	8.3	7.6	6.1	7.3	6.1	10.0	5.1	7.2	4.8	4.9	4.8	5.5	8.9	6.7	5.4	6.5
Overall estimation	**8.9**	**8.8**	**6.6**	**6.9**	**6.7**	**6.9**	**5.4**	**6.4**	**4.6**	**6.5**	**4.6**	**4.9**	**5.2**	**5.5**	**7.9**	**6.3**	**5.3**	**6.2**
Difference	**0.6**	**0.4**	**0.2**	**-1.3**	**-1.1**	**0.0**	**-1.1**	**-0.9**	**-2.4**	**0.0**	**-2.0**	**-0.2**	**-0.8**	**-1.1**	**0.3**	**-1.1**	**-0.8**	**-0.7**

Table 4.14 Extra weighted ratings of the quality of systems and elements of intermodal transport - service providers

Criteria	National level														Danube micro-region (DMR)			DR
	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia	DMR 1	DMR 2	DMR 3	DR
Quality of IT system	**9.4**	**9.1**	**6.8**	**5.6**	**5.6**	**6.9**	**4.2**	**5.6**	**2.2**	**6.4**	**2.6**	**4.7**	**4.4**	**4.3**	**8.2**	**5.3**	**4.5**	**5.5**
Infrastructure	11.1	9.9	7.8	9.2	7.5	8.5	6.8	8.5	5.6	8.0	5.1	6.0	6.6	6.1	9.3	7.8	6.3	7.4
IT terminals	11.3	10.9	6.7	8.3	5.8	6.7	4.5	6.7	2.7	7.2	4.0	4.7	4.4	5.2	9.2	6.0	5.0	6.2
IT connections	7.8	8.5	7.0	6.2	7.5	6.8	6.2	8.5	5.6	7.5	5.6	6.6	6.6	6.9	7.6	6.7	6.7	6.9
Competition	10.0	10.0	8.4	7.8	8.8	7.0	5.5	6.3	2.5	7.0	2.5	5.3	5.0	5.2	9.3	6.9	5.0	6.5
IT on corridors	7.0	6.5	5.6	4.8	5.1	5.9	3.4	2.2	2.3	5.3	2.6	3.5	3.8	4.4	6.3	4.7	3.9	4.7
Door to door serv.	7.3	7.4	3.7	5.6	6.5	6.8	5.6	5.0	8.0	4.4	7.5	4.3	6.0	5.5	5.8	6.3	5.5	5.8
IT technologies	7.4	7.5	6.6	6.1	4.9	5.8	4.9	8.0	4.1	5.7	3.8	3.9	3.8	4.4	7.1	5.4	4.3	5.2
Overall estimation	**8.8**	**8.7**	**6.5**	**6.8**	**6.6**	**6.8**	**5.3**	**6.4**	**4.4**	**6.5**	**4.4**	**4.9**	**5.2**	**5.4**	**7.8**	**6.2**	**5.2**	**6.1**
Difference	**0.6**	**0.4**	**0.3**	**-1.3**	**-1.0**	**0.1**	**-1.1**	**-0.9**	**-2.2**	**0.0**	**-1.9**	**-0.2**	**-0.7**	**-1.1**	**0.4**	**-1.0**	**-0.8**	**-0.6**

Taking into account the above, the average rating of the quality of the intermodal transport system can be obtained as an average rating of the overall quality of the system and the rating of the quality of its elements. On the basis of these ratings, it is possible to carry out the ranking of country and sorting it into micro regions from the standpoint of development of intermodal transport system and rating of service providers (Table 4.15). In this way, we can sort all the countries of Danube Region in four micro regions: DMR 1 - Germany and Austria; DMR 2 - Hungary and Slovenia; DMR 3 - Bulgaria, Czech Republic, Slovakia and Ukraine; and DMR 4 - Serbia, Romania, Croatia, Montenegro, Bosnia and Herzegovina and Moldova.

Table 4.15 Ranking of countries according to the rating of the quality of the intermodal transport system from the standpoint of the service provider

Quality Score	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia
Quality of IT system	9.4	9.1	6.8	5.6	5.6	6.9	4.2	5.6	2.2	6.4	2.6	4.7	4.4	4.3
Quality of elements	8.9	8.8	6.6	6.9	6.7	6.9	5.4	6.4	4.6	6.5	4.6	4.9	5.2	5.5
Average	**9.2**	**9.0**	**6.7**	**6.3**	**6.2**	**6.9**	**4.8**	**6.0**	**3.4**	**6.5**	**3.6**	**4.8**	**4.8**	**4.9**
Rang	1	2	4	6	7	3	10	8	14	5	13	11	12	9
Micro region	**1**	**1**	**2**	**3**	**3**	**2**	**4**	**3**	**4**	**3**	**4**	**4**	**4**	**4**

4.3 Overall rating of intermodal transport

The intensity of intermodal flows at the level of the entire Danube Region is non-homogeneous. The interconnection of the northwestern part of the Danube Region is remarkable (interconnections between the countries: Germany (the states of Bavaria and Baden Württemberg), the Czech Republic, Slovakia, Austria, Slovenia and Hungary). Over ninety percent of the total intermodal flows are realized on the corridors between the mentioned six countries of the northwestern part of the Danube Region. The south-eastern part of the Danube Region, consisting of eight countries (four Ukrainian regions, Moldova, Romania, Bulgaria, Croatia, Bosnia and Herzegovina, Serbia and Montenegro) is very underdeveloped from the standpoint of the intensity and quality of intermodal flows and connections between countries.

The highest intensity intermodal flows of the combined intermodal transport expressed in TEU/ year from the country as the origin in the transport chain, to the destination in the Danube Region are characteristic for Slovakia (about 500,000 TEU / year, of which 45% to the Czech Republic, 35% to Slovenia and 8% to Austria). The corridors from the Dunajska Streda to the Ceska Trebova, Koper and Krems were identified as the main corridors. The corridors from Dunajska Streda to Ceska Trebova and Koper are characterized by high quality of intermodal service, with favorable and mainly short delivery time. The quality of the intermodal service on the corridor to Krems is slightly lower with slightly more unfavorable delivery time than in the previous two cases. Corridors from the main intermodal terminals in Slovakia (Bratislava, Dunajska Streda, Kosice) to destinations and economic centers

in Serbia (especially Belgrade), Romania (especially Arad), Moldova and Ukraine Danube regions have been identified as missing connections.

By the geographical position, Hungary is the central country of the Danube Region. From Hungary, to other countries of the Danube Region, by the combined intermodal transport is delivered about 200,000 TEU/ year. The main intermodal corridors are positioned from Budapest to the periphery of the country: dominantly to the west, ie. to the Adriatic ports (mostly to Port of Koper and Rijeka, about 57%), to Bavaria via the destination in Austria (mostly to Munich, about 30%) and to Prague via the Dunajska Streda (about 9%). The quality of service on these corridors is predominantly „medium" and the delivery time is mostly short. About 4% of the containers are shipped to the countries of the southeastern part of the Danube Region, mostly to Croatia (about 2.5%), followed by Romania (Arad about 1%) and very few to Serbia and the Zakarpatty region of Ukraine (Chop, less than 1%). The quality of intermodal service on these corridors is low, except in part to Arad. Delivery time is long to Serbia and shorter to Romania and Transcarpathia region.From the standpoint of missing connections, it can be concluded that it is necessary to establish connections to Bulgaria, while the flows should be intensified to all the major economic centers in the southeastern part of the Danube Region (Belgrade, Arad, Ukrainian Danube regions).

The Czech Republic is a country positioned in the north of the Danube Region. It is bordering with Germany, with strong intermodal flows to the Northern European ports of Rotterdam, Hamburg and Bremen From Czech Republic and Prague about 2/3 of the total flows gravitate to the Northern European ports. Within the territory of the Czech Republic, the significant intermodal corridor has been developed from the terminal in the west of the country (Plzeň) through Prague and the Ceska Trebova to the terminals in the east of the country (Zlin and Ostrava). From the Czech Republic to the other countries of the Danube Region, using combined intermodal transport, about 175,000 TEU/year was delivered. Among the most important corridors are: Ostrava-Koper (about 13% of the total flows), from Prague to the destination in Bavaria (mostly Munich, about 24%), Prague-Budapest (about 14%), from Ceska Trebova to the Dunajska Streda (about 38%), Ceska Trebova-Krems-Salzburg (about 8% of flows). The most favorable quality of intermodal service and delivery time is on the corridors of the Ceska Trebova-Dunajska Streda and corridor to the terminals in Bavaria (almost „high" level of service, and delivery time between „short" and „medium"). On the corridors to Krems, Salzburg and Koper, the quality of intermodal service is slightly worse than on the corridors mentioned above. The same is true during delivery time. Connections with Serbia (especially Belgrade), Croatia (especially Zagreb, Rijeka), Romania (especially Arad) and other eastern regions of the Danube Region (destinations in Moldova, Bulgaria and Ukraine) are highlighted as missing connections.

Since it is entering the Adriatic Sea, Slovenia belongs to the more developed countries in the Danube region in terms of intermodality, primarily due to the port of Koper. From Slovenia to the rest of Danube Region, using combined intermodal transport, about 175,000 TEU/year is delivered. Dominant corridors are positioned from Koper to destinations in Slovakia (Dunajska Streda, Bratislava, Zilina, Dobra and some destinations in the Czech Republic) and Hungary (Budapest). About 88% of TEUs are shipped on these corridors (according to Slovakia 51% and Hungary 37%). The quality of intermodal service on the corridor to Slovakia is high and slightly better than the quality of service on the corridor to Hungary. Delivery time

for both corridors is assessed as favorable, i.e. short. From Slovenia to Austria and Germany (Corridors to, Graz, Furnitz and Munich) about 10% of total TEU is transshipped. These corridors are characterized by a slightly lower quality of intermodal service than on the dominant corridors. The same is true during delivery. The same is true during delivery time. Currently, around 1% of the total number of TEUs is delivered to countries in the southeastern part of the Danube Region (destinations in Croatia, Bosnia and Herzegovina and Serbia). The quality of the intermodal service is generally low with a long delivery time. Of the missing connections, it is necessary to mention the connections to Romania (mostly to Arad) and Montenegro (Podgorica). It is also necessary to establish and intensify very underdeveloped flows to Croatia, Bosnia and Herzegovina and Serbia.

At the level of the entire Danube region, in Austria, there are the most intermodal terminals which are classified into large-scale of intermodal terminals -groups, 6, 7, 8 (according to criteria: terminals area, volume of realized transport volumes, level of development of the technological process and the subsystems that make them). There are a total of ten. All these terminals have strong connections with the largest terminals outside the Danube Region: to the Northern European ports (Hamburg, Bremerhaven, Antwepen, Rotterdam, etc.), Trieste and other terminals in Germany (Rostok, Duisburg, Ludwigshafen, etc.). Consequently, most of the intermodal flows from Austria end up to the destinations outside the Danube Region. From Austria is delivered to the Danube region using combined intermodal transport , about 120,000 TEU/year is delivered. Of this, about 42% of TEU is delivered to Slovenia (the dominant corridors aro to the port of Koper from Ens, Krems, Furnitz, Salzburg, and indirectly from Vienna). The quality of service on these corridors is predominantly high with short delivery times. According to Hungary (mostli Sopron), about 32% of TEUs are delivered. The quality of the intermodal service on this corridor is medium, the same applies during delivery time. According to the destinations in the Czech Republic and Slovakia (mainly from the Krems to the Ceska Trebova and the Dunajska Streda) about 7% of TEUs are delivered. These corridors are characterized by high quality of intermodal service with predominantly short delivery times. According to Arad, around 6% of TEU are delivered via Hungary. The quality of the service and delivery time are the same as on the corridor to Sopron. Of the missing connections, the direct connection between Vienna and Koper and connection to Belgrade are highlighted, as well as the intensification of the flows to Zagreb, to which the existing flows are insignificant.

Similarly to Austria, Germany has nine terminals classified in categories 6, 7 and 8 that have strong connections with Northern European ports ports and other destinations outside the Danube Region. Therefore, the intermodal flows and corridors are dominantly oriented to destinations outside the Danube Region. Most of the intermodal flows from Bavaria and Baden Wirtemberg in relation to the Danube Region (about 120,000 TEU/year) are delivered in Hungary (about 60% in Budapest), in Czech Republic and Slovakia (about 27%) and Slovenia (around 10% in Port of Koper). The quality of intermodal service on these corridors is predominantly high with short delivery times. According to Zagreb, Belgrade and Romania intermodal flows are negligible (below 1%). The quality of intermoda service is low and the delivery time is generally long. Of the missing connection, especially the connections from Munich to the entire south-eastern part of the Danube Region are highlighted.

Romania is geographically located in the east of the Danube Region. The main terminals in this country are terminals in Constanta and Arad. Terminals in Constanta mainly serve destinations within Romania. From Romania to the rest of the Danube Region, it is delivered with combined transport about 25,000 TEU/year. The most important corridors are oriented to Budapest and destinations in Austria (over 90% of delivered TEUs). The level of intermodal service in this direction is medium. The same is true during delivery time. Other corridors are negligible, about 1% of TEU is delivered from Bucharest and Ploiesti to Stara Zagora and Burgas. The quality of intermodal service and delivery times on these corridors are not favorable. Of the missing connection, especially the connections from to neighboring countries, Moldova, Serbia and Ukraine, as well as Germany and Slovenia (especially Port of Koper) are highlighted.

Similar to Romania, in Bulgaria, the main terminals are the ports that come to the Black Sea, Burgas and Varna. These terminals serving destinations within Bulgaria. In the near future, the construction of a terminal in Sofia is expected. According to the existing situation, intermodal corridors are underdeveloped. The corridors between Stara Zagora and Bucharest/Ploiesti are characterized by low quality of intermodal service with long delivery times. The total flows of combined transport do not exceed the value of 5,000 TEU/year. Connections with Serbia (especially Belgrade), Slovenia (Koper, via Zagreb), Hungary (Budapest, via Arad) are the missing connections.

In Croatia, intermodal transport is poorly developed. From the standpoint of terminals, the main intermodal players are the ports on the Adriatic Sea, primarily Rijeka, then Ploče and Split. Other terminals, by technological process, equipment, capacity, etc., cannot be classified into typical functional intermodal terminals. Very small quantities of containers (below 5000 TEU/year) are shipped from Rijeka and Zagreb to Germany (Munich), Hungary (Budapest) and Serbia (Belgrade). The quality of intermodal service is low and the delivery time is long. Luka Ploče does not have a concrete railway connection across the territory of Croatia but is connected by the railway corridor through Mostar to Sarajevo. And on this corridor the service level is low and the delivery time is unfavorable.

In Serbia, Montenegro and Bosnia and Herzegovina, there are no developed intermodal terminals except the terminals in Bar, which is a functional intermodal terminal, but with still insufficiently developed capacity. For example, the observed problem in the case of the terminal in Bar is the occurrence of unloading of containers and the repackaging of goods on road freight vehicles, which eliminates the basic purpose of intermodality and increase the transport costs. On the other hand, frequent breaks of traffic flows are characterized on the railway corridor Bar-Belgrade, which makes transport of containers as "mission impossible". The mentioned corridor is very little used or is not used at all for the transport of containers. In Belgrade, ŽIT terminal is dislocated from the "Sava Plateau" (due to the implementation of the project "Belgrade Waterfront") to the location in Makiš and it is partially functional. The big disadvantage of this terminal is very short lengths of rail tracks. The newly opened terminal in Dobanovci near Belgrade has no respectable intermodal flows in order to be ranked among the main players of intermodal service at the level of Serbia. Other objects in the form of railway stations and non-operating ports cannot be classified nor compared with the existing intermodal terminals in the northwestern part of the Danube Region. In Bosnia and Herzegovina there are no functional intermodal terminals. They are mainly rail

stations or river ports that have only the most basic equipment for loading several containers daily without storage facilities. All this clearly indicates that intermodal corridors (with a origin or destination on the territory of the country) are almost completely underdeveloped in these three countries. Existing,more correctly said, multimodal flows are characterized by a low level of service with a long and unpredictable delivery time. Missing connections or intensification of existing flows are needed in all directions for these three countries, in particular:

- Bosnia and Herzegovina: connections with Serbia (Belgrade, Novi Sad), Croatia (Rijeka, Zagreb, Ploče) and Slovenia (Ljubljana, Koper)
- Croatia: connections with Serbia (Belgrade, Novi Sad), Slovenia (Ljubljana, Koper), Romania (Timisoara, Arad), as well as connections with the port of Ploce and further to Montenegro
- Serbia: connections with Hungary (Budapest), Bulgaria (Sofia), Romania (Belgrade, Bucharest), Germany (Munich), Montenegro (railway corridor Belgrade-Bar)

In addition to international connections, it is necessary to significantly improve the linkages of national economic centers in all three countries.

Intermodal transport is also underdeveloped in Moldova and four Ukrainian regions (Chernivtsi Oblast, Ivano-Frankivsk Oblast, Odessa Oblast and Transcarpathia Oblast). In Odessa Oblast, there are three terminals on the Black Sea coast (two terminals in Odessa and one in Illichivsk), but the destinations of these terminals are largely outside of the Danube Region. In Moldova there are two small incomplete functional intermodal terminals in Chisinau and on the Danube River in Giurgiulesti. Intermodal flows are of very low intensity with low quality of service and unpredictable delivery times. Connections with neighboring countries, Slovakia, Hungary and Romania are especially highlighted as the missing links.

The overall rating of intermodal transport in Danube Region was carried out on the basis of a survey of users and service providers. Also their ratings of the quality of services and systems, as well as previous research of the project team are taked in account (Table 4.16). On the basis of this expert rating, the ranking of countries from the standpoint of intermodal transport and their sorting into micro regions with similar characteristics was carried out:

- DMR 1: Germany and Austria;
- DMR 2: Czech Republic, Slovakia and Slovenia;
- DMR 3: Hungary, Romania and Croatia;
- DMR 4: Bulgaria, Ukraine, Montenegro, Serbia, Bosnia and Herzegovina and Moldova.

Table 4.16 Overall rating of of intermodal transport quality

Quality Score	Austria	Germany	Slovenia	Czech Republic	Slovakia	Hungary	Romania	Ukraine	Moldova	Bulgaria	Bosnia & Herzegovina	Croatia	Montenegro	Serbia
Quality of IT service	8.4	8.7	6	7.8	6.6	6	5	5.3	4.6	5.2	4.5	5.6	5.3	4.7
Quality of IT system	9.2	9	6.7	6.3	6.2	6.9	4.8	6	3.4	6.5	3.6	4.8	4.8	4.9
Previous research	8.5	9	7	8	8	5.5	5.5	2.5	1.5	2.5	1.5	4.5	2.5	2.5
Overall rating	**8.7**	**8.9**	**6.6**	**7.4**	**6.9**	**6.1**	**5.1**	**4.6**	**3.2**	**4.7**	**3.2**	**5.0**	**4.2**	**4.0**
Rang	2	1	5	3	4	6	7	10	14	9	13	8	11	12
Micro region	**1**	**1**	**2**	**2**	**2**	**3**	**3**	**4**	**4**	**4**	**4**	**3**	**4**	**4**

5 RECOMMENDATIONS AND MEASURES FOR DEVELOPMENT OF INTERMODAL TRANSPORT

Area of IT has been considered within European initiatives framework trough notable number of projects on different levels. Projects dealt with IT on national and transnational level and as a results had a lists of initiatives and actions that, through numerous national documents, were further developed. In two parts, A and B, those are systematically presented:

A. Recommendations and actions for ***IT development*** based on existing initiatives in the region and
B. Recommendations and actions concerning ***development of IT service quality*** that have a priority based on this project questionnaires and analysis.

5.1 RECOMMENDATIONS AND MEASURES FOR INTERMODAL TRANSPORT DEVELOPMENT

Overview of strategic documents produced the most number of interventions in the area of Management (business-related) and Transport infrastructure (Table 5.1). Information and Technology Systems (ITS) makes the area of the most recognized problem. Regarding area of Management and Transport infrastructure are given in Tables 5.2 and 5.3 respectively. These interventions have not been divided across MRs since they could be implemented in all countries depending on situation. From period to period, it is necessary to follow the situation and **update** documents with learning from previous experience.

Table 5.1 Number of interventions by area in strategic documents

Area	No. of suggested interventions	Area	No. of suggested interventions
Management	32	ITS	8
Transport infrastructure	16	Human resources	5
Projects	15	International cooperation	4
Financing	13	Network of terminals	4
Environment	10	Law	3
Terminal	8	Transport means	3
Border crossings	6		
Institutional framework	6	**Total**	**133**

Table 5.2 Interventions in the area of Management from strategic documents

Management
Better usage of Intermodal Transport
Establishing joint offices in transport nodes
Strengthening of transit traffic
Strengthening of competitiveness of domestic carriers on markets
Implementation of JIT principle between nodes and business centers
Use of IWW in supplying (in urban zones)
Liberalization of the market, securing the same conditions of access for all interested parties
Securing the implementation of recommended practices in companies
Securing access to services for small and medium enterprises
Optimization of resource use
Organization of schedule in railway transportation
Securing business transparency
Improvement of optimization – better management in the aspects of economy and security, intermodality and ecology
Information regarding delays – Banned traffic on certain days
Support of cooperation among companies
Monitoring performances of logistics networks
Giving priority to train composition carrying intermodal unites
Attracting of foreign and domestic operators
Promotion of regular intermodal lines
Obtaining alternatives for shifting of goods to ecological modes
Development of services in maritime transport
Reconstruction of national railway operator
Reduction of one wagon shipping prices and its promotion
Reduction of heavy road traffic
Stimulation of transport on IWW with the implementation of fiscal politics (prices of fuels for instances)
Subventions for intermodal transport unites procurement
Reduction of "grey economy" in transport
Fitting providers and ministries needs
Making private and public sector familiar with principles of intermodal transport and establishment of Freight Villages
Managing of urban supplying (City Logistics principles)
Value Added Service
Establishment of Free-trade zones

Table 5.3 Interventions in the area of Transport Infrastructure from strategic documents

Transport infrastructure
Electrification of railway tracks
Avoidance of nonstandard curves thus limitations (speed)
Construction and modernization of railway tracks
Axle pressure control on border crossings
Securing velocities at the rate of 160km/h on railways
By-passes (at bottle necks)
Removing of bottle necks
Securing the 22.5t/axle pressure on the main railway corridors
Increase the efficiency of railways maintenance
Connect airports
Connect ports
Implementation of UIC standards for high speed railways
Maintaining navigable conditions
SEETO recommendations regarding infrastructure maintained
Stimulating long distance transport (by improving the connectedness)
Stimulating construction and use of industrial tracks (where it is economically justified)

When talking about the most important problems and their corresponding areas (Chapter 2.1), interventions regarding are given in Table 5.4. Some of it, for instance "elimination of congestions" were not described in detail, but they are planned as an action. Certain actions are not directly connected to IT, but indirectly – for an example "raising the awareness of pollution (by creating more green surfaces)".

Table 5.4 Interventions regarding areas of the most important problems

Institutional framework
State maritime company
Establishing of state departments responsible for transport activities
Company for railway maintenance
Coordination body (or agencies)
Promotion of agencies connected to water, railway and road transport
Connecting staff from public and private sector in agencies and bodies, associations
Law
Penalties for overweighting vehicles with freight
Support to PPP
Law in the area of construction and maintenance of infrastructure with responsible party defined
Transport means
Fleet modernization
Procurement of railway transport means (sustainably and economically acceptable)
Studies and innovative projects regarding fleet modernization
Information
ITS

Development of ITS applications
Introducing centrally managed ITS
ERTMS, ETCS, GSM-R, RIS
Optimization of ITS in ports
Improve the data gathering
Telematics support
Information services (from routing to payments)
Border crossings
Analysis of requirements from free regime of transit traffic
Elimination of congestions
International agreements
NCTS i Single Window system
Equipping of border offices
Elimination of administrative barriers
Environment
Creating "noise maps" and noise reduction
Actions regarding transit traffic
Fees for services proportional to pollution emission
Energy return by braking
Eco modes promotion
Stimulating shift to more ecological modes
Study of wild animals movement and reducing the impact on them
Fees to vehicles according to pollution
Introducing exterior costs to fees in road transport
Vegetation besides roads

Suggested interventions in other areas are given in Table 5.5. Interventions in area of Terminal and Network of terminals besides Project area have a significant impact on health and strength of IT.

Table 5.5 Interventions in other areas of strategic documents

Financing
Fuel excise
Alternative ways of financing
Improving the management of resources from public budget
Exterior support for realization of maintenance work
Intermodal transport financing
Implementation of FIDIC rules
Secure the financing of infrastructure by changing and improving law
Strengthening of private capital involved in development and strengthening of infrastructure and its maintenance
New strategies for projects financing
Supporting procurement of ecologically approved vehicles
Balance financing from budget and from users intended for maintenance
Financing guidelines

Subventions to railway operators
Projects
Analysis of the needs for shunting station
Making an arrangements for logistics in spatial planning
Defining actions for intermodal transport developments
Economic analysis of infrastructural investments
Harmonized system to facilitate projects regarding infrastructure
Plans and strategies regarding maritime and intermodal transport
Periodic maintenance plans
Facilitating of procedures
Establishment of terminal locating system
Setting up financing and aimed investing plans in detail
Updating of the documents regular
Study of new railway tracks to be incorporated in SEETO network study
Study regarding indispensable terminals
Study of investing in tracks that are not part of the main corridors
Studies in cooperation with private sector
Human resources
Employment of additional staff
Strengthening of employees knowledge of intermodal transport and logistics principles
Motivation in the manner of greater salaries
Employees training
Promotion of carriers in logistics sector
Terminal
Additional space for storing containers
Construction of the terminals
Moving certain functions from port
Securing appropriate space for maneuvering surfaces
Prolonging tracks in terminals to 750m
Improving Capacities in terminals regarding loading and unloading
Removal of limitations of capacity
Terminal equipment improvement
International cooperation
Cooperation and knowledge exchange among sectors
Cooperation with neighboring countries
Agreements with non EU countries
Involvement in international programs
Network of terminals
Interconnecting terminals and centers
Appraisal of network of terminals
Development of regional centers
Development of Freight Villages

The conclusion is that from all the measures, 133 of them (some measures are more numerous, but they are of the same nature as one), we need to pick only those that best suited for fulfilling the goal. Thus, determining the priority of implementation of actions and goals, as well as their time limits, is an inevitable part of every strategic document.

Less developed countries have documents that are often not realistic, i.e. the goals and measures in those documents do not match the current conditions and potentials. Some envision over 100 measures without any significant importance, priority, defined time limit and budget. Without defining it first, it is difficult to determine a way, responsibilities and the progress towards achieving the goals. For example, in one strategy one of the measures was enabling traffic for compositions of 44 t that transport intermodal units – which is already defined by the Law and does not represent an additional measure.

On the other hand, in developed countries there are plans where in most cases measures are financially determined, the relationship with other areas is observed and changes to the Law are referred to as well as other guidelines. In addition, Institutional frameworks are significantly more developed as well as the awareness and knowledge of intermodal transport.

Further, measures should be related to goals and vice versa, ranked by priority. They can be divided in groups: systemic, infrastructural, organizational and operational. Examples of **systemic measures** are: periodic updating of plans for infrastructure maintenance, maintenance and amendment of databases for different sectors in transport and upgrades of transport model. **Infrastructural measures** are divided by categories. Thus, for the railway category upgrades are envisioned for railways that are part of the TEN-T network, equipping and modernization of border crossings and upgrades of transport nodes and their corresponding roads. In water transport measures are aimed at securing the navigation conditions on the Danube and implementation of River Information System (RIS). It is rare for documents to have separation of intermodal transport and/or logistics as a transport subsystem. It is mostly bound to rail traffic, even though intermodal transport does not have to include rail transport. **Organizational measures** relating to intermodal transport include support and creation of conditions for conducting intermodal transport from the aspect of organization, infrastructure and transport resources; coordination with international standards on railways and border crossings; enabling the implementation of customs formalities at intermodal terminals; holding at the border crossings of trains for no longer than 30 minutes per AGTC and reduction of charges, enabling of traffic on Saturdays and Sundays for road transporters who provide services from/to terminals in intermodal transport. **Operational measures** are tied to day to day decisions/management, such as timetables of intermodal lines.

Goals can be of different natures – economic, social, political, technological – technical and others. A question is raised: how to define which goal is more important and what weight to give to certain actions according to these aspects? Economy and traffic and transport hinder or drag each other forward. If the state in traffic and transport is improved, the state of economy will be improved as well. If the state of economy is improved, the economic and social parameters that govern the country will be improved as well. It comes from this that it may be best to **start from the base** – work on the basic subsystems of transport, in this case intermodal,

and every growth of intermodal transport will lead **to the growth of** GDP (chapter 1.3.3).

Basic subsystems of intermodal transport are: transport – manipulative unit, transport means, transport infrastructure, terminals and centers, terminal networks, organization, operators and associations, telematics support and logistics strategies. Countries have noticed problems in all subsystems (although perhaps not connecting them like that) such as lack of intermodal units, railway cars, FVs and other centers of different functions and levels, lack of organizations and bodies on national level, telematics support and logistic strategies (inadequate business and bad company practices).

From the proposed measures, 73 of them directly influence intermodal transport and 36 of those are related to subsystems. There is a lack of attention to waterways, especially on the Danube. Additionally, insufficient attention is paid to terminal networks (other than in the document for Romania) and in the functioning of terminals and centers.

While analyzing **terminals and centers**, their functions cannot be omitted. Specter of services that are being provided can be **a stronger tool for concurrency** than the services themselves. In the document for Romania other than the factors of success, there are references to the factors of failure of certain harbors in the race to attract the flows. Thus, besides the price, the entire service is listed as an important tool for conquering the market of the Central Europe. Improvement of this area countries see differently. Bulgaria through investment in infrastructure and terminals with two operational programs where the priorities are clearly defined; Czech Republic through modernization of TEN-T network. Rarely do countries understand the terminal network as a separate entity. Thus in the Romanian document there are proposed types of terminals inside a **network of 19 terminals** (3 of which are trimodal). As a problem it was identified in Moldova and Ukraine as well; especially in Moldova which does not have a modern intermodal terminal so they suggest building of 2 terminals.

Terminals and centers (especially FVs) need to be of open type where control function can be held by a neutral body that will carry out interests of everyone who are connected with the center in any fashion. It can be built by the model PPP and/or with investment from various parties. There is no need to fear this. Good example of good implementation of PPP is Graz.

Of special importance is the feature of terminals and centers as breakpoints for freight – transport flows is not only in that they stop heavy flows before entry to urban environments, but also in that they link the points between which it is possible to establish extensive flows so they give a chance to types that demand bigger goods quantities. Finally, functioning of FV without intermodal transport is not possible in a way such that its entire potential is exploited. Types are environmentally acceptable with more throughput than road transport, so their advantage and necessity are even more needed. Existence of FV on the peripheries of cities (on a higher level and with wider range of functions) will contribute to the development of the network and put „on the map" not just the city, but the region in which it is located. Economic benefits will be felt by the country as well, companies, and individuals too, who will get the goods cheaper and more efficiently. Social and environmental impacts are also very significant.

It is incorrect to think that there is a limit (in the number of residents, spatial dispersion or similar) for the existence of terminals or centers that would serve a particular city or Area. Every city has logistics. Some larger, some smaller in volume. There is always a tendency for the logistics to be as efficient as possible for everyday work, and by supplying and „pulling" flows out of the metro area by consolidating, processing and „supplementing" those flows in breakpoints that is precisely what is achieved.

Terminals and centers can have, as was stated, different specter of services. Flows from Turkey to European Union and back are significant (considering that almost half of the entire export of Turkey and 39% of import is on this relation) and they transit through certain countries. For example, in Austria and Hungary there are *hucke pack* technologies, i.e. technology A and B transport of road compositions. If this were possible in Serbia, Bulgaria, Macedonia or any other country on the transit path, transit would be significantly easier, and there would be less impact on the environment. In some countries it is mandatory to use this way of transport on certain relations, however there are no complaints given that all the sides benefit from it. The only thing that is needed for the technology is the existence of a ramp that would allow passage and descent of road compositions to and from railway pallet cars. Countries need to recognize the advantages of using these kinds of systems and networks.

Next subsystem is **transport – manipulative unit**. As can be observed, in the intermodal transport it can be the entire vehicle, part of a vehicle, container or swap body (European Intermodal Transport Unit – EITU). Some of these require vertical, some horizontal loading and some can be loaded both ways. Containers and vessels can be placed on many types of railway cars (R, K, L and S series) while other can be put only on S cars (example is technology A that goes on S cars mostly because of the limit of the height of the cargo profile).

A lack of swap bodies was observed. They are somewhat more costly than containers which are present on the market for more than half a century. Swap body is Europe's answer to the container because of the loss of space when using pallets (1200x800 mm, European Pallet Association – EPAL) from European pallet system (33 EPALs fit in a vessel type A1360 while in a 40ft container there can fit 25). It is evident that this reduces the number of trips when using vessels. Because of the mixing technologies in trans-oceanic transport, usage of vessels is easier in land transport.

Standardized units, among other things, speed up the flow of the chain by avoiding individual pallet loading. The only loss is precisely at transfer points compared to direct transport in terms of time, expenses and loading risks. However, the number of direct routes between points m and n is m*n while with an intermediary between the points that number of links is m+n. With various **benefits**, such as extended payment periods and subventions, the purchase of these units can be encouraged.

A mitigating circumstance for **organization** of intermodal transport itself would be improvement of cooperation between companies. Consolidating the flows, concentrating the companies in one place (for example in FV) attracts flows, there is a possibility of different way of helping and resource sharing and avoiding the duplication of resources and areas. Opening a platform or area meant for FV

(combining with free zones and similar), companies would get used to and recognize the mutual interest of entering the market from a single shared space.

In order to secure functioning on higher levels from which support, promotion and knowledge should come from, **institutional framework** geared up with the law should be set up. Various bodies and associations can be incorporated from people from different areas of work. It is a mistake to set up limitations like either non passing on certain days (which could be left out from previous era) or in length of the vehicles. In that way carriers can be pressured to carry more tours and not be able to divide it avoiding congestions and delays.

It is necessary to identify everyday problems in IT. For instance, lack of terminals or infrastructural links. Institution can play a significant role regarding coordination on both national and transnational level thus boosting the use of IT and facilitate market access to domestic operators. Without institution behind it, IT and logistics interests can be **left out** from government decisions.

Telematics support should not be left behind. Today when digital logistics overpassed price of service in terms of importance, companies that do not possess information in real time in certain place lose the battle. ITS must cover all modes and be integrated – otherwise information can be lost and desynchronization could occur. However, this systems are expensive even for large companies thus solution is seen in cooperation between companies and government so that efficient ITS could be established.

Finally, use of certain **logistics strategy** varies, from period to period according to current situation. Companies, but governments as well (for example by establishing network of terminals) should investigate different strategies that can be used i.e. they should be informed about those advantages and disadvantages. To make it possible, it is necessary to make a room for well informed and educated staff in the area of logistics together with other staff from other areas so that everyday business could be improved.

Taking into consideration all afore mentioned, government together with private sector should bring strategic documents. Those documents are to be prices and with defined time horizon, with targeted interventions and regularly updated as well as monitored trough performance indicators. To sum up, in Table 5.6 are given key concerns of the significant importance for each subsystem of IT.

Table 5.6 Key concerns in subsystems of intermodal transport

Subsystem	Key concerns
Stacking & manipulating unit	Procurement (manufacturing); Use; Promotion;
Transport units	Procurement (manufacturing); Use; Promotion;
Transport infrastructure	Management; Revitalization; Maintenance plan; Charging for use
Terminal	Designing; Functions (offered services); PPP
Network of terminals	No. and location of terminals with their functions (with level concerned)
Operators and associations	Institutional framework; Educated staff
Organization	Freight Villages; Cooperation
Telematics	Integration; Customer tailored service; Cooperation
Logistics strategies	Educated staff

Actions and recommendations for improvement of IT quality are directly connected to recommendations for improvement of modes. Generally, if interventions regarding individual modes are realized, improvement of IT could be achieved.

5.2 RECCOMMENDATIONS AND ACTIONS FOR THE IMPROVEMENT OF INTERMODAL TRANSPORT QUALITY

Based on analysis of questionnaires regarding IT quality, four groups of interventions and actions are proposed (Table 5.7): Institutional – organizational (IO), designing & planning (PP), technical – structural (T) and financial (F). Importance of actions and recommendations in MRs are shown in Table 5.8.

Table 5.7 Key interventions and recommendations for improvement of intermodal transport quality

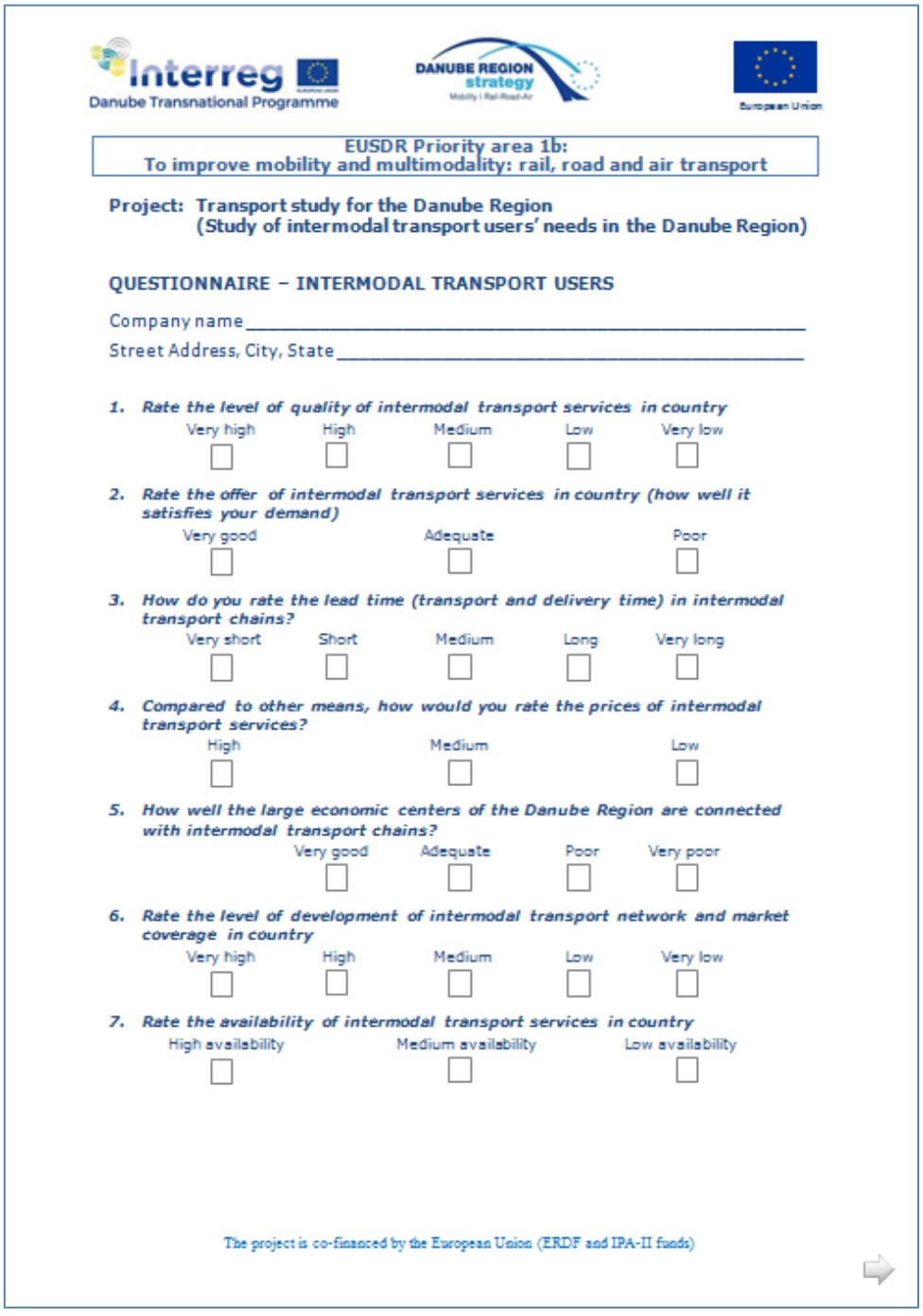
GRUPA	Institutional – Organizational
IO1	Establishment of national agencies for the quality of intermodal transport
IO2	Development of a strategic document for improving the quality of intermodal transport at the national and international level, harmonized within the micro region and the whole
IO3	Improving coordinated action to reduce retention at customs border procedures (especially in DMR 3 and DMR 4)
IO4	It is preferable that intermodal transport is institutionally removed from railway transport. The institution fighting for survival is not well placed to provide IT care because it will turn to other existential priorities, especially in regions where there is only one dominant organization – reduce the impact of the national rail operator.
IO5	Stimulate the regulation of business in intermodal transport at the micro regional and international level
IO6	Improving the institutional framework at the international level regarding the quality of IT.
IO7	Stimulate the efforts of railway operators in the intermodal transport market
IO8	The proactive role of the railways in the market of intermodal services, it is not enough to wait passively for the cargo to appear on the rail by itself
IO9	Extending and deepening the supply of services in the "door-to-door" intermodal chain
IO10	Coordinate the offer and quality of service in IT, through more efficient organizational linking in intermodal chains of users and operators (especially in DMR 3 and DMR 4).
IO11	Promotion of knowledge about quality in intermodal transport and logistics.
IO12	Promotion of career in intermodal transport and logistics
GRUPA	**Designing & Planning**
P1	Bringing of Actions plans for development of IT quality, for each micro – region.
P2	Identification and improvement of key intermodal corridors for each micro – region, improvement of quality in accordance with specific needs of intermodal transport chains
P3	Define national action plan for development of intermodal terminals in groups 6, 7 and 8, especially in countries where dominant are 0, 1 and 2.
P4	Improvement of research of terminal location problems and their allocations next to logistics centers. Creation of integrated logistics networks.
P5	Improvement of spatial plans in logistics and intermodal transport as one whole
P6	Study of spatial coverage of users by intermodal logistics network
P7	Completion of development plan regarding regular intermodal lines in micro regions and in the Danube Region.

P8	Study of implementation of intermodal transport chain in city logistics zone of larger economic centers in micro- regions.
P9	Elaboration of intermodal transport quality performances in order to expands services in other market areas (agricultural industry for instance).
P10	Elaboration of a plan regarding connecting intermodal and airway transport in micro – regions and plans for certain industries (agricultural industry).
P11	International projects connected to improvement of IT quality on certain corridors within and between micro – regions.
GRUPA	**Technical – structural**
T1	Definition of unique performance classification to monitor intermodal transport quality for whole region and micro – regions.
T2	Forming data base of intermodal transport service quality performances on national and MR level in order to monitor, synchronize and improve quality of IT.
T3	Fleet innovations, on national and international level for intermodal unites shipment in accordance with freight flows on corridors within micro – regions.
T4	Extension of the container fleet and introduction of new solutions, such as three-way access, sensor installation, etc. (eg introducing smart containers).
T5	Increase availability of loading / unloading of containers at the start / end points of the transport chain, at the sender / receiver of goods.
T6	Stimulating of usage of existing resources
T7	Implementation of ITS with efficient algorithms for joint tasks in micro – regions and their interconnection.
T8	Technological incorporation of logistics center in intermodal supply chains.
T9	Introduction of cross docking terminal for ITU and selection of the HUB terminal locations in the function of flow structure.
T10	Introducing the Dry port in the function of intermodal transport (especially in DMR 3, DMR 4)
T11	Connecting intermodal terminals with logistics centers in business centers
T12	Increase of availability of intermodal logistics nodes to users of intermodal transport
T13	Development and introducing of centralized ITS as a support to intermodal transport and logistics
T14	Development of ECO hub terminals in intermodal transport chains
T15	Stimulation of the use of eco vehicles, especially in the pre and post haulage activities of the intermodal transport chains.
T16	The inclusion of IT chains in the chain of VAL services (in a network of logistics centers that provide VAL services)
T17	Improvement of intermodal terminals and elimination of restrictions: length of tracks and allocation, additional functions and implementation of ITS, innovative technologies etc.
GRUPA	**Financial and law – related measures**
F1	Development of PPP model of financing infrastructure on individual directions of the micro regions and their Interregional linking
F2	Introduction of procedures for reducing differences in performance monitoring and requirements for the IT quality.
F3	Balanced development of the ownership of the container fleet between service providers and the owners of the goods being transported. Potentiate the development of the container fleet in favor of the intermodal service provider.
F4	Liberalization of the IT market against the monopoly of certain railway operators
F5	Increasing the representation of the PPP business model to intermodal structures in MR1 requires a boost to development partnership of different financing and business structures
F6	Defining the targeted financing plan – priority financing measures for the key performance of the quality of intermodal transport, on the principle of profitability.

Table 5.8 Importance of interventions and recommendations for IT quality in MRs

Recommendations	DMR 1	DMR 2	DMR 3	DMR 4
IO 1	●	●	●	●
IO 2	●	●	●	●
IO 3	●	●	●	●
IO 4	●	●	●	●
IO 5	●	●	●	●
IO 6	●	●	●	●
IO 7	●	●	●	●
IO 8	●	●	●	●
IO 9	●	●	●	●
IO 10	●	●	●	●
IO 11	●	●	●	●
IO 12	●	●	●	●
P1	●	●	●	●
P2	●	●	●	●
P3	●	●	●	●
P4	●	●	●	●
P5	●	●	●	●
P6	●	●	●	●
P7	●	●	●	●
P8	●	●	●	●
P9	●	●	●	●
P10	●	●	●	●
P11	●	●	●	●
T1	●	●	●	●
T2	●	●	●	●
T3	●	●	●	●
T4	●	●	●	●
T5	●	●	●	●
T6	●	●	●	●
T7	●	●	●	●
T8	●	●	●	●
T9	●	●	●	●
T10	●	●	●	●
T11	●	●	●	●
T12	●	●	●	●
T13	●	●	●	●
T14	●	●	●	●
T15	●	●	●	●
T16	●	●	●	●
T17	●	●	●	●
F1	●	●	●	●
F2	●	●	●	●
F3	●	●	●	●
F4	●	●	●	●
F5	●	●	●	●
F6	●	●	●	●

APPENDIX 1. QUESTIONNAIRE FOR USERS OF INTERMODAL TRANSPORT SERVICES



Interreg
Danube Transnational Programme

DANUBE REGION strategy
Mobility | Rail-Road-Air

European Union

EUSDR Priority area 1b:
To improve mobility and multimodality: rail, road and air transport

Project: Transport study for the Danube Region
(Study of intermodal transport users' needs in the Danube Region)

QUESTIONNAIRE – INTERMODAL TRANSPORT USERS

Company name _____

Street Address, City, State _____

1. ***Rate the level of quality of intermodal transport services in country***

Very high ☐ High ☐ Medium ☐ Low ☐ Very low ☐

2. ***Rate the offer of intermodal transport services in country (how well it satisfies your demand)***

Very good ☐ Adequate ☐ Poor ☐

3. ***How do you rate the lead time (transport and delivery time) in intermodal transport chains?***

Very short ☐ Short ☐ Medium ☐ Long ☐ Very long ☐

4. ***Compared to other means, how would you rate the prices of intermodal transport services?***

High ☐ Medium ☐ Low ☐

5. ***How well the large economic centers of the Danube Region are connected with intermodal transport chains?***

Very good ☐ Adequate ☐ Poor ☐ Very poor ☐

6. ***Rate the level of development of intermodal transport network and market coverage in country***

Very high ☐ High ☐ Medium ☐ Low ☐ Very low ☐

7. ***Rate the availability of intermodal transport services in country***

High availability ☐ Medium availability ☐ Low availability ☐

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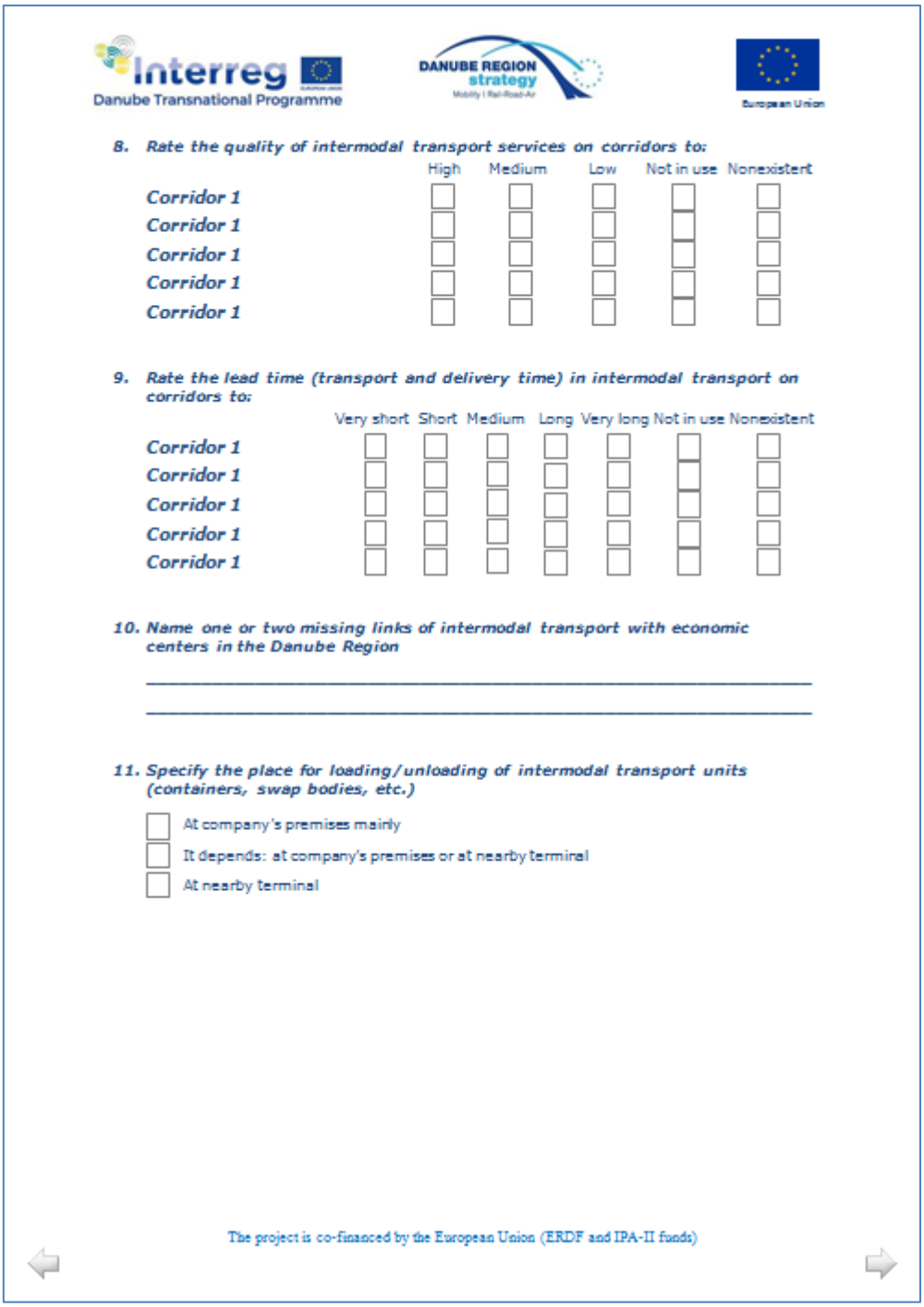

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8. *Rate the quality of intermodal transport services on corridors to:*

	High	Medium	Low	Not in use	Nonexistent
Corridor 1	☐	☐	☐	☐	☐
Corridor 1	☐	☐	☐	☐	☐
Corridor 1	☐	☐	☐	☐	☐
Corridor 1	☐	☐	☐	☐	☐
Corridor 1	☐	☐	☐	☐	☐

9. *Rate the lead time (transport and delivery time) in intermodal transport on corridors to:*

	Very short	Short	Medium	Long	Very long	Not in use	Nonexistent
Corridor 1	☐	☐	☐	☐	☐	☐	☐
Corridor 1	☐	☐	☐	☐	☐	☐	☐
Corridor 1	☐	☐	☐	☐	☐	☐	☐
Corridor 1	☐	☐	☐	☐	☐	☐	☐
Corridor 1	☐	☐	☐	☐	☐	☐	☐

10. *Name one or two missing links of intermodal transport with economic centers in the Danube Region*

_____

_____

11. *Specify the place for loading/unloading of intermodal transport units (containers, swap bodies, etc.)*

☐ At company's premises mainly

☐ It depends: at company's premises or at nearby terminal

☐ At nearby terminal

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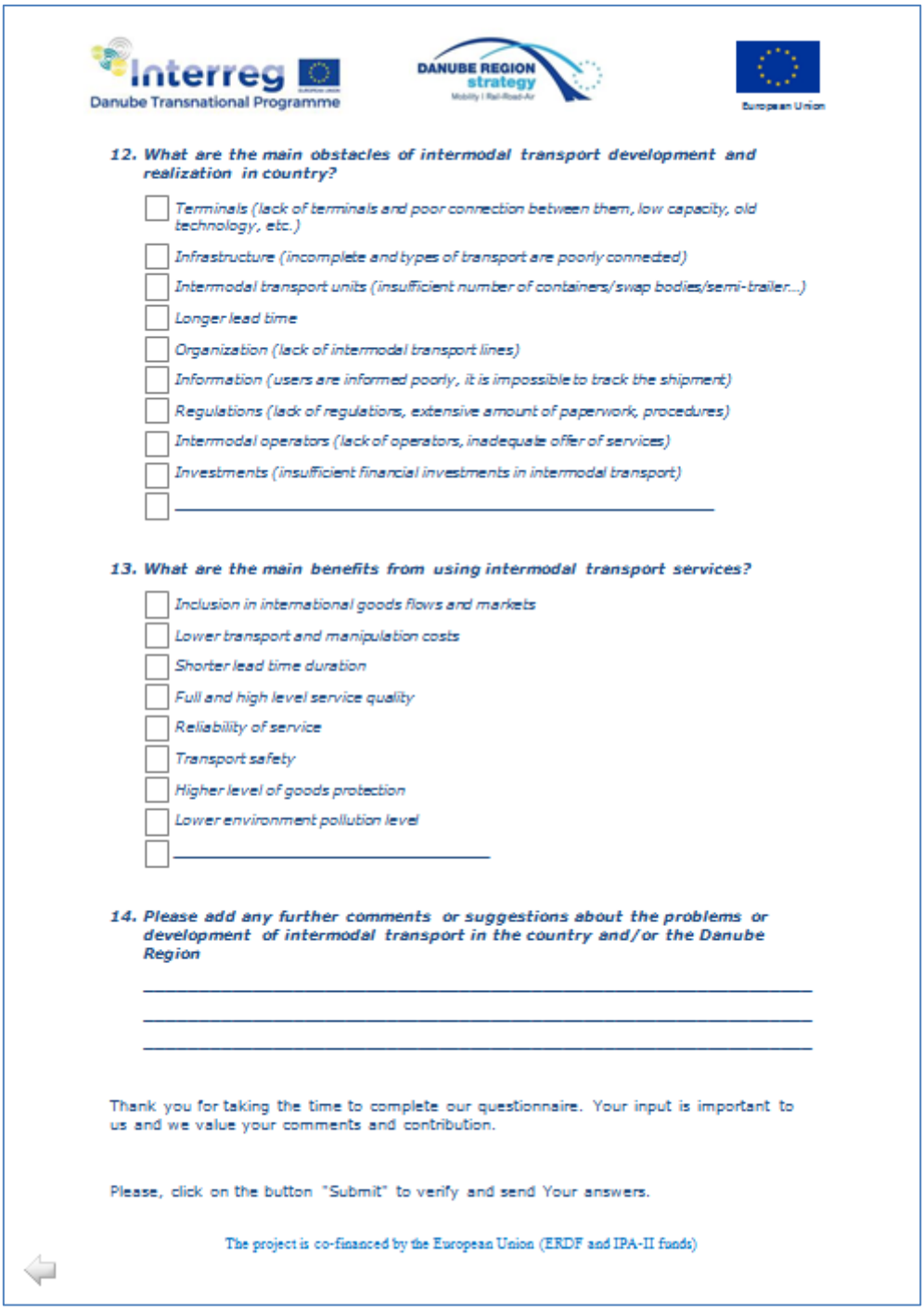


Interreg Danube Transnational Programme

DANUBE REGION strategy

European Union

12. What are the main obstacles of intermodal transport development and realization in country?

- ☐ *Terminals (lack of terminals and poor connection between them, low capacity, old technology, etc.)*
- ☐ *Infrastructure (incomplete and types of transport are poorly connected)*
- ☐ *Intermodal transport units (insufficient number of containers/swap bodies/semi-trailer...)*
- ☐ *Longer lead time*
- ☐ *Organization (lack of intermodal transport lines)*
- ☐ *Information (users are informed poorly, it is impossible to track the shipment)*
- ☐ *Regulations (lack of regulations, extensive amount of paperwork, procedures)*
- ☐ *Intermodal operators (lack of operators, inadequate offer of services)*
- ☐ *Investments (insufficient financial investments in intermodal transport)*
- ☐ _____

13. What are the main benefits from using intermodal transport services?

- ☐ *Inclusion in international goods flows and markets*
- ☐ *Lower transport and manipulation costs*
- ☐ *Shorter lead time duration*
- ☐ *Full and high level service quality*
- ☐ *Reliability of service*
- ☐ *Transport safety*
- ☐ *Higher level of goods protection*
- ☐ *Lower environment pollution level*
- ☐ _____

14. Please add any further comments or suggestions about the problems or development of intermodal transport in the country and/or the Danube Region

_____

_____

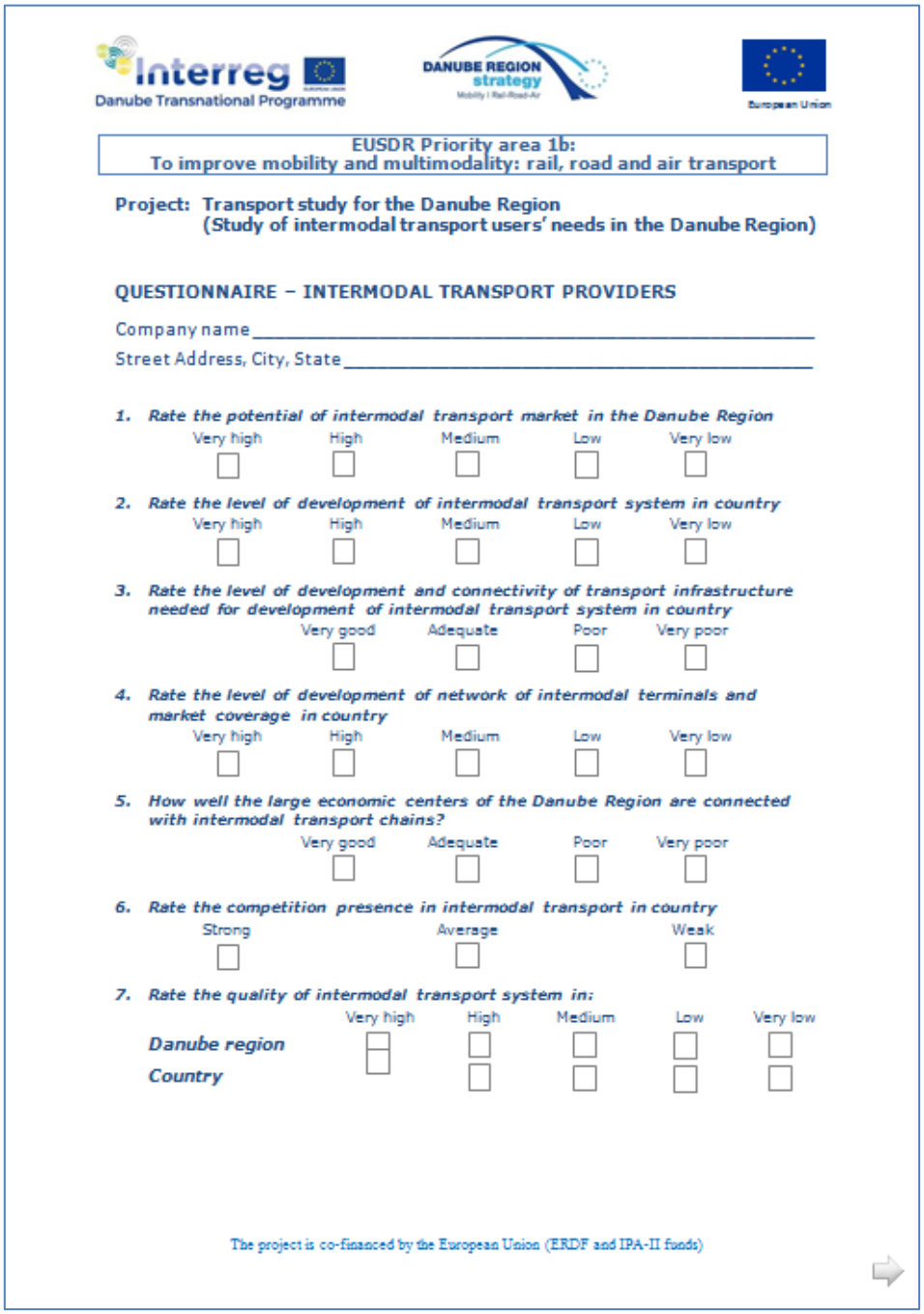
_____

Thank you for taking the time to complete our questionnaire. Your input is important to us and we value your comments and contribution.

Please, click on the button "Submit" to verify and send Your answers.

The project is co-financed by the European Union (ERDF and IPA-II funds)

APPENDIX 2. QUESTIONNAIRE FOR PROVIDERS OF INTERMODAL TRANSPORT SERVICES



Interreg
Danube Transnational Programme

DANUBE REGION strategy
Mobility | Rail-Road-Air

European Union

EUSDR Priority area 1b:
To improve mobility and multimodality: rail, road and air transport

Project: Transport study for the Danube Region
(Study of intermodal transport users' needs in the Danube Region)

QUESTIONNAIRE – INTERMODAL TRANSPORT PROVIDERS

Company name _____

Street Address, City, State _____

1. ***Rate the potential of intermodal transport market in the Danube Region***

Very high ☐ High ☐ Medium ☐ Low ☐ Very low ☐

2. ***Rate the level of development of intermodal transport system in country***

Very high ☐ High ☐ Medium ☐ Low ☐ Very low ☐

3. ***Rate the level of development and connectivity of transport infrastructure needed for development of intermodal transport system in country***

Very good ☐ Adequate ☐ Poor ☐ Very poor ☐

4. ***Rate the level of development of network of intermodal terminals and market coverage in country***

Very high ☐ High ☐ Medium ☐ Low ☐ Very low ☐

5. ***How well the large economic centers of the Danube Region are connected with intermodal transport chains?***

Very good ☐ Adequate ☐ Poor ☐ Very poor ☐

6. ***Rate the competition presence in intermodal transport in country***

Strong ☐ Average ☐ Weak ☐

7. ***Rate the quality of intermodal transport system in:***

	Very high	High	Medium	Low	Very low
Danube region	☐	☐	☐	☐	☐
Country	☐	☐	☐	☐	☐

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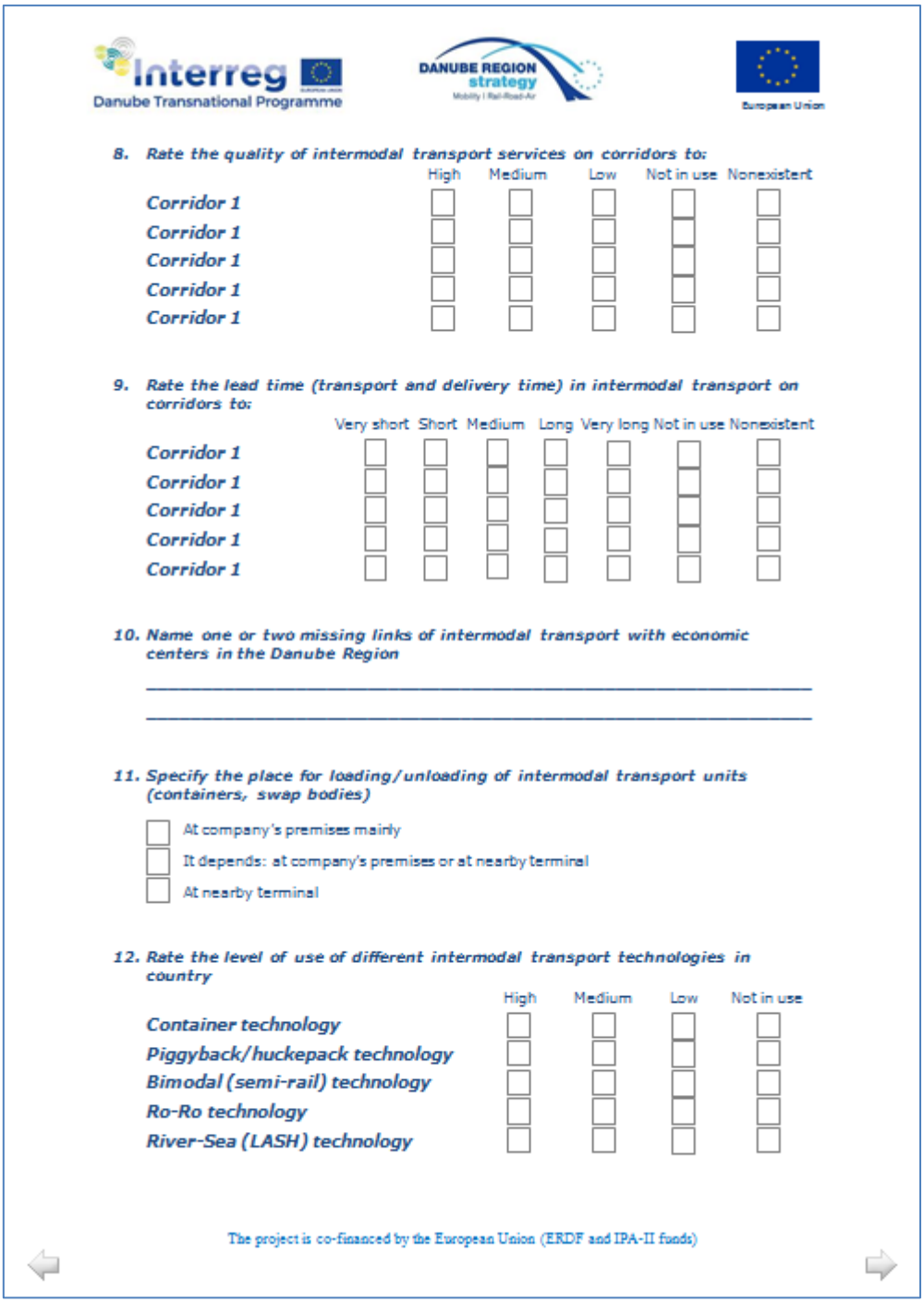

Interreg Danube Transnational Programme

DANUBE REGION strategy

European Union

8. *Rate the quality of intermodal transport services on corridors to:*

	High	Medium	Low	Not in use	Nonexistent
Corridor 1	☐	☐	☐	☐	☐
Corridor 1	☐	☐	☐	☐	☐
Corridor 1	☐	☐	☐	☐	☐
Corridor 1	☐	☐	☐	☐	☐
Corridor 1	☐	☐	☐	☐	☐

9. *Rate the lead time (transport and delivery time) in intermodal transport on corridors to:*

	Very short	Short	Medium	Long	Very long	Not in use	Nonexistent
Corridor 1	☐	☐	☐	☐	☐	☐	☐
Corridor 1	☐	☐	☐	☐	☐	☐	☐
Corridor 1	☐	☐	☐	☐	☐	☐	☐
Corridor 1	☐	☐	☐	☐	☐	☐	☐
Corridor 1	☐	☐	☐	☐	☐	☐	☐

10. *Name one or two missing links of intermodal transport with economic centers in the Danube Region*

_____

_____

11. *Specify the place for loading/unloading of intermodal transport units (containers, swap bodies)*

☐ At company's premises mainly

☐ It depends: at company's premises or at nearby terminal

☐ At nearby terminal

12. *Rate the level of use of different intermodal transport technologies in country*

	High	Medium	Low	Not in use
Container technology	☐	☐	☐	☐
Piggyback/huckepack technology	☐	☐	☐	☐
Bimodal (semi-rail) technology	☐	☐	☐	☐
Ro-Ro technology	☐	☐	☐	☐
River-Sea (LASH) technology	☐	☐	☐	☐

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DANUBE REGION strategy Mobility | Rail-Road-Air

European Union

13. Please name an example of good intermodal transport chain practice *(write key points: place of loading, terminal of origin, transit terminal, terminal of destination, place of unloading)*

_____

_____

14. As an example of good practice, especially stands out

- ☐ Lead time
- ☐ Reliability
- ☐ Costs
- ☐ Organization, connection
- ☐ Technology
- ☐ Container track and trace and IT solutions
- ☐ Services offered within chain
- ☐ _____

15. What are the main obstacles of intermodal transport development and realization in country?

- ☐ Terminals (lack of terminals and poor connection between them; low capacity; etc.)
- ☐ Infrastructure (incomplete and types of transport are poorly connected)
- ☐ Intermodal transport units (insufficient number of containers/swap bodies/semi-trailer...)
- ☐ Rate of use of technologies (Piggyback/huckepack, Ro-Ro, etc.)
- ☐ Transport means (lack of freight wagons and vessels for container conveyance)
- ☐ Organization (lack of intermodal transport lines)
- ☐ Regulations (lack of regulatory documents on both national and international level, extensive amount of paperwork)
- ☐ Stimulating measures (lack of measures stimulating intermodal transport development)
- ☐ Investments (insufficient financial investments in intermodal transport)
- ☐ _____

16. What are the main benefits from using intermodal transport services?

- ☐ Inclusion in international goods flows and markets
- ☐ Lower transport and manipulation costs
- ☐ Shorter lead time
- ☐ Full and high level service quality
- ☐ Reliability of service
- ☐ Transport safety
- ☐ Higher level of goods protection
- ☐ Lower environment pollution level
- ☐ _____

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DANUBE REGION strategy

European Union

17. Please specify top five priorities needed for intermodal transport development in country

1. _____
2. _____
3. _____
4. _____
5. _____

18. Please add any further comments or suggestions about the problems or development of intermodal transport in the country and/or the Danube Region

_____
_____
_____

Thank you for taking the time to complete our questionnaire. Your input is important to us and we value your comments and contribution.

Please, click on the button "Submit" to verify and send Your answers.

The project is co-financed by the European Union (ERDF and IPA-II funds)

APPENDIX 3. QUALITY OF SERVICES AND LEAD TIME ON CORRIDORS

Table P3.1 Assessment of the IT quality on corridors, directions - Austria

Evaluation	Adriatic ports (via Ljubljana)		Croatia (Zagreb)		Czech Rep. (Praha)		Czech Rep. (Cesha Trebova)		Slovakia (Dunajska Streda)		Hungary (Sopron)	
	U	P	U	P	U	P	U	P	U	P	U	P
High	50.0	25.0	25.0	0.0	25.0	50.0	25.0	25.0	0.0	25.0	0.0	25.0
Medium	25.0	50.0	25.0	25.0	50.0	50.0	50.0	75.0	50.0	25.0	50.0	50.0
Low	0.0	0.0	25.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0
Not in use	25.0	25.0	25.0	25.0	25.0	0.0	25.0	0.0	50.0	50.0	50.0	0.0
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

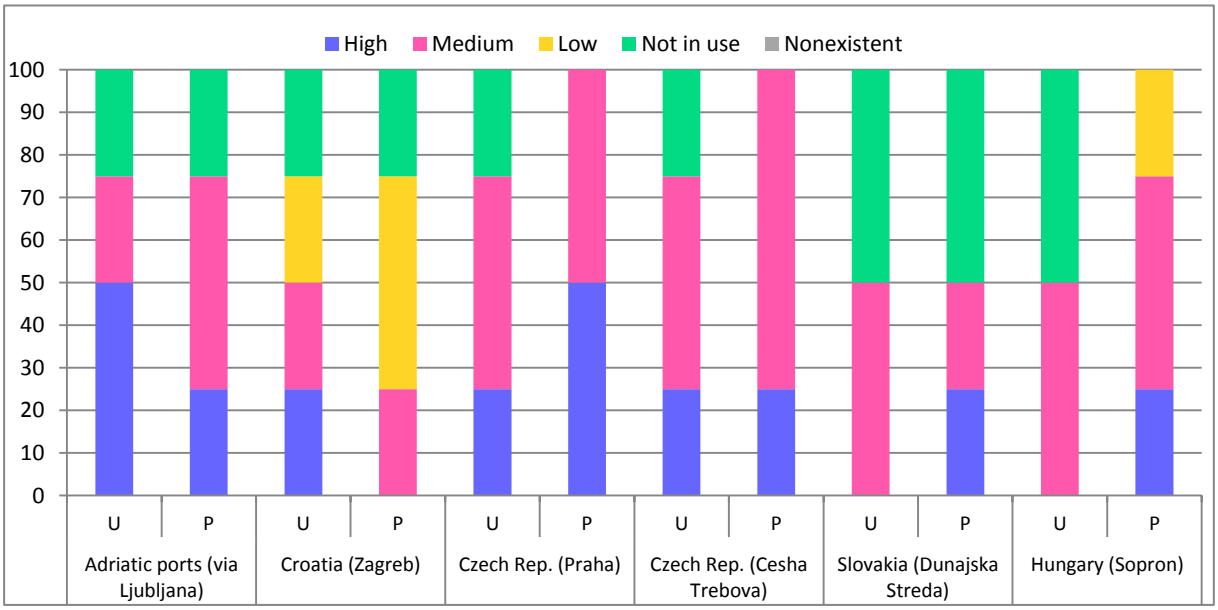

Fig. P3.1 Assessment of the IT quality on corridors, directions - Austria

Table P3.2 Assessment of the lead time on IT corridors - Austria

Evaluation	Adriatic ports (via Ljubljana)		Croatia (Zagreb)		Czech Rep. (Praha)		Czech Rep. (Cesha Trebova)		Slovakia (Dunajska Streda)		Hungary (Sopron)	
	U	P	U	P	U	P	U	P	U	P	U	P
Very short	0.0	0.0	0.0	0.0	0.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0
Short	50.0	75.0	25.0	0.0	50.0	50.0	25.0	75.0	25.0	25.0	0.0	25.0
Medium	25.0	0.0	50.0	25.0	25.0	25.0	50.0	25.0	25.0	25.0	50.0	50.0
Long	0.0	0.0	0.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0
Very long	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Not in use	25.0	25.0	25.0	50.0	25.0	0.0	25.0	0.0	50.0	50.0	50.0	0.0
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

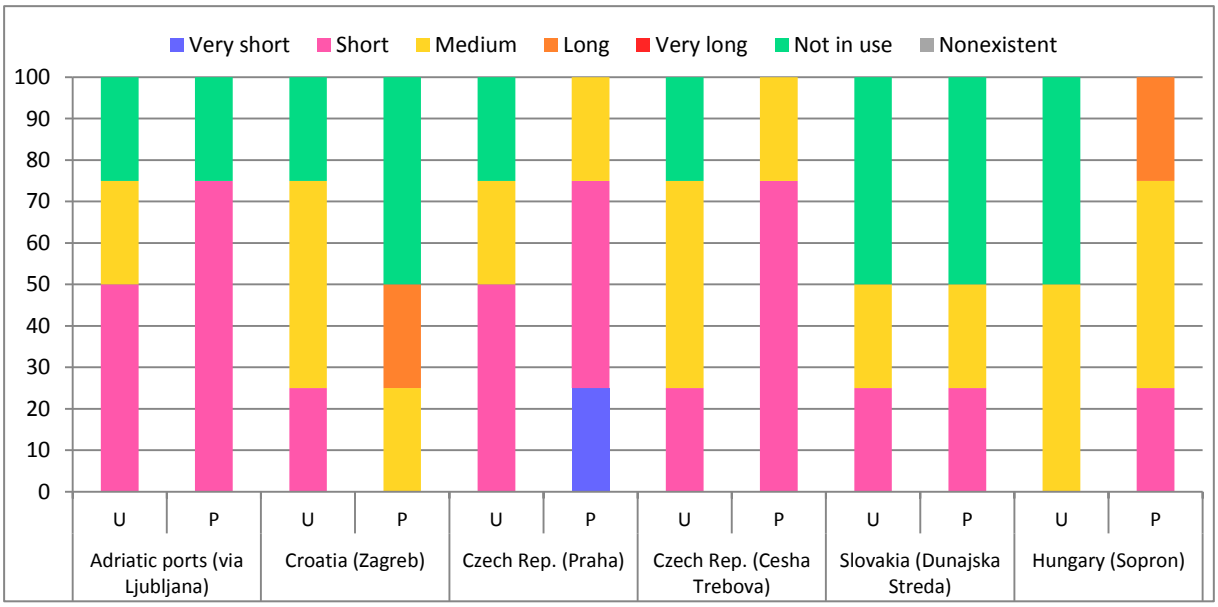

Fig. P3.2 Assessment of the lead time on IT corridors - Austria

Table P3.3 Assessment of the IT quality on corridors, directions - Germany

Evaluation	North European ports		Adriatic ports (via Ljubljana)		Croatia, Serbia (via Ljubljana)		Hungary (Budapest)		Czech R., Slovakia	
	U	P	U	P	U	P	U	P	U	P
High	50.0	100.0	75.0	0.0	0.0	0.0	25.0	20.0	50.0	40.0
Medium	50.0	0.0	25.0	80.0	50.0	0.0	75.0	80.0	50.0	60.0
Low	0.0	0.0	0.0	0.0	0.0	60.0	0.0	0.0	0.0	0.0
Not in use	0.0	0.0	0.0	20.0	50.0	40.0	0.0	0.0	0.0	0.0
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

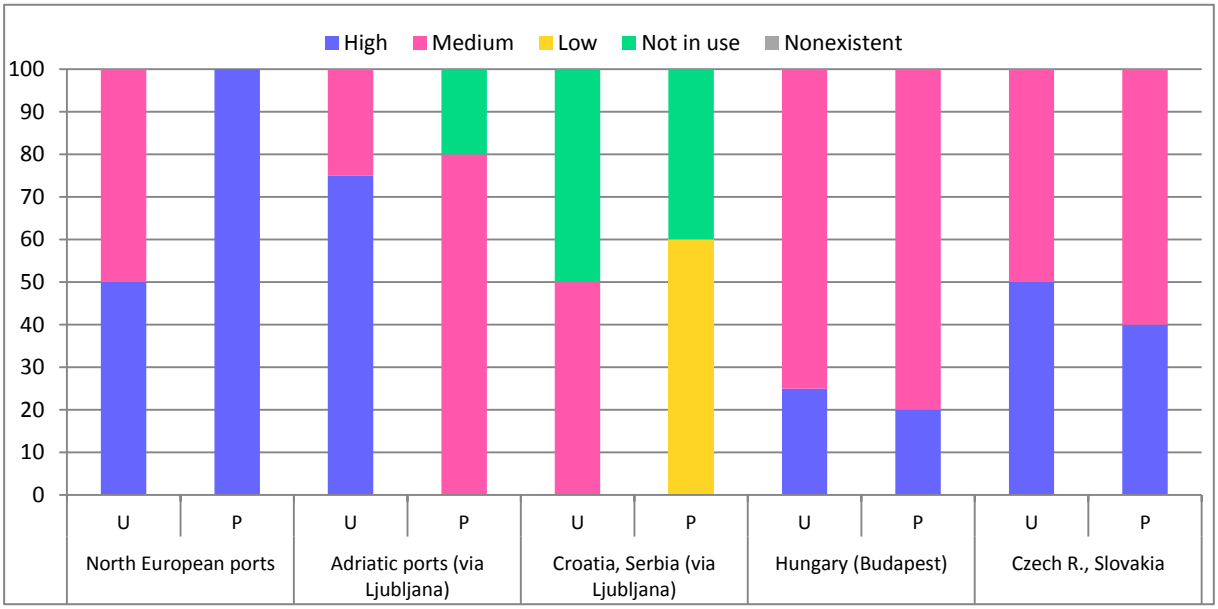

Fig. P3.3 Assessment of the IT quality on corridors, directions - Germany

Table P3.4 Assessment of the lead time on IT corridors - Germany

Evaluation	North European ports		Adriatic ports (via Ljubljana)		Croatia, Serbia (via Ljubljana)		Hungary (Budapest)		Czech R., Slovakia	
	U	P	U	P	U	P	U	P	U	P
Very short	25.0	60.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Short	75.0	40.0	50.0	60.0	0.0	0.0	50.0	100.0	50.0	80.0
Medium	0.0	0.0	50.0	20.0	50.0	20.0	50.0	0.0	50.0	20.0
Long	0.0	0.0	0.0	0.0	0.0	40.0	0.0	0.0	0.0	0.0
Very long	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0
Not in use	0.0	0.0	0.0	20.0	50.0	20.0	0.0	0.0	0.0	0.0
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

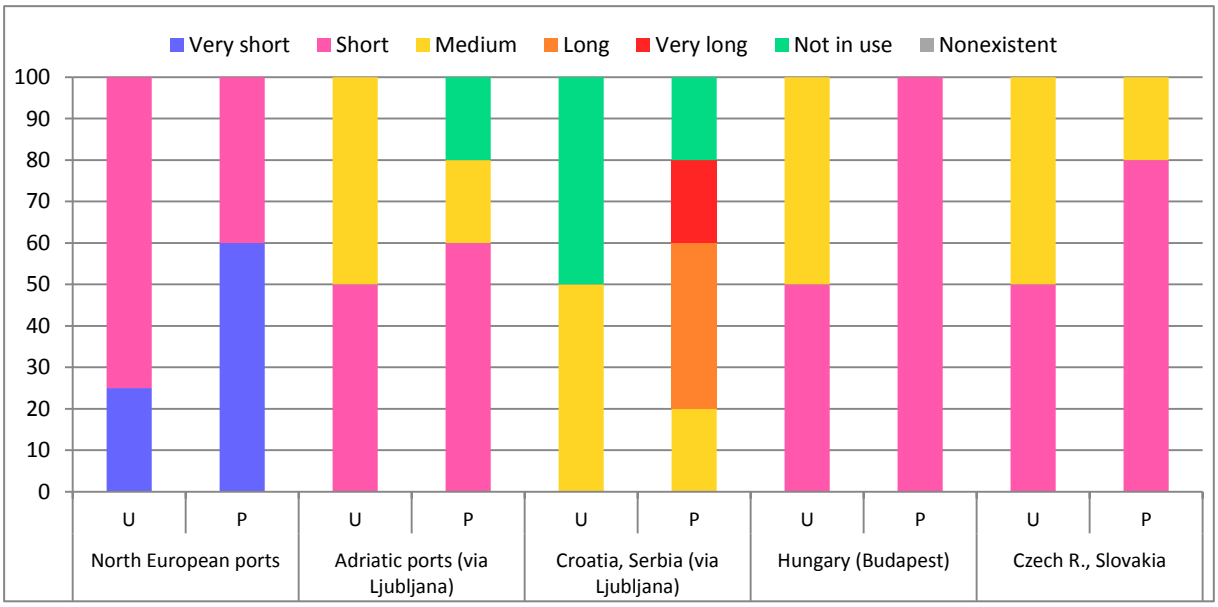

Fig. P3.4 Assessment of the lead time on IT corridors - Germany

Table P3.5 Assessment of the IT quality on corridors, directions - Slovenia

Evaluation	Hungary (Budapest)		Austria (Fürnitz Vilach)		Austria (Graz/ Werndorf)		Serbia (Belgrade)		Slovakia (Dunajska Streda)		Croatia (Zagreb)		Germany (München)	
	U	P	U	P	U	P	U	P	U	P	U	P	U	P
High	40.0	42.9	20.0	42.9	40.0	57.1	0.0	0.0	40.0	57.1	0.0	0.0	20.0	71.4
Medium	60.0	57.1	80.0	42.9	60.0	42.9	0.0	14.3	20.0	28.6	20.0	57.1	80.0	28.6
Low	0.0	0.0	0.0	14.3	0.0	0.0	80.0	71.4	20.0	14.3	80.0	42.9	0.0	0.0
Not in use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.3	20.0	0.0	0.0	0.0	0.0	0.0
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

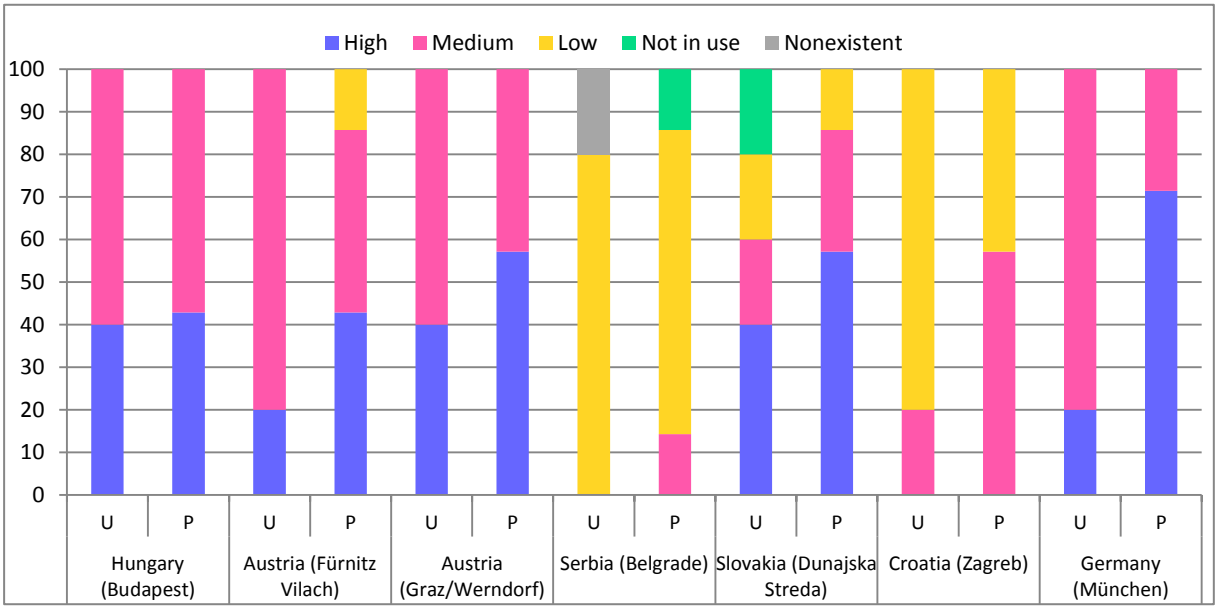

Fig. P3.5 Assessment of the IT quality on corridors, directions - Slovenia

Table P3.6 Assessment of the lead time on IT corridors - Slovenia

Evaluation	Hungary (Budapest)		Austria (Fürnitz Vilach)		Austria (Graz/ Werndorf)		Serbia (Belgrade)		Slovakia (Dunajska Streda)		Croatia (Zagreb)		Germany (München)	
	U	P	U	P	U	P	U	P	U	P	U	P	U	P
Very short	0.0	42.9	0.0	28.6	0.0	42.9	0.0	0.0	0.0	42.9	0.0	14.3	0.0	42.9
Short	20.0	14.3	20.0	14.3	20.0	28.6	0.0	14.3	20.0	14.3	20.0	28.6	20.0	14.3
Medium	20.0	28.6	20.0	42.9	40.0	28.6	0.0	28.6	0.0	42.9	0.0	28.6	0.0	42.9
Long	40.0	14.3	40.0	14.3	20.0	0.0	0.0	28.6	20.0	0.0	40.0	28.6	60.0	0.0
Very long	20.0	0.0	20.0	0.0	20.0	0.0	80.0	14.3	40.0	0.0	40.0	0.0	20.0	0.0
Not in use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	20.0	14.3	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

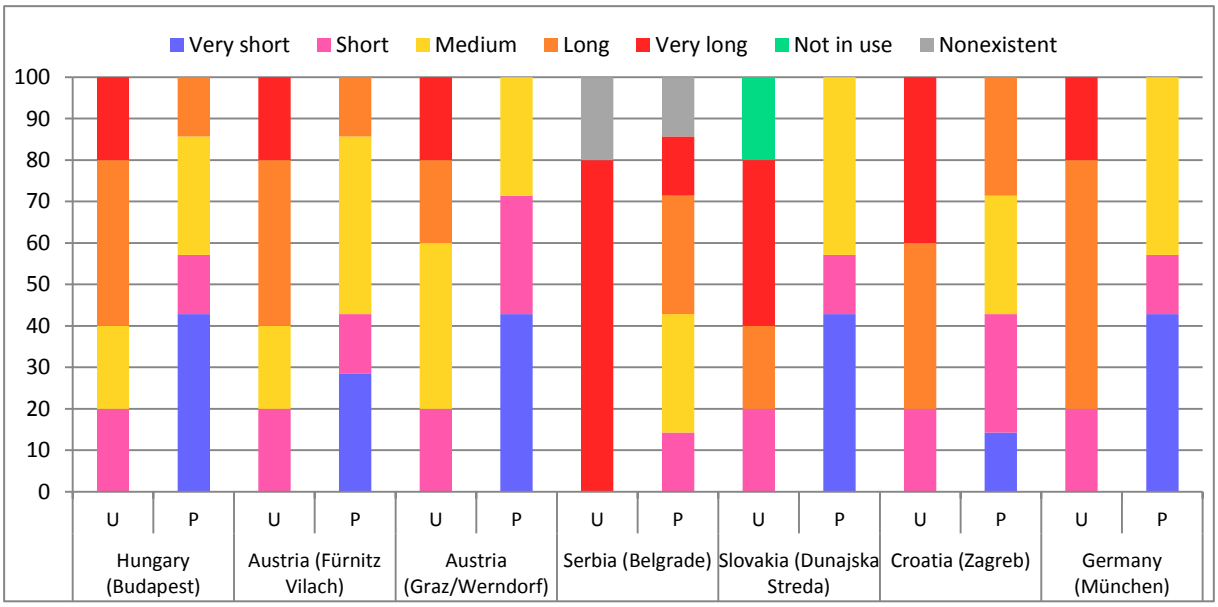

Fig. P3.6 Assessment of the lead time on IT corridors - Slovenia

Table P3.7 Assessment of the IT quality on corridors, directions - Czech Republic

Evaluation	North European ports		Austria (Krems)		Austria (Salcburg)		Germany (München)		Slovakia, Hungary (via Dunajska Streda)	
	U	P	U	P	U	P	U	P	U	P
High	75.0	100.0	0.0	0.0	0.0	0.0	75.0	60.0	25.0	60.0
Medium	25.0	0.0	50.0	60.0	50.0	60.0	25.0	40.0	75.0	40.0
Low	0.0	0.0	50.0	40.0	50.0	40.0	0.0	0.0	0.0	0.0
Not in use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

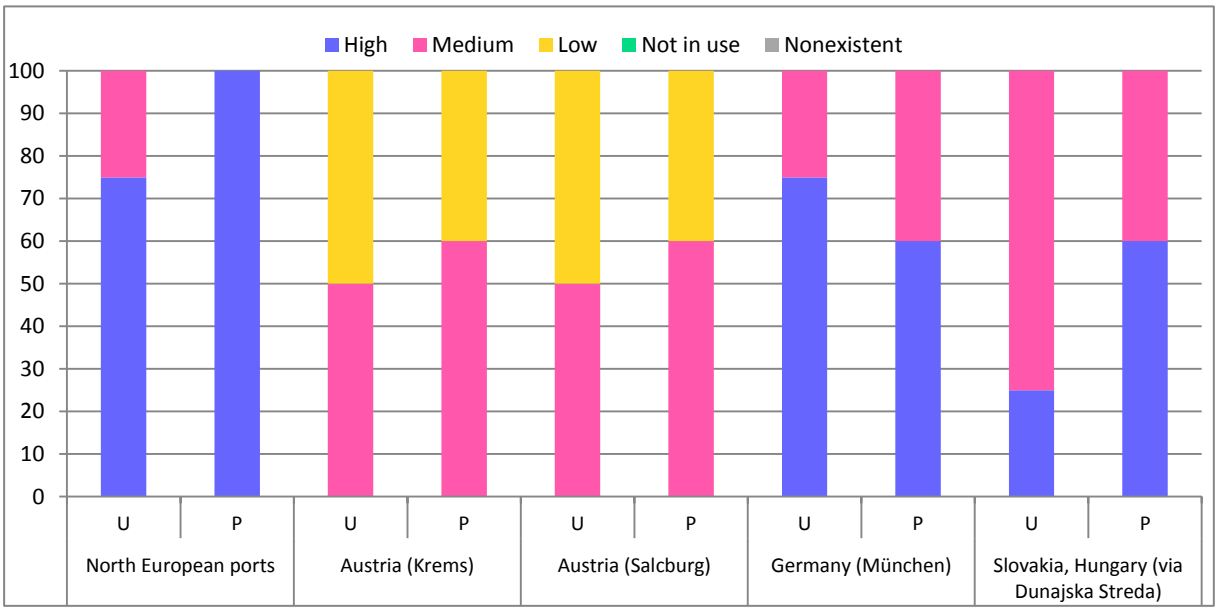

Fig. P3.7 Assessment of the IT quality on corridors, directions - Czech Republic

Table P3.8 Assessment of the lead time on IT corridors - Czech Republic

Evaluation	North European ports		Austria (Krems)		Austria (Salcburg)		Germany (München)		Slovakia, Hungary (via Dunajska Streda)	
	U	P	U	P	U	P	U	P	U	P
Very short	0.0	60.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Short	50.0	40.0	25.0	0.0	25.0	0.0	50.0	40.0	50.0	80.0
Medium	50.0	0.0	75.0	60.0	75.0	80.0	50.0	60.0	50.0	20.0
Long	0.0	0.0	0.0	40.0	0.0	20.0	0.0	0.0	0.0	0.0
Very long	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Not in use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

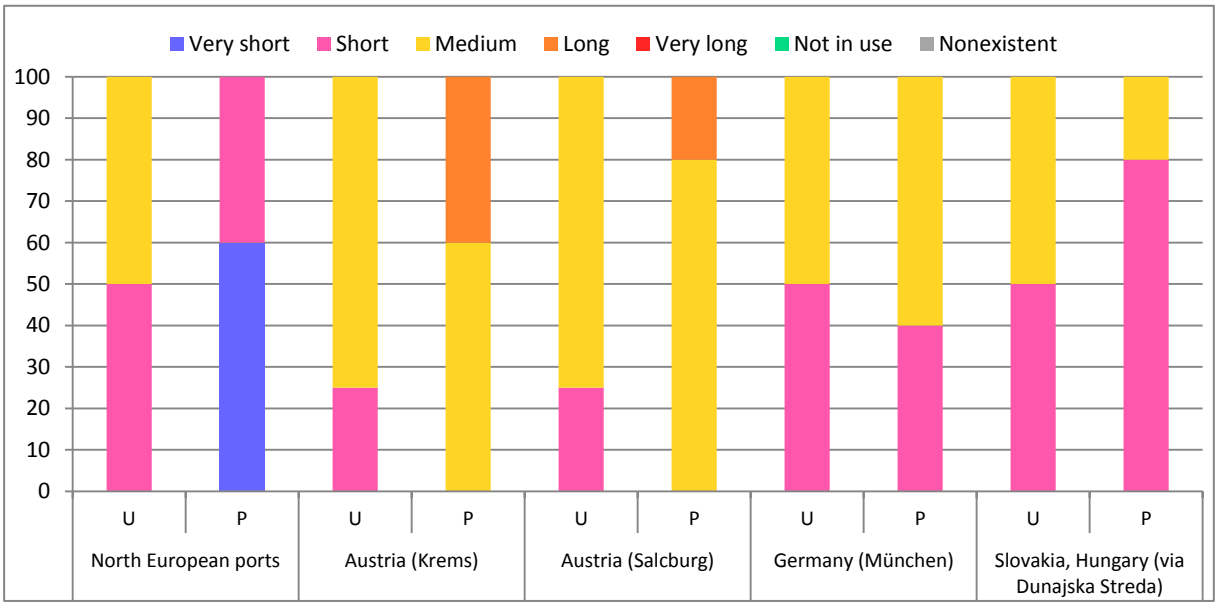

Fig. P3.8 Assessment of the lead time on IT corridors - Czech Republic

Table P3.9 Assessment of the IT quality on corridors, directions - Slovakia

Evaluation	Austria (Krems)		Czech Republic (Cesha Trebova)		Adriatic ports (Koper, Rijeka)		Hungary (Budapest)		Ukraine (Chop)	
	U	P	U	P	U	P	U	P	U	P
High	0.0	0.0	50.0	50.0	50.0	50.0	25.0	0.0	0.0	0.0
Medium	50.0	66.7	50.0	50.0	50.0	50.0	50.0	66.7	0.0	16.7
Low	50.0	33.3	0.0	0.0	0.0	0.0	25.0	16.7	0.0	50.0
Not in use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.7	100.0	33.3
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

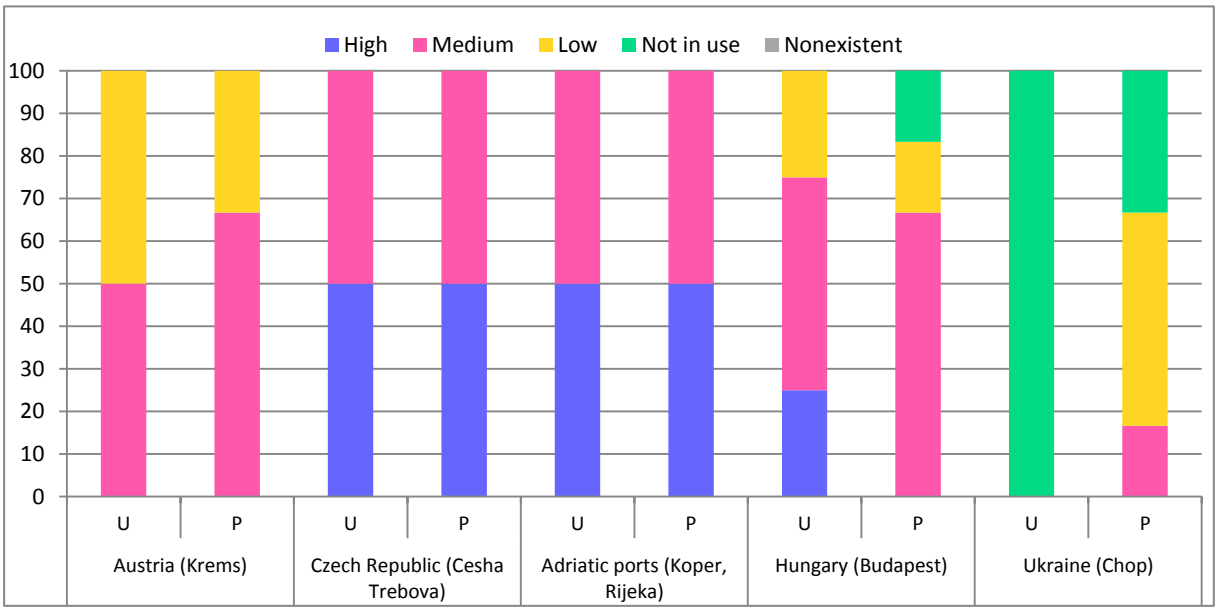

Fig. P3.9 Assessment of the IT quality on corridors, directions - Slovakia

Table P3.10 Assessment of the lead time on IT corridors - Slovakia

Evaluation	Austria (Krems)		Czech Republic (Cesha Trebova)		Adriatic ports (Koper, Rijeka)		Hungary (Budapest)		Ukraine (Chop)	
	U	P	U	P	U	P	U	P	U	P
Very short	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Short	25.0	50.0	25.0	66.7	50.0	33.3	25.0	33.3	0.0	16.7
Medium	50.0	33.3	50.0	33.3	50.0	66.7	75.0	50.0	0.0	33.3
Long	25.0	16.7	25.0	0.0	0.0	0.0	0.0	0.0	0.0	16.7
Very long	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Not in use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.7	100.0	33.3
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

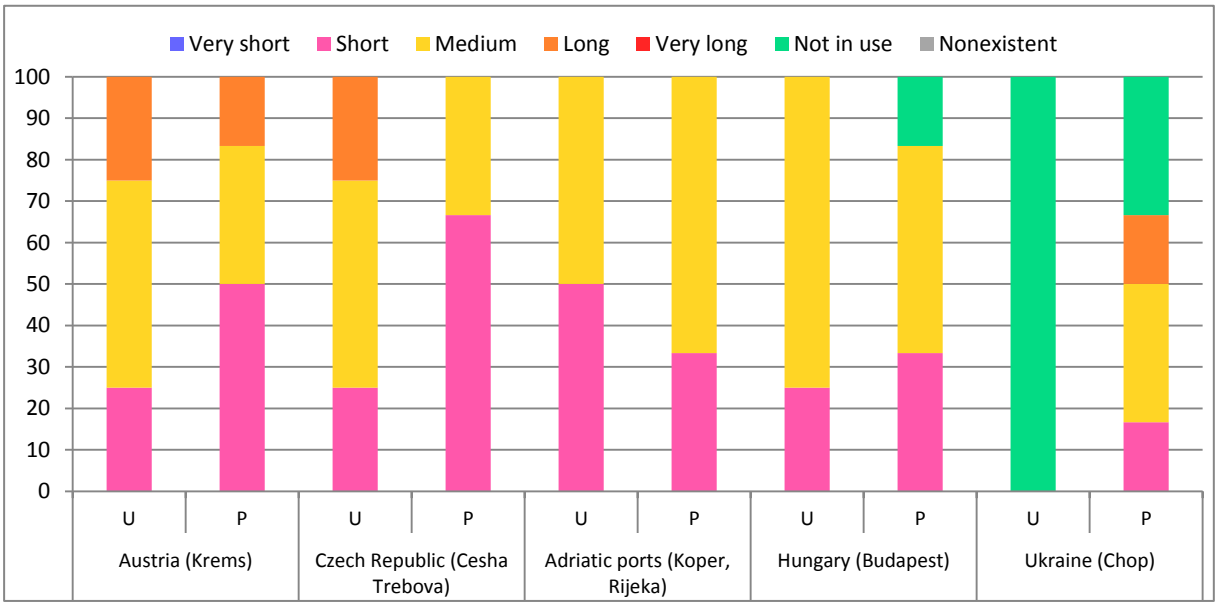

Fig. P3.10 Assessment of the lead time on IT corridors - Slovakia

Table P3.11 Assessment of the IT quality on corridors, directions - Hungary

Evaluation	Serbia (Novi Sad, Belgrade)		Adriatic port (Koper)		Slovakia (Dunajska Streda)		Germany (München)		Romania (Arad)		Ukraine (Chop)	
	U	P	U	P	U	P	U	P	U	P	U	P
High	0.0	0.0	25.0	40.0	0.0	40.0	0.0	40.0	0.0	20.0	0.0	0.0
Medium	0.0	0.0	50.0	60.0	75.0	40.0	75.0	40.0	0.0	20.0	0.0	0.0
Low	25.0	40.0	0.0	0.0	0.0	20.0	0.0	0.0	75.0	0.0	0.0	40.0
Not in use	75.0	60.0	25.0	0.0	25.0	0.0	25.0	20.0	25.0	60.0	100.0	60.0
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

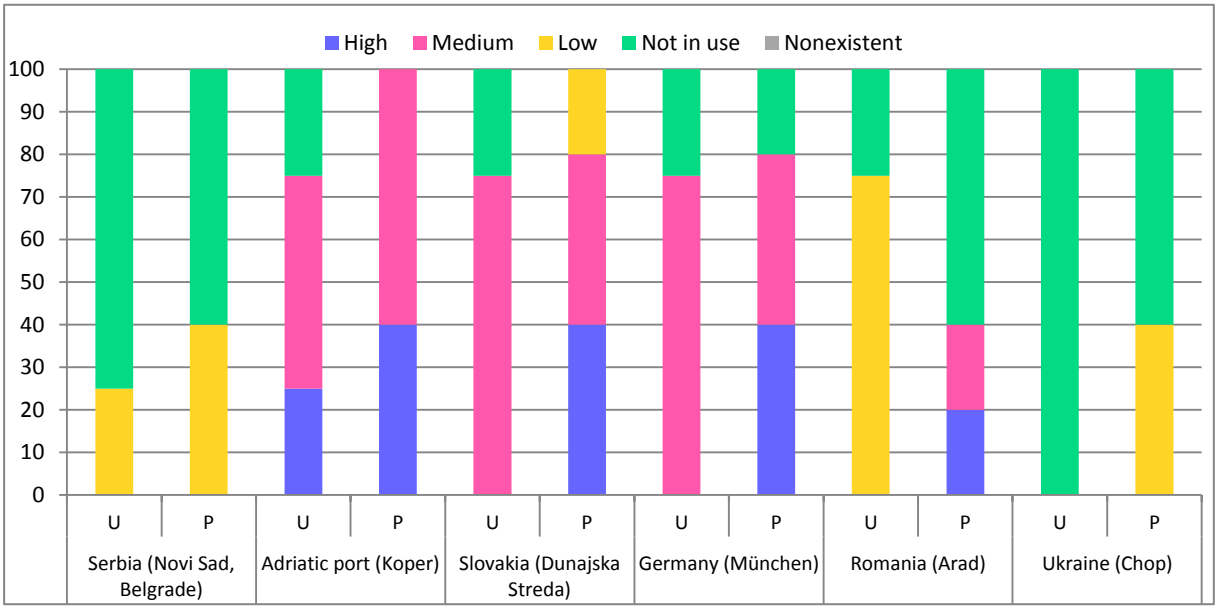

Fig. P3.11 Assessment of the IT quality on corridors, directions - Hungary

Table P3.12 Assessment of the lead time on IT corridors - Hungary

Evaluation	Serbia (Novi Sad, Belgrade)		Adriatic port (Koper)		Slovakia (Dunajska Streda)		Germany (München)		Romania (Arad)		Ukraine (Chop)	
	U	P	U	P	U	P	U	P	U	P	U	P
Very short	0.0	0.0	0.0	20.0	0.0	20.0	0.0	20.0	0.0	0.0	0.0	0.0
Short	0.0	0.0	50.0	20.0	25.0	20.0	0.0	40.0	0.0	40.0	0.0	20.0
Medium	25.0	0.0	50.0	60.0	50.0	60.0	75.0	20.0	25.0	0.0	0.0	20.0
Long	0.0	40.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0
Very long	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Not in use	75.0	40.0	0.0	0.0	25.0	0.0	25.0	20.0	25.0	60.0	100.0	60.0
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

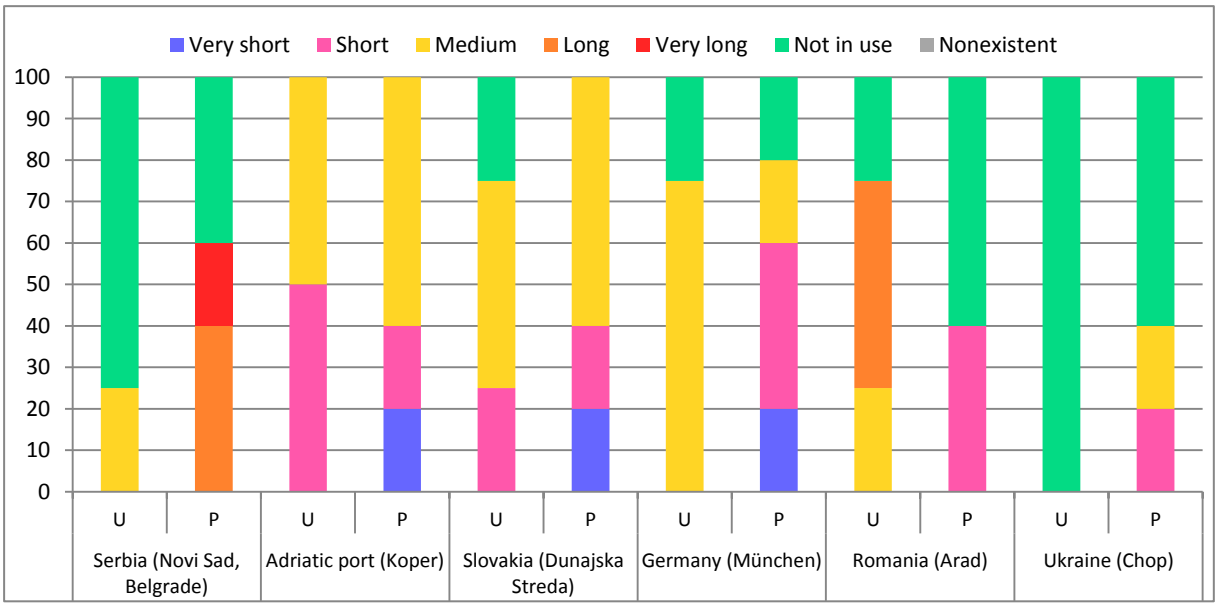

Fig. P3.12 Assessment of the lead time on IT corridors - Hungary

Table P3.13 Assessment of the IT quality on corridors, directions - Romania

Evaluation	Hungary (Budapest)		Ukraine (Chop)		Ukraine (Odessa, Ilyichevsk)		Moldova (Kishinev)		Serbia (Belgrade)		Bulgaria (Stara Zagora)		Bulgaria (Varna, Burgas)	
	U	P	U	P	U	P	U	P	U	P	U	P	U	P
High	0.0	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medium	60.0	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	40.0	0.0	20.0
Low	20.0	20.0	20.0	0.0	20.0	0.0	20.0	20.0	40.0	0.0	60.0	40.0	40.0	60.0
Not in use	20.0	0.0	80.0	80.0	80.0	80.0	80.0	60.0	60.0	80.0	20.0	20.0	60.0	20.0
Nonexistent	0.0	0.0	0.0	20.0	0.0	20.0	0.0	20.0	0.0	20.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

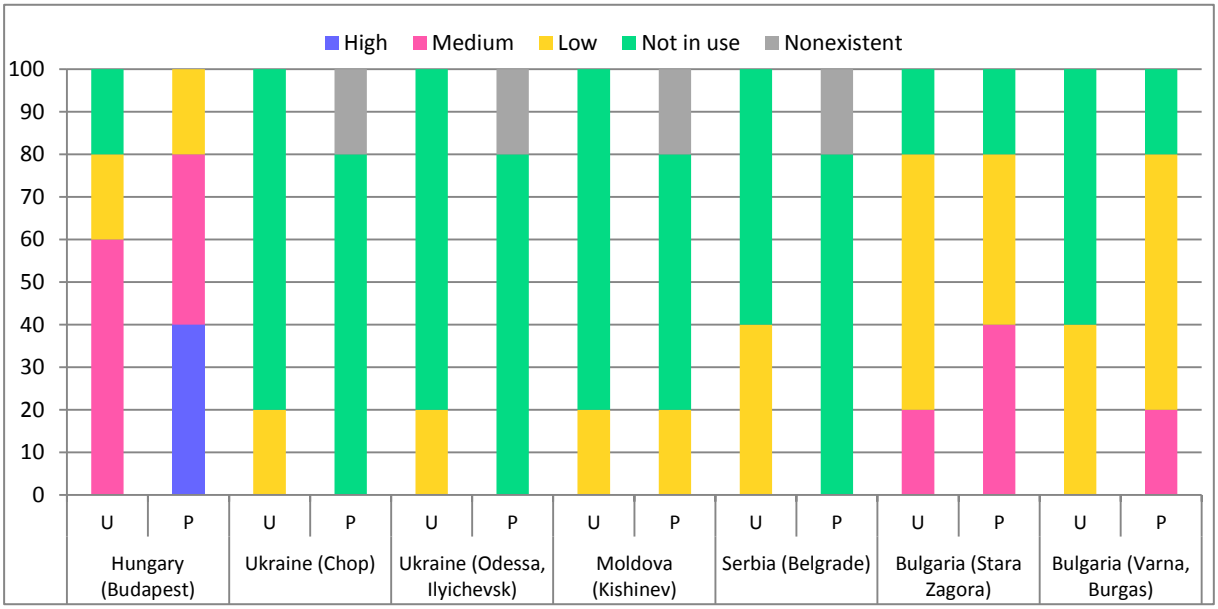

Fig. P3.13 Assessment of the IT quality on corridors, directions - Romania

Table P3.14 Assessment of the lead time on IT corridors - Romania

Evaluation	Hungary (Budapest)		Ukraine (Chop)		Ukraine (Odessa, Ilyichevsk)		Moldova (Kishinev)		Serbia (Belgrade)		Bulgaria (Stara Zagora)		Bulgaria (Varna, Burgas)	
	U	P	U	P	U	P	U	P	U	P	U	P	U	P
Very short	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Short	20.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medium	60.0	60.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	40.0	60.0	60.0	60.0
Long	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0
Very long	0.0	0.0	20.0	0.0	0.0	0.0	20.0	20.0	20.0	0.0	20.0	20.0	0.0	20.0
Not in use	20.0	0.0	80.0	80.0	80.0	80.0	80.0	60.0	80.0	80.0	20.0	20.0	40.0	20.0
Nonexistent	0.0	0.0	0.0	20.0	0.0	20.0	0.0	20.0	0.0	20.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

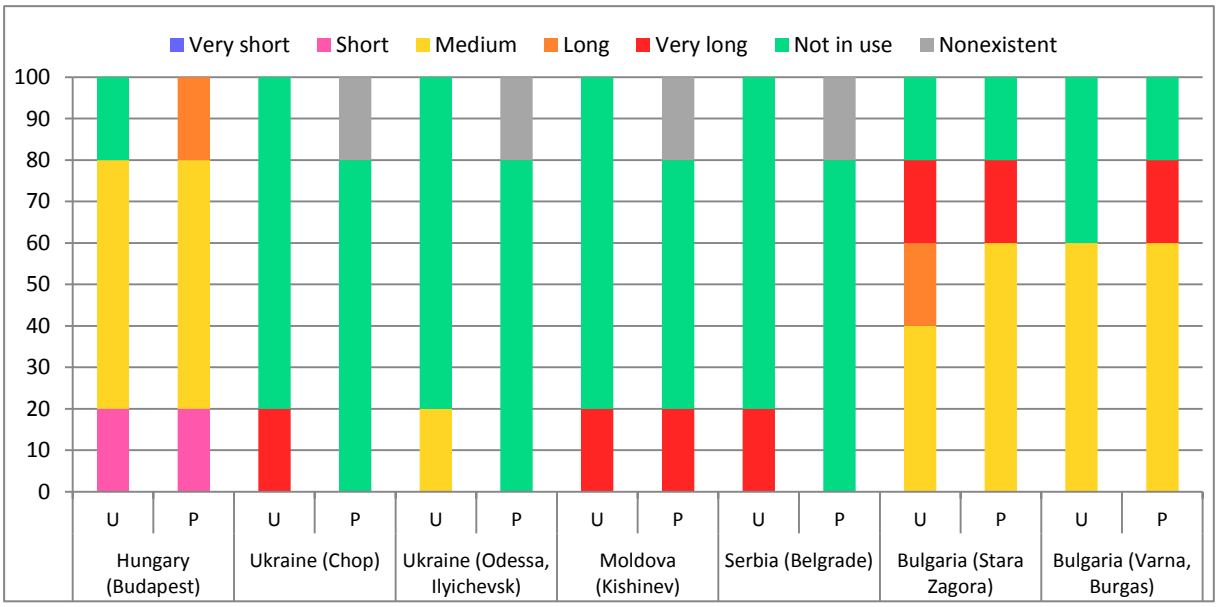

Fig. P3.14 Assessment of the lead time on IT corridors - Romania

Table P3.15 Assessment of the IT quality on corridors, directions - Ukraine

Evaluation	Hungary (Debrecen, Budapest)		Slovakia (Dobra-Kosice-Dunajska Streda)		Moldova (Kishinev-Bender)		Romania (Constanta)		Romania (Bacau)	
	U	P	U	P	U	P	U	P	U	P
High	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medium	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Low	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Not in use	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

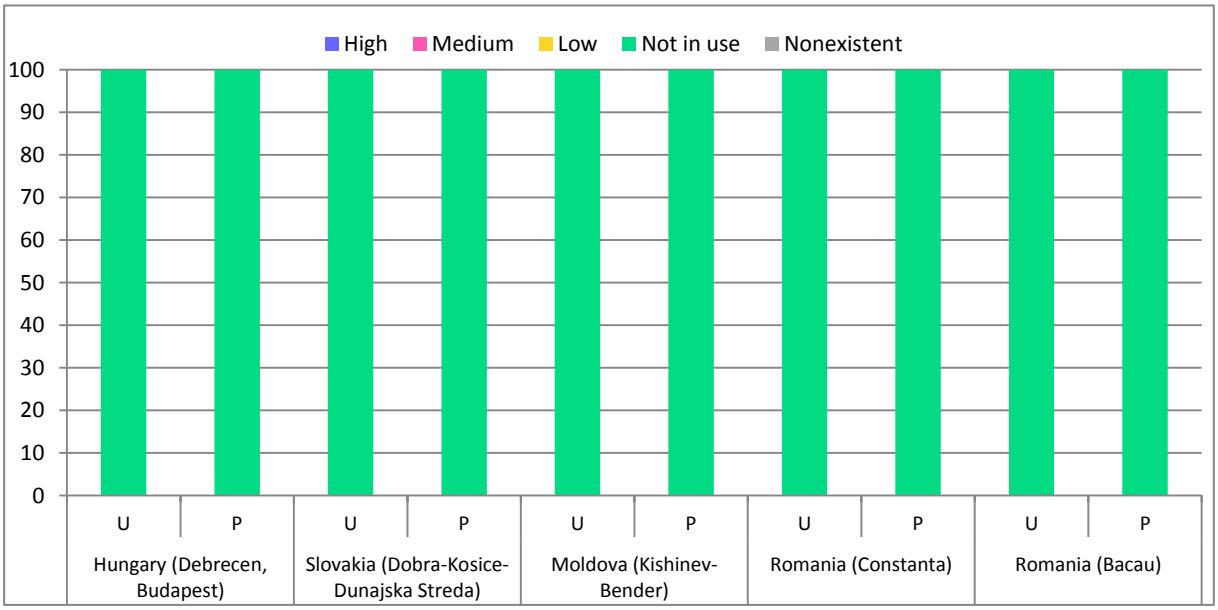

Fig. P3.15 Assessment of the IT quality on corridors, directions - Ukraine

Table P3.16 Assessment of the lead time on IT corridors - Ukraine

Evaluation	Hungary (Debrecen, Budapest)		Slovakia (Dobra-Kosice-Dunajska Streda)		Moldova (Kishinev-Bender)		Romania (Constanta)		Romania (Bacau)	
	U	P	U	P	U	P	U	P	U	P
Very short	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Short	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medium	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Long	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Very long	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Not in use	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

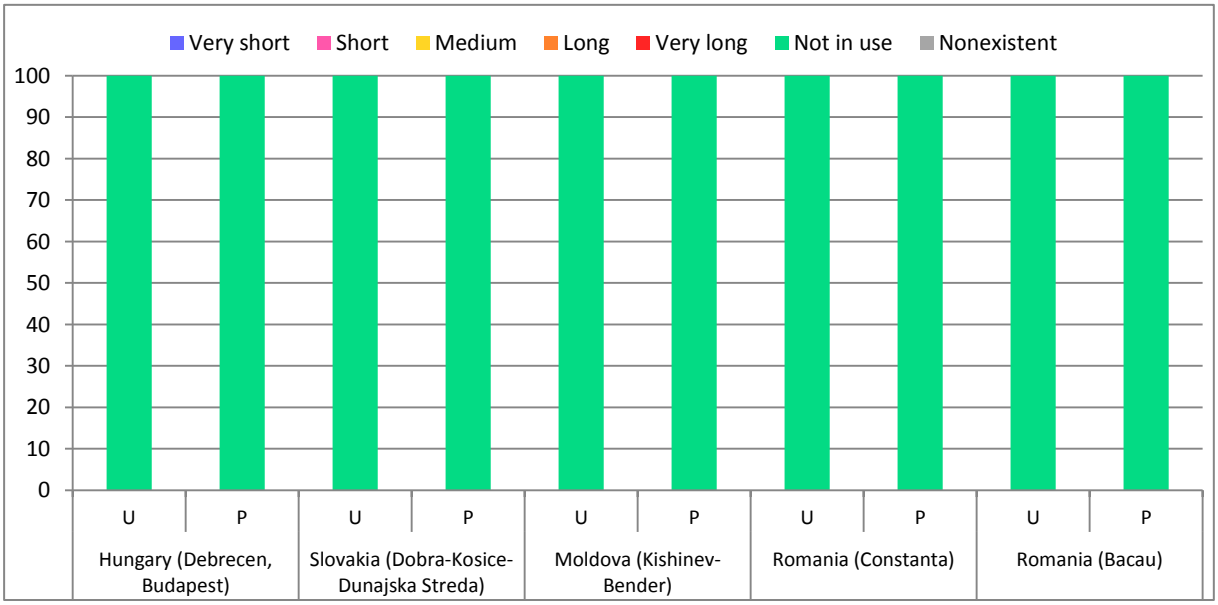

Fig. P3.16 Assessment of the lead time on IT corridors - Ukraine

Table P3.17 Assessment of the IT quality on corridors, directions - Moldova

Evaluation	Ukraine (Chop)		Ukraine (Odessa, Ilyichevsk)		Ukraine (Kiev)		Romania (Bacau)		Romania (Suceava, Rastolita)		Romania (Constanta)	
	U	P	U	P	U	P	U	P	U	P	U	P
High	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medium	50.0	0.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	100.0
Low	50.0	50.0	50.0	0.0	100.0	50.0	100.0	50.0	100.0	50.0	50.0	0.0
Not in use	0.0	50.0	0.0	50.0	0.0	50.0	0.0	50.0	0.0	50.0	0.0	0.0
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

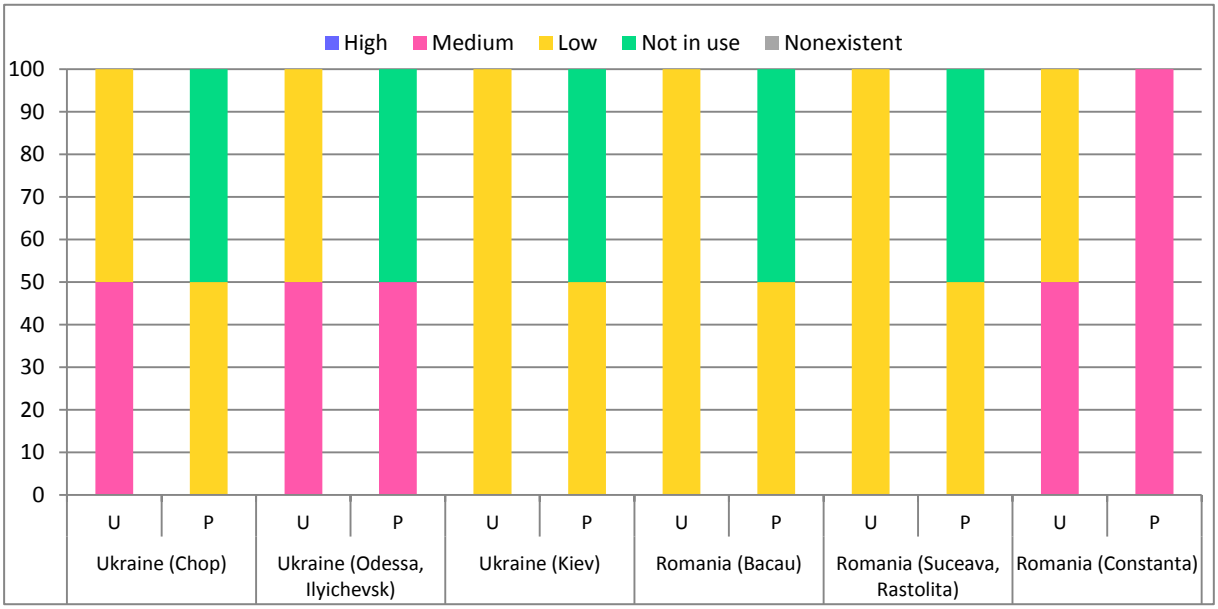

Fig. P3.17 Assessment of the IT quality on corridors, directions - Moldova

Table P3.18 Assessment of the lead time on IT corridors - Moldova

Evaluation	Ukraine (Chop)		Ukraine (Odessa, Ilyichevsk)		Ukraine (Kiev)		Romania (Bacau)		Romania (Suceava, Rastolita)		Romania (Constanta)	
	U	P	U	P	U	P	U	P	U	P	U	P
Very short	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Short	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medium	50.0	50.0	100.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	100.0
Long	0.0	0.0	0.0	0.0	50.0	0.0	50.0	0.0	50.0	0.0	50.0	0.0
Very long	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Not in use	50.0	50.0	0.0	50.0	0.0	50.0	0.0	50.0	0.0	50.0	0.0	0.0
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

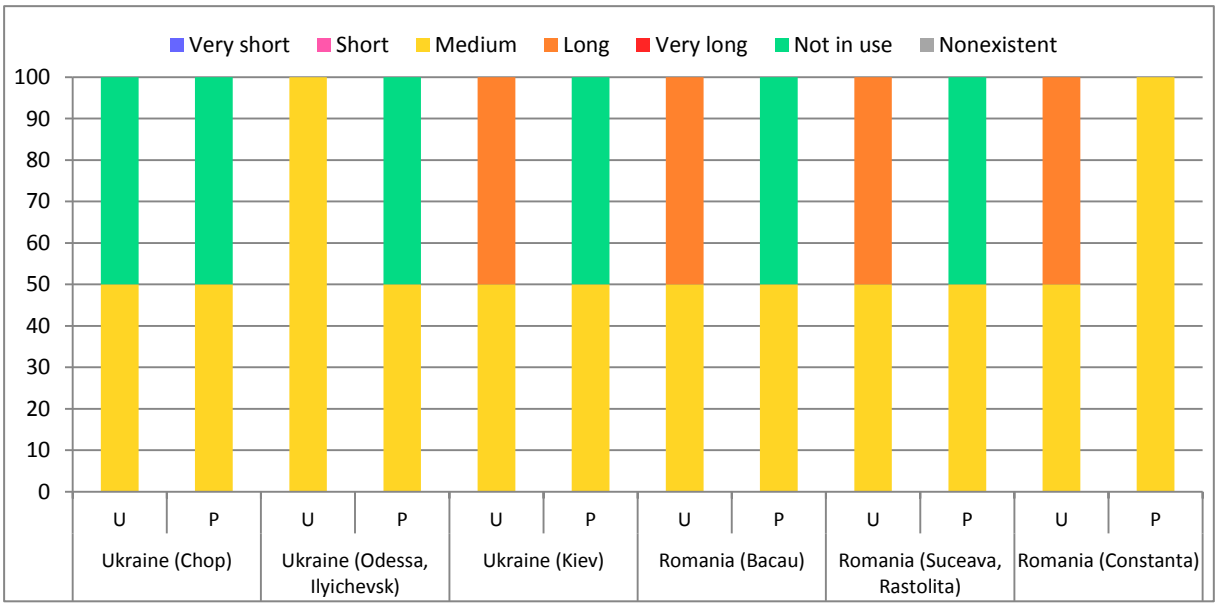

Fig. P3.18 Assessment of the lead time on IT corridors - Moldova

Table P3.19 Assessment of the IT quality on corridors, directions - Bulgaria

Evaluation	Serbia (Belgrade)		Serbia (Kosovo, Pristina)		Romania (Bucharest, Ploiesti)		Romania (Constanta)	
	U	P	U	P	U	P	U	P
High	0.0	0.0	0.0	0.0	0.0	20.0	0.0	20.0
Medium	0.0	0.0	0.0	0.0	50.0	40.0	50.0	40.0
Low	0.0	0.0	0.0	0.0	25.0	40.0	25.0	40.0
Not in use	100.0	100.0	100.0	100.0	25.0	0.0	25.0	0.0
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

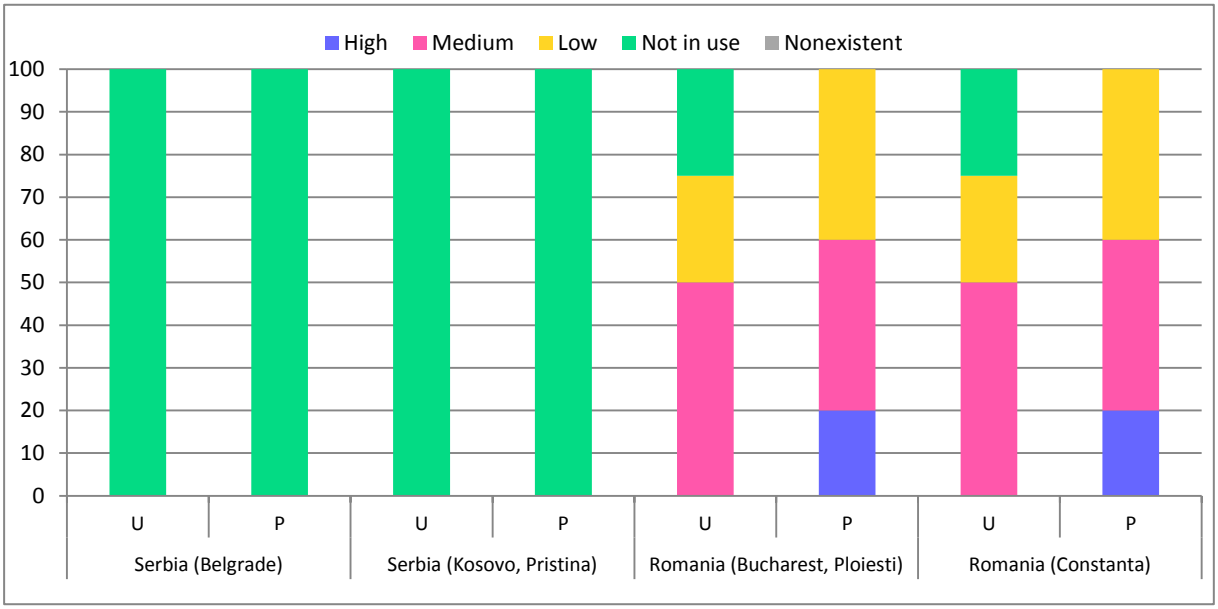

Fig. P3.19 Assessment of the IT quality on corridors, directions - Bulgaria

Table P3.20 Assessment of the lead time on IT corridors - Bulgaria

Evaluation	Serbia (Belgrade)		Serbia (Kosovo, Pristina)		Romania (Bucharest, Ploiesti)		Romania (Constanta)	
	U	P	U	P	U	P	U	P
Very short	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Short	0.0	0.0	0.0	0.0	0.0	60.0	0.0	20.0
Medium	0.0	0.0	0.0	0.0	66.7	20.0	75.0	40.0
Long	0.0	0.0	0.0	0.0	0.0	20.0	0.0	20.0
Very long	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0.0
Not in use	100.0	100.0	100.0	100.0	33.3	0.0	0.0	20.0
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

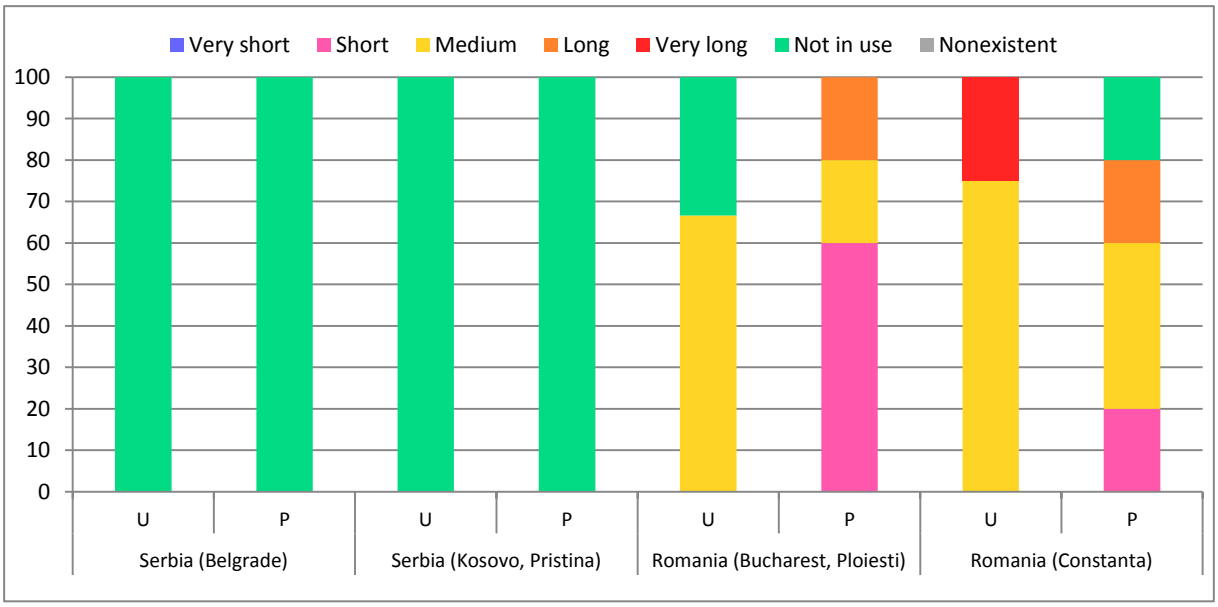

Fig. P3.20 Assessment of the lead time on IT corridors - Bulgaria

Table P3.21 Assessment of the IT quality on corridors, directions – Bosnia & Herzegovina

Evaluation	Croatia (Port of Ploče)		Adriatic ports (Koper, Rijeka)		Slovenia (Ljubljana via Zagreb)		Serbia (Belgrade)		Monte-negro (Port of Bar)	
	U	P	U	P	U	P	U	P	U	P
High	20.0	0.0	30.0	0.0	30.0	16.7	10.0	0.0	0.0	0.0
Medium	40.0	33.3	60.0	100.0	30.0	66.7	40.0	50.0	20.0	0.0
Low	30.0	66.7	10.0	0.0	30.0	0.0	30.0	33.3	60.0	83.3
Not in use	10.0	0.0	0.0	0.0	10.0	16.7	20.0	16.7	20.0	16.7
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

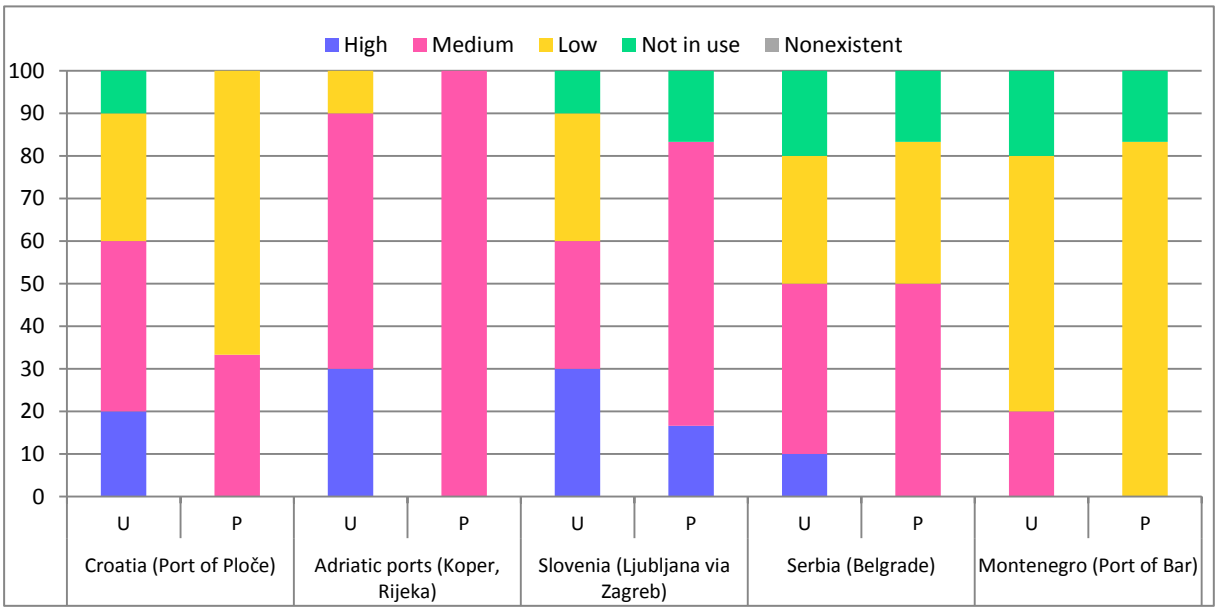

Fig. P3.21 Assessment of the IT quality on corridors, directions – Bosnia & Herzegovina

Table P3.22 Assessment of the lead time on IT corridors - Bosnia & Herzegovina

Evaluation	Croatia (Port of Ploče)		Adriatic ports (Koper, Rijeka)		Slovenia (Ljubljana via Zagreb)		Serbia (Belgrade)		Monte-negro (Port of Bar)	
	U	P	U	P	U	P	U	P	U	P
Very short	0.0	0.0	0.0	0.0	30.0	0.0	0.0	0.0	0.0	0.0
Short	10.0	0.0	20.0	0.0	0.0	33.3	10.0	16.7	0.0	0.0
Medium	50.0	33.3	40.0	83.3	30.0	33.3	30.0	0.0	20.0	0.0
Long	30.0	33.3	40.0	0.0	20.0	0.0	40.0	50.0	50.0	50.0
Very long	0.0	33.3	0.0	0.0	0.0	0.0	10.0	0.0	20.0	16.7
Not in use	10.0	0.0	0.0	16.7	20.0	33.3	10.0	33.3	10.0	33.3
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

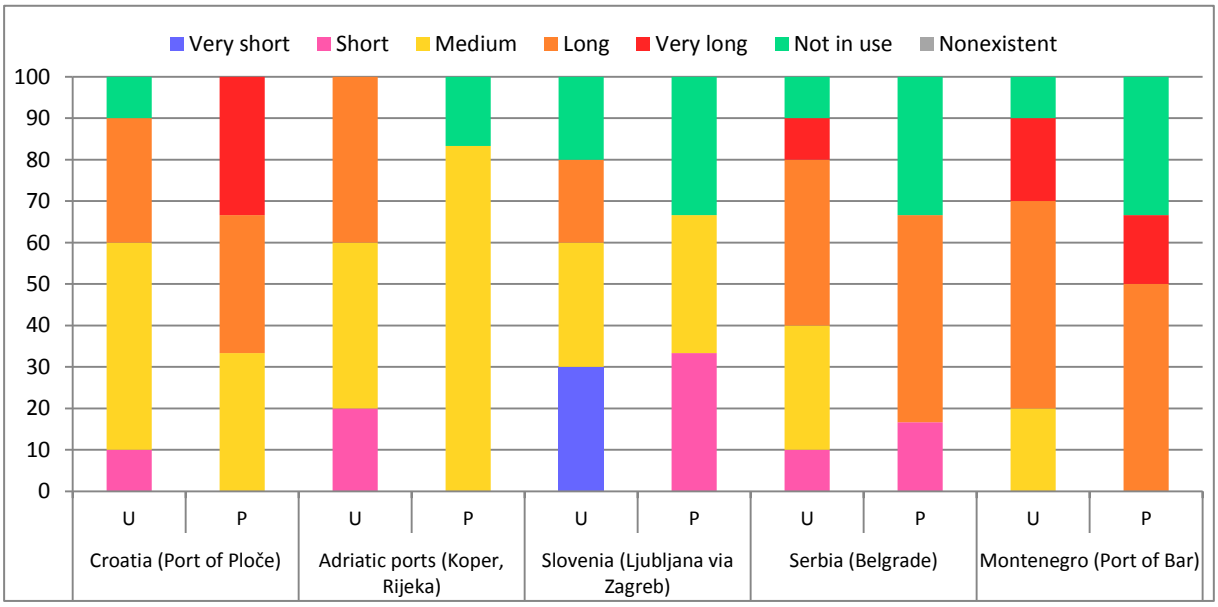

Fig. P3.22 Assessment of the lead time on IT corridors - Bosnia & Herzegovina

Table P3.23 Assessment of the IT quality on corridors, directions – Croatia

Evaluation	Serbia (Belgrade)		Slovenia (ljubljana)		BiH (Sarajevo)		BiH (Banja Luka)		Hungary (Budapest)	
	U	P	U	P	U	P	U	P	U	P
High	0.0	0.0	0.0	25.0	0.0	0.0	0.0	12.5	0.0	12.5
Medium	20.0	37.5	40.0	25.0	20.0	37.5	0.0	25.0	40.0	62.5
Low	80.0	50.0	60.0	37.5	80.0	25.0	100.0	25.0	40.0	25.0
Not in use	0.0	12.5	0.0	0.0	0.0	25.0	0.0	25.0	20.0	0.0
Nonexistent	0.0	0.0	0.0	12.5	0.0	12.5	0.0	12.5	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

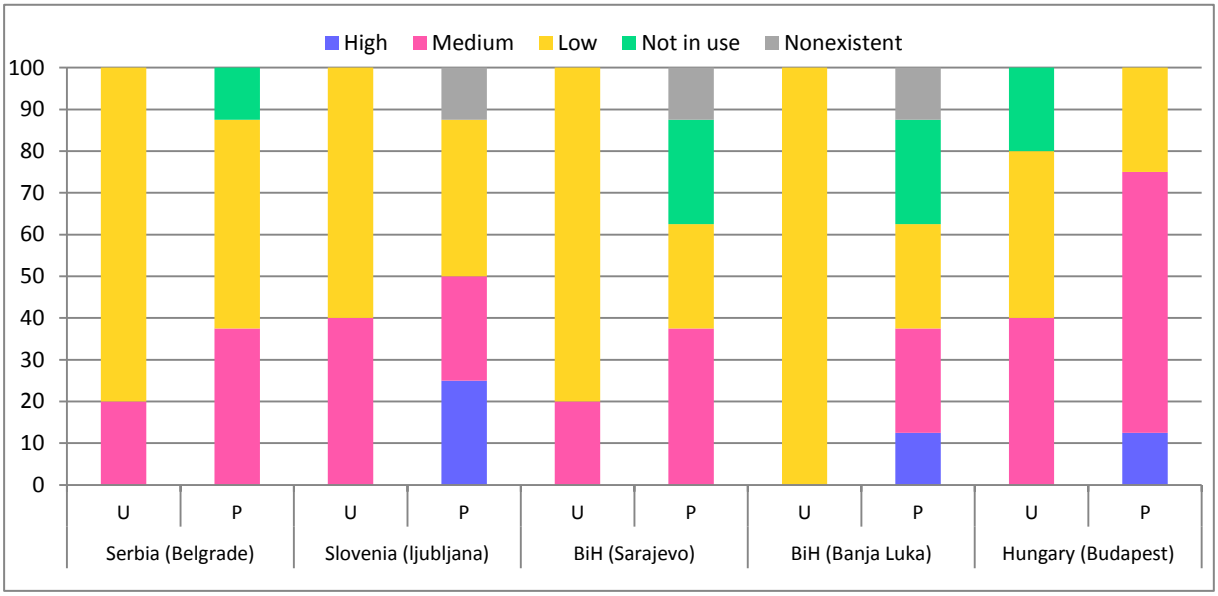

Fig. P3.23 Assessment of the IT quality on corridors, directions – Croatia

Table P3.24 Assessment of the lead time on IT corridors - Croatia

Evaluation	Serbia (Belgrade)		Slovenia (ljubljana)		BiH (Sarajevo)		BiH (Banja Luka)		Hungary (Budapest)	
	U	P	U	P	U	P	U	P	U	P
Very short	0.0	0.0	0.0	12.5	0.0	0.0	0.0	0.0	0.0	12.5
Short	0.0	0.0	20.0	12.5	0.0	0.0	0.0	0.0	0.0	0.0
Medium	0.0	37.5	60.0	37.5	20.0	37.5	0.0	25.0	0.0	50.0
Long	80.0	37.5	20.0	0.0	60.0	25.0	80.0	37.5	60.0	25.0
Very long	20.0	25.0	0.0	12.5	20.0	12.5	20.0	0.0	20.0	12.5
Not in use	0.0	0.0	0.0	12.5	0.0	25.0	0.0	37.5	20.0	0.0
Nonexistent	0.0	0.0	0.0	12.5	0.0	0.0	0.0	0.0	0.0	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

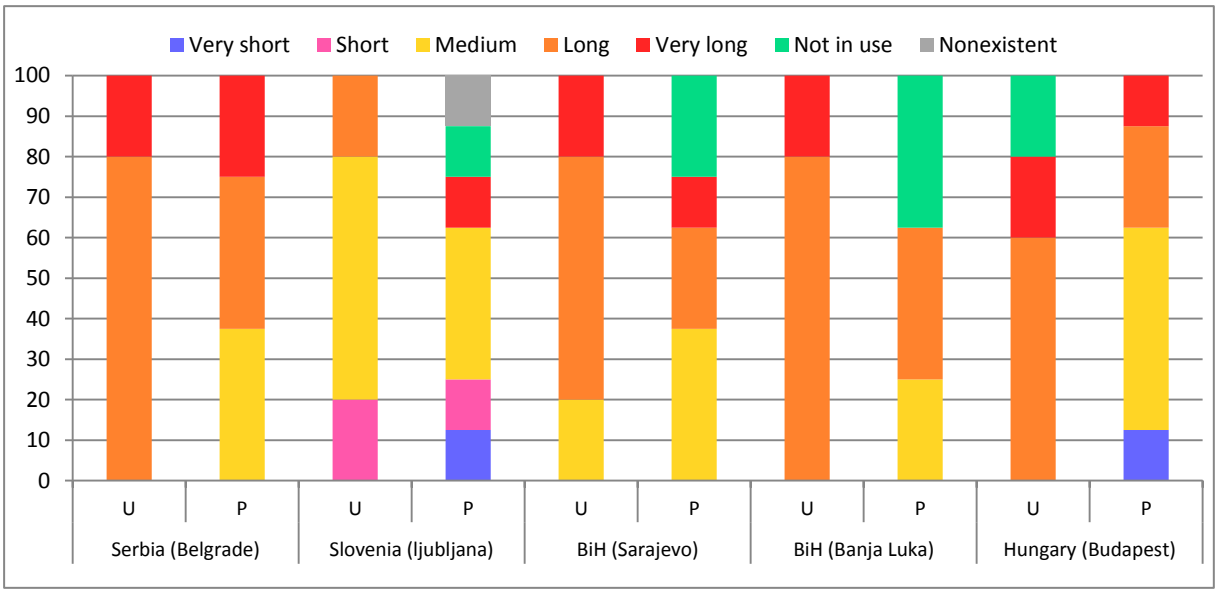

Fig. P3.24 Assessment of the lead time on IT corridors - Croatia

Table P3.25 Assessment of the IT quality on corridors, directions – Montenegro

Evaluation	Serbia (Belgrade)		Serbia (Kosovo, Priština)		BiH (Sarajevo)		Adriatic ports (Koper, Rijeka)	
	U	P	U	P	U	P	U	P
High	16.7	16.7	0.0	0.0	16.7	0.0	16.7	0.0
Medium	50.0	33.3	16.7	50.0	16.7	50.0	33.3	50.0
Low	33.3	50.0	66.7	50.0	66.7	50.0	16.7	33.3
Not in use	0.0	0.0	16.7	0.0	0.0	0.0	0.0	16.7
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

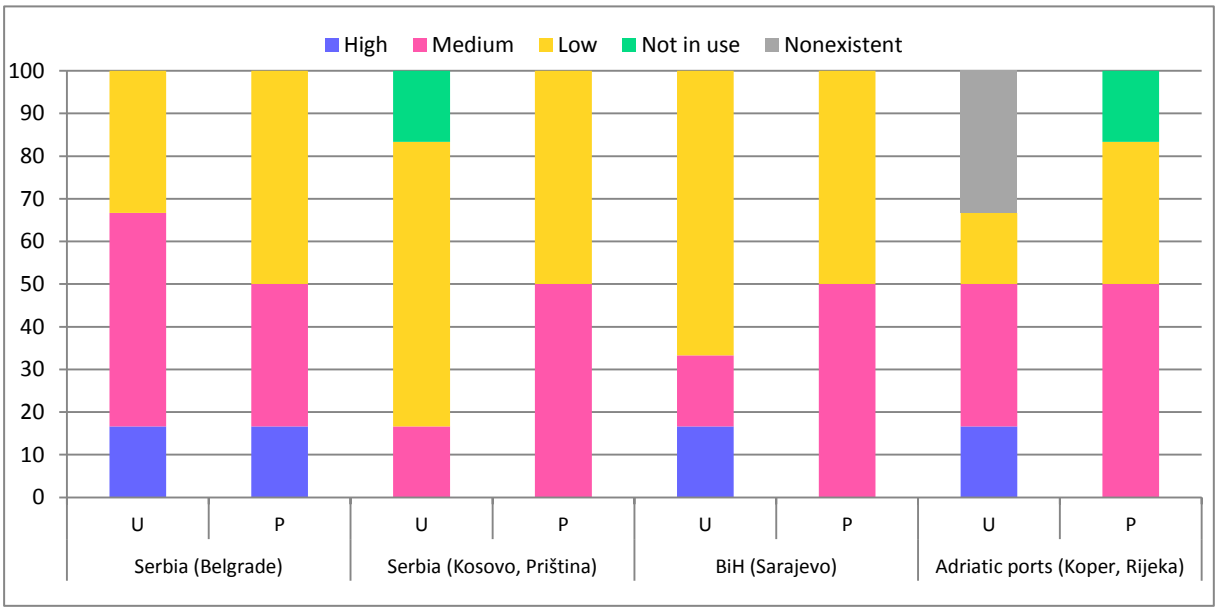

Fig. P3.25 Assessment of the IT quality on corridors, directions – Montenegro

Table P3.26 Assessment of the lead time on IT corridors - Montenegro

Evaluation	Serbia (Belgrade)		Serbia (Kosovo, Priština)		BiH (Sarajevo)		Adriatic ports (Koper, Rijeka)	
	U	P	U	P	U	P	U	P
Very short	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Short	16.7	16.7	16.7	16.7	0.0	16.7	0.0	0.0
Medium	33.3	33.3	0.0	16.7	66.7	16.7	0.0	66.7
Long	50.0	33.3	16.7	50.0	33.3	66.7	50.0	16.7
Very long	0.0	16.7	50.0	16.7	0.0	0.0	16.7	16.7
Not in use	0.0	0.0	16.7	0.0	0.0	0.0	0.0	0.0
Nonexistent	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

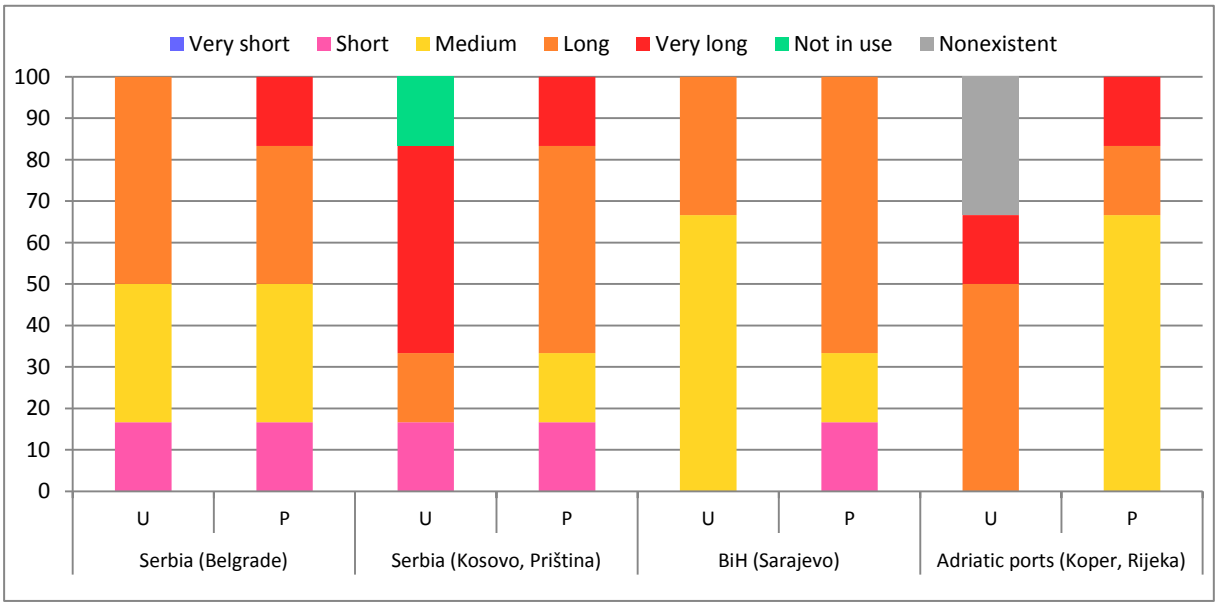

Fig. P3.26 Assessment of the lead time on IT corridors - Montenegro

Table P3.27 Assessment of the IT quality on corridors, directions – Serbia

Evaluation	Slovenia (Ljubljana)		Port of Koper (Slovenia)		Port of Rijeka (Croatia)		Port of Bar (Monte-negro)		Port of Thessaloniki (Greece)		Port of Constanta (Romania)		Hungary (Budapest)		Bulgaria		BiH	
	U	P	U	P	U	P	U	P	U	P	U	P	U	P	U	P	U	P
High	7.7	27.3	15.4	36.4	15.4	18.2	0.0	0.0	0.0	9.1	0.0	0.0	0.0	18.2	0.0	0.0	0.0	0.0
Medium	23.1	27.3	30.8	9.1	61.5	72.7	30.8	9.1	23.1	27.3	0.0	9.1	7.7	36.4	7.7	27.3	7.7	9.1
Low	23.1	18.2	30.8	27.3	15.4	0.0	38.5	54.5	7.7	9.1	15.4	36.4	15.4	18.2	7.7	18.2	7.7	18.2
Not in use	46.2	18.2	15.4	18.2	7.7	9.1	15.4	18.2	61.5	36.4	76.9	45.5	69.2	27.3	76.9	54.5	69.2	54.5
Nonexistent	0.0	9.1	7.7	9.1	0.0	0.0	15.4	18.2	7.7	18.2	7.7	9.1	7.7	0.0	7.7	0.0	15.4	18.2
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

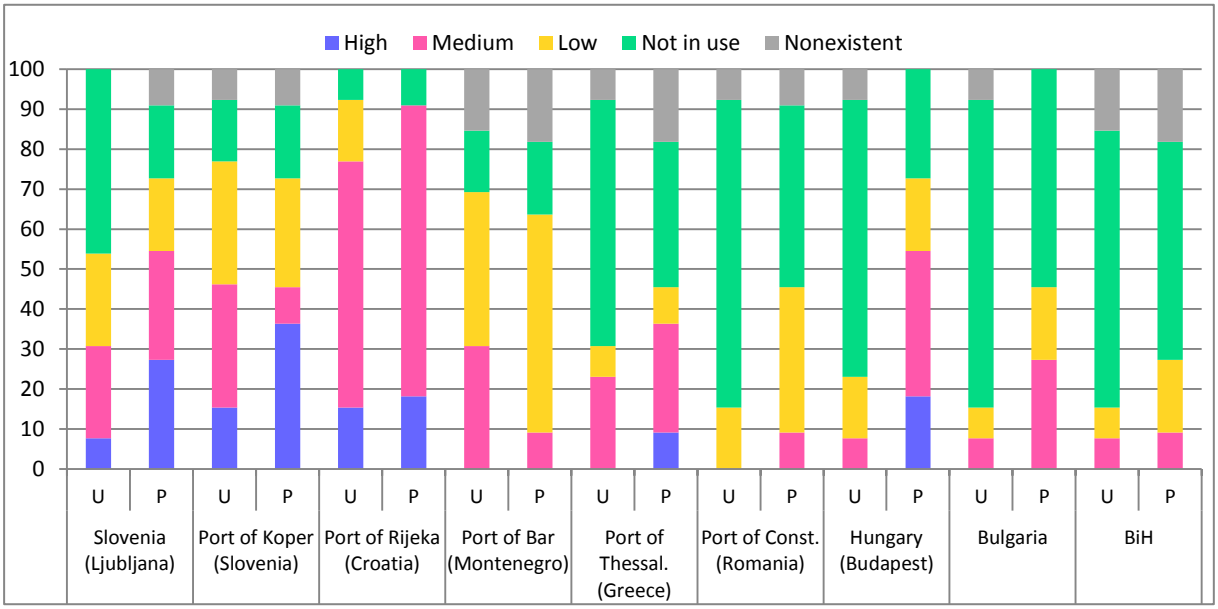

Fig. P3.27 Assessment of the IT quality on corridors, directions – Serbia

Table P3.28 Assessment of the lead time on IT corridors - Serbia

Evaluation	Slovenia (Ljubljana)		Port of Koper (Slovenia)		Port of Rijeka (Croatia)		Port of Bar (Monte-negro)		Port of Thessaloniki (Greece)		Port of Constanta (Romania)		Hungary (Budapest)		Bulgaria		BiH	
	U	P	U	P	U	P	U	P	U	P	U	P	U	P	U	P	U	P
Very short	0.0	9.1	0.0	9.1	0.0	9.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Short	7.7	18.2	30.8	27.3	30.8	36.4	7.7	0.0	0.0	0.0	0.0	0.0	0.0	18.2	0.0	18.2	0.0	9.1
Medium	23.1	18.2	15.4	9.1	30.8	36.4	30.8	18.2	7.7	36.4	0.0	18.2	7.7	9.1	7.7	9.1	7.7	9.1
Long	23.1	27.3	38.5	27.3	30.8	9.1	23.1	27.3	23.1	9.1	7.7	18.2	7.7	27.3	7.7	9.1	15.4	18.2
Very long	0.0	0.0	0.0	0.0	0.0	0.0	15.4	27.3	0.0	0.0	7.7	9.1	7.7	0.0	0.0	0.0	0.0	9.1
Not in use	46.2	18.2	7.7	18.2	7.7	9.1	15.4	18.2	61.5	45.5	76.9	54.5	69.2	45.5	76.9	63.6	69.2	54.5
Nonexistent	0.0	9.1	7.7	9.1	0.0	0.0	7.7	9.1	7.7	9.1	7.7	0.0	7.7	0.0	7.7	0.0	7.7	0.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

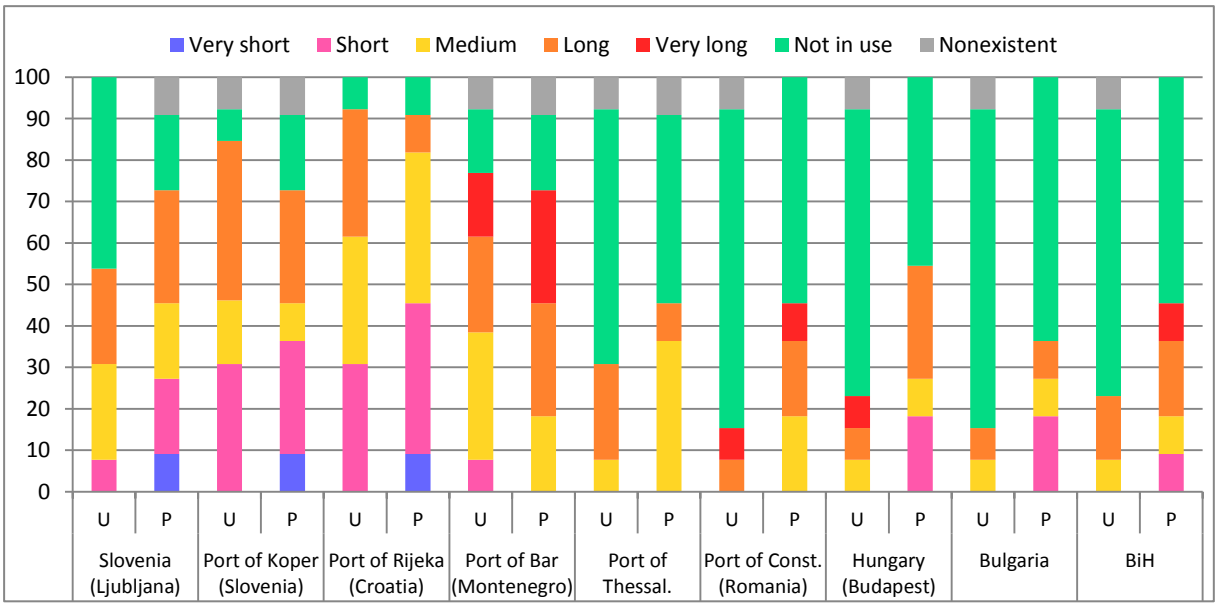

Fig. P3.28 Assessment of the lead time on IT corridors - Serbia