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## INTRODUCTION

We present readers with another Booklet of Science under the title “Problems of Transportation and Logistics”. This publication was prepared by five authors who worked meticulously and diligently on developing the articles contained in this notebook. Covered subjects are shown in both theoretical and practical terms. The essential objectives of the studies are:

- Presentation of the current problems of local governments in the field of passenger transportation system,
- Showing trends in contemporary transportation policy in the Baltic Sea region,
- A reference to the aspects of the competitiveness of rail transportation in Poland,
- Emphasizing the changes in demand and its impact on the supply chain.

The authors are aware that limited volume of studies and their nature allow only for partial research in regards to the problems of transportation and logistics. Presented instances were chosen based on authors interest and experience. Realizing that the presented studies are only a modest expression of scientific inquiry, we hope that they will become an inspiration to the broader research and reflection.

*Editor*  
*Elżbieta Załoga*



Joanna Kasińska\*

## ASSESSMENT OF CHANGES OF THE SIZE AND STRUCTURE OF FERRY TRANSPORT IN THE BALTIC SEA REGION IN THE YEARS 2011–2014

### Abstract

The aim of the research was an attempt to find the answer for basic research question: To what extent the ferry transport in the BSR has changed in recent years? Analysis of data and assessment became the main research methods. In addition, the functions of linear trends for the selected variables included in the study were estimated.

The article presents the multi-aspects analysis of the transport of goods and passengers by ferry/ro-ro fleet in the Baltic Sea Region in 2011–2014. Following issues have been discussed: ferry/ro-ro fleets of the top 30 Baltic operators, ferry/ro-ro passengers in the top 30 Baltic ports, the number and structure of the transport of goods, passengers and freight units.

**Keywords:** Baltic Sea Region (BSR), ferry, ro-ro, transport

### Introduction

The Baltic Sea is often treated as an internal sea of the European Union (Northern Europe; intercontinental shelf sea of the Atlantic Ocean). The countries of the Baltic Sea Region (the BSR) are: Denmark, Germany, Poland,

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Lithuania, Latvia, Estonia, Russia, Finland and Sweden.<sup>1</sup> The Baltic Sea region is highly diversified under the economic, geographical, natural (resources availability), political, civilization and historical reasons. Altogether, over 289 million people are inhabiting it [about 20% of the EU population (27)], whence directly in the seashores around 98–99 million, and indirectly, 190 million people.<sup>2</sup>

In the BSR in April 2015 34 shipowners served a dense network of ferry/ro-ro, which is one of its specific features. This form of navigation is considered to be dominant (without analysing container traffic). 21 ferry/ro-ro operators offered car&passenger connections (ropax for short), 10 – a ro-ro combination and 3 – container&car connections.<sup>3</sup> In particular areas of the Baltic Sea however, the degree of the concentration of ferry transports is diversified which is mainly due to the different economic potential of the BSR countries and therefore is affecting the size and directions of the trade exchange occurring between them. The ferry/ro-ro shipping is being used for the purposes of passenger and cargo transports, and in the case of the latter has a significant participation in the transport of high-value goods.<sup>4</sup>

## The purpose and applied research methods

The aim of the research was an attempt to find the answer for basic research question: To what extent the ferry transport in the BSR has changed in recent years? Trying to find the answer, in the article a brief characteristic of the BSR was presented. Particular attention was paid to the size of the fleet of the top 30 operators, the key 30 ports of the Baltic Sea as regards transhipped freight units, the type, number and gross tonnage of the vessels operated by them, the length

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<sup>1</sup> Sometimes, due to the geographic location and existing transport routes leading among others through the territory of Denmark, Norway is also ranked among these countries. Also, economic, historical, cultural reasons as well as the membership in different regional organizations are speaking for it, which means that in some studies among the BSR countries Iceland also appears. This study focuses on the basic countries belonging to the BSR (excluding Iceland).

<sup>2</sup> E. Czermański, *Charakterystyka gospodarcza Regionu Morza Bałtyckiego*, p. 17, <http://studiamaterialy.pl/wpcontent/uploads/2013/07/ZN-2012-ITiHM-ECz.pdf> (access 29.08.2015).

<sup>3</sup> *Baltic ro-ro & ferry market 2014/15*, “Baltic Transport Journal”, p. 11; [http://www.balticpress.com/ftp2/baltic\\_ro-ro\\_ferry\\_yearbook\\_2014-15\\_preview.pdf](http://www.balticpress.com/ftp2/baltic_ro-ro_ferry_yearbook_2014-15_preview.pdf) (access 02.09.2015).

<sup>4</sup> A.S. Grzelakowski, *Region Morza Bałtyckiego jako obszar wysokiej aktywności handlowej i transportowej oraz perspektywy jego rozwoju*, <http://www.portalmorski.pl/referaty/2004/04.pdf> (access 02.09.2015).

of the shipping lines, the number of passengers carried and the structure of the ferry/ro-ro traffic by countries, the size and structure by type of the transported cars, buses, other road vehicles, and the served journeys. The article attempts to analyze and assess the size and structure of the ferry transport in the BSR in the years 2011–2014. For this purpose, mainly tabular and graphical form of presentations were used. Besides, analysis of data and assessment became the main research methods. In addition, the functions of linear trends for the selected variables included in the study were estimated. Identification of trends matching to the empirical data required to use the coefficient of determination  $R^2$ , which indicates the extent to which trends describe the course of the dependent variables.

## Research findings

In terms of number of vessels among ferry/ro-ro operators six of them dominate (as of April 2015): Finnlines (22 vessels; 644,8 thousand GT), Stena Line (17 vessels; 512 thousand GT), DFDS Seaways (17 vessels; 493,3 thousand GT), Tallink/Silja (12 vessels; 483,8 thousand GT), Scandlines (12 vessels; 135,9 thousand GT) i Transfennica (10 vessels; 225,9 thousand GT). They have a total of 90 units (for 171 vessels operating in the Baltic Sea), which is over half of the fleet (52.63%). For comparison: in 2012 Finnlines had at their disposal 14 vessels (505,7 thousand GT), and in 2013 owned 12 units (433,7 thousand GT); in 2012 Stena Line had 10 vessels (316,6 thousand GT), and in 2013 – 18 (518,3 thousand GT), DFDS Seaways in the years 2012 and 2013 had 10 vessels (262,3–262,6 thousand GT), at the same time Tallink/Silja owned 11 vessels (472,2–512,1 thousand GT), however, Scandlines in 2012 had 19 vessels (349,3 thousand GT), and in 2013 – 10 units (127,1 thousand GT).<sup>5</sup> Also transport market in the BSR is constantly changing. The total length of shipping lines served by them includes 198 435 km (approx. 60%). In terms of gross tonnage of ships on the transport market in this region also Viking Line, Color Line, TT-Line, SOL Continental Line and Unity Line are respected. Other data are shown in Table 1.

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<sup>5</sup> As of the beginning of 2012, *Baltic Ro-Ro&Ferry Yearbook 2012 – ploughing through the North-South & West-East matrix*, “Baltic Transport Journal”, p. 19 [http://www.balticpress.com/ftp/baltic\\_roro\\_ferry\\_yearbook\\_2012\\_free.pdf](http://www.balticpress.com/ftp/baltic_roro_ferry_yearbook_2012_free.pdf) (access 03.09.2015) and as of April 2013, *Baltic Ro-Ro&Ferry Yearbook 2013 – last year on fairly calm waters?*, “Baltic Transport Journal”, p. 13, [http://www.balticpress.com/\\_yearbook\\_roro\\_2013/btj.roro.ferry.yearbook\\_2013.pdf](http://www.balticpress.com/_yearbook_roro_2013/btj.roro.ferry.yearbook_2013.pdf) (access 03.09.2015); <http://baltictransportjournal.com> (access 03.09.2015).

Table 1

Ferries and ro-ro vessels in the BSR. The list of the top 30 operators (as of April 2015)

Operator	Vessels	Number of vessels	GT	Length of the shipping lines (km)	Shipping line in km/km per week
Finnlines	prom/ro-ro	22	644 784	67 032	223 870
Stena Line	prom	17	511 972	36 696	109 065
DFDSSeaways	prom/ro-ro	17	493 304	48 751	185 640
Tallink/Silja	prom/ro-ro	12	483 815	15 557	47 860
Viking Line	prom	7	264 491	6 535	20 960
Color Line	prom	6	250 148	7 518	30 361
Transfennica	ro-ro	10	225 881	24 214	116 755
TT-Line	prom/ro-ro	6	179 391	14 600	49 925
SOLContinent Line	ro-ro	7	149 785	15 826	53 310
Unity Line	prom	7	139 821	10 736	25 260
Scandlines	prom	12	135 879	6 185	19 780
SCA Logistics	ro-ro	5	102 875	10 500	35 000
CldN	ro-ro	4	92 964	9 993	32 708
Fjord Line	prom	4	86 826	3 420	14 700
Destination Gotland	prom	4	71 678	3 500	12 820
St. Peter Line	prom	2	71 676	2 135	4 760
Polferries	prom	3	66 950	3 548	11 094
Færgen	prom	8	55 829	3 115	6 482
Eckerö Line	prom	2	48 723	2 490	5 754
Black Sea Ferry	ro-ro	2	45 479	3 290	10 020
Smyril Line	prom	1	35 966	1 830	4 480
Mols-Linien	prom	3	26 621	1 134	3 596
Wagenborg Shipping Sweden	ro-ro	2	24 920	3 332	9 130
Mann Lines	ro-ro	1	24 688	3 000	13 320
Navirail	prom	1	20 921	1 400	1 900
Anship	ro-ro	1	20 729	1 787	7 250
Sea-Cargo	ro-ro	2	18 563	2 882	6 510
Wasaline	prom	1	17 503	1 150	2 025
ULS Estonia	prom	1	7 654	590	660
Lillgaard	ro-ro	1	6 040	780	1 220
TOTAL		171	4 325 876	313526	1 066 215

a) – without data for 2011 for Karlskrona

Source: *Baltic Ro-Ro&Ferry Yearbook 2013 – last year on fairly calm waters?*, “Baltic Transport Journal”, p. 33, [http://www.baltic-press.com/\\_yearbook\\_oro\\_2013/btj.oro.ferry.yearbook\\_2013.pdf](http://www.baltic-press.com/_yearbook_oro_2013/btj.oro.ferry.yearbook_2013.pdf) (access 03.09.2015); *Transport. Wyniki działalności w 2011 r.*, GUS, Warszawa 2012, p. 254; <http://www.stat.gov.pl>

(access 02.09.2015); *Baltic Ro-Ro&Ferry Yearbook 2014/15 – steady as they go*, “Baltic Transport Journal”, [http://www.baltic-press.com/ftp2/baltic\\_ro-ro\\_ferry\\_yearbook\\_2014-15\\_preview.pdf](http://www.baltic-press.com/ftp2/baltic_ro-ro_ferry_yearbook_2014-15_preview.pdf), p. 32 (access 03.09.2015).

In 2014 the 30 largest ports in the BSR (of 71) handled a total of 92.865 million passengers. Passenger traffic in the best of them (Helsinki, Tallinn, Stockholm, Helsingborg, Helsingør, Puttgarden and Rødby) took a total of 55.730 million passengers (60.01%). Comparing to the previous year, the largest gains in this respect Gdynia and Karlskrona recorded (by +10.0% each), then Stromstad (+9.7%), Aarhus (+7.7%), Rostock (+6.6%), Hirtshals (+5.6%) and Kapellskär (+5.1%). The worst results concern Riga (−12.5%), Turku (−4.9%) and Stockholm (−4.3%). Other data for the years 2011–2014 are shown in Table 2.

Table 2

The top 30 ferry/ro-ro Baltic ports in the years 2011–2014  
(number of passengers in thousand)

Port	Country	2011	2012	2013	2014	2014:2013 (%)
1	2	3	4	5	6	7
Helsinki	Finland	10 255	10 608	10 724	10 901	+1.7%
Tallinn	Estonia	7 700	8 394	8 709	9 081	+4.3%
Stockholm	Sweden	9 124	9 025	8 833	8 453	−4.3%
Helsingborg	Sweden	8 340	7 841	7 763	7 656	−1.4%
Helsingør	Denmark	8 340	7 824	7 721	7 635	−1.1%
Puttgarden	Germany	6 027	6 001	5 945	6 002	+1.0%
Rødby	Denmark	6 027	6 001	5 945	6 002	+1.0%
Turku	Finland	2 813	3 312	3 425	3 257	−4.9%
Mariehamn	Finland	2 767	3 310	3 040	3 024	−0.5%
Odden	Denmark	1 811	2 038	2 462	2 525	+2.6%
Hirtshals	Denmark	2 249	2 245	2 344	2 476	+5.6%
Rostock	Germany	2 010	2 344	2 299	2 450	+6.6%
Aarhus	Denmark	1 233	1 507	2 182	2 350	+7.7%
Ystad	Sweden	1 913	1 962	1 934	1 953	+1.0%
Frederikshavn	Denmark	1 829	1 711	1 718	1 741	+1.3%
Gothenburg	Sweden	1 637	1 591	1 646	1 713	+4.1%
Trelleborg	Sweden	1 564	1 538	1 618	1 681	+3.9%
Visby	Sweden	1 598	1 590	1 583	1 630	+3.0%

1	2	3	4	5	6	7
Kiel	Germany	1 498	1 569	1 577	1 624	+3.0%
Rønne	Denmark	1 423	1 467	1 440	1 469	+2.0%
Nynäshamn	Sweden	1 398	1 408	1 385	1 430	+3.2%
Gedser	Denmark	1 368	1 414	1 329	1 363	+2.6%
Strömstad	Sweden	1 202	1 143	1 085	1 190	+9.7%
Eckerö	Finland	914	890	911	912	+0.1%
Grisslehamn	Szwecja	914	890	911	912	+0.1%
Kapellskär	Sweden	924	930	867	911	+5.1%
Copenhagen	Denmark	722	735	744	727	-2.3%
Riga	Latvia	719	732	774	677	-12.5%
Gdynia	Poland	485	469	509	560	+10.0%
Karlskrona	Sweden	no data	469	509	560	+10.0%
TOTAL		88 804	90 958	91 932	92 865	

a) – without data for 2011 for Karlskrona

Source: *Baltic Ro-Ro&Ferry Yearbook 2013 – last year on fairly calm waters?*, “Baltic Transport Journal”, p. 33, [http://www.baltic-press.com/\\_yearbook\\_roro\\_2013/btj.roro.ferry.yearbook\\_2013.pdf](http://www.baltic-press.com/_yearbook_roro_2013/btj.roro.ferry.yearbook_2013.pdf) (access 03.09.2015); *Transport. Wyniki działalności w 2011 r.*, GUS, Warszawa 2012, p. 254; <http://www.stat.gov.pl> (access: 02.09.2015); *Baltic Ro-Ro&Ferry Yearbook 2014/15 – steady as they go*, “Baltic Transport Journal”, p. 32, [http://www.baltic-press.com/ftp2/baltic\\_ro-ro\\_ferry\\_yearbook\\_2014-15\\_preview.pdf](http://www.baltic-press.com/ftp2/baltic_ro-ro_ferry_yearbook_2014-15_preview.pdf) (access 03.09.2015).

In the years 2011–2014 the number of passengers at the top 30 ports in the BSR in this respect increased from 88 804 thousand to 92 865 thousand, so by 4 061 thousand persons (4.57%). Changes of this magnitude in the studied years are described by the function of a linear trend  $y = 1\,315.7 t + 87\,851$  (Figure 1). The estimated trend in 95.19% describes the development of the dependent variable, and means that in the studied years, the number of passengers in ports increased statistically on average from year to year by about 1315.7 thousand people.

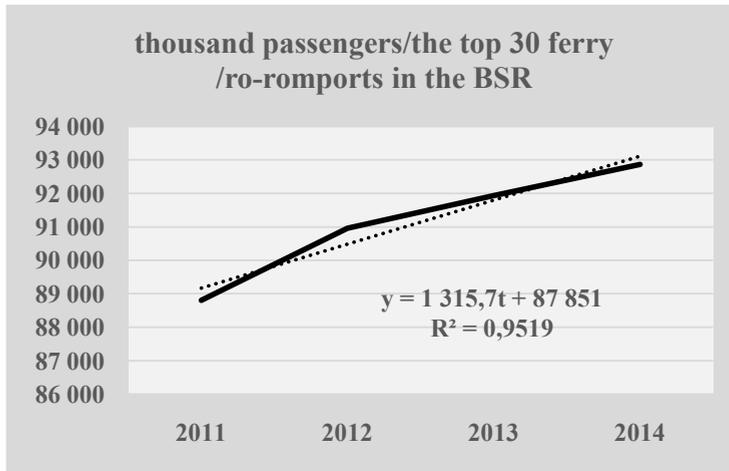


Figure 1. Passenger traffic at the key 30 ports of the BSR in this respect in 2011–2014 (in thousand). The function of a linear trend

Source: own calculations based on data from *Baltic Ro-Ro&Ferry Yearbook 2014/15 – steady as they go*, “Baltic Transport Journal”, p. 32, [http://www.baltic-press.com/ftp2/baltic\\_ro-ro\\_ferry\\_yearbook\\_201415\\_preview.pdf](http://www.baltic-press.com/ftp2/baltic_ro-ro_ferry_yearbook_201415_preview.pdf) (access 02.09.2015); *Baltic Ro-Ro&Ferry Yearbook 2013 – last year on fairly calm waters?*, “Baltic Transport Journal”, p. 28; *Transport. Wyniki działalności w 2011 r.*, GUS, Warszawa 2012, p. 254, <http://www.stat.gov.pl> (access 02.09.2015).

In 2014 Swedish ports (28 089 thousand people; 30.25%) and Danish ports (26 288 thousand people; 28.31%) dominated in handling passenger ferry/ro-ro traffic in the BSR. Also Finnish ports have quite a large market share (18 094 thousand people; 19.48%). In total, Sweden (11 ports), Denmark (9 ports) and Finland (4 ports) in the segment of passenger transport have a 78.04% market share (Figure 2).

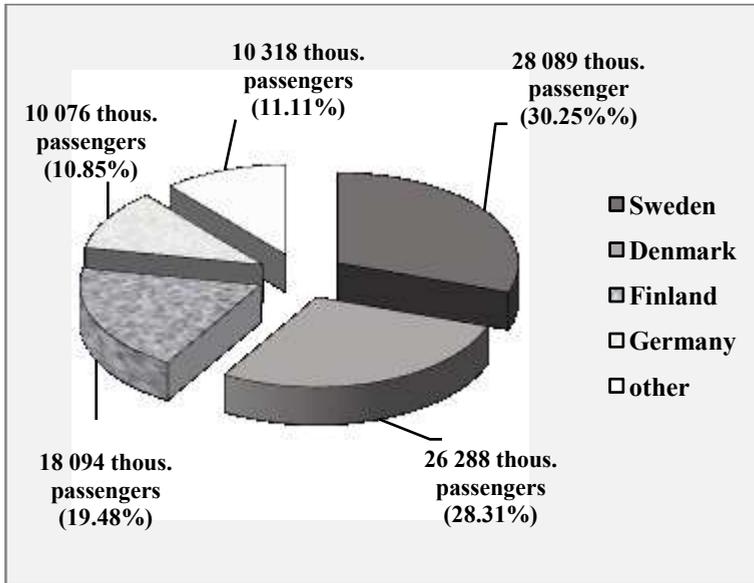


Figure 2. The size and structure of the ferry/ro-ro passenger traffic in 30 major ports in the BSR in this respect by country in 2014 (thousand; %)

Source: own calculations based on the data from *Baltic Ro-Ro&Ferry Yearbook 2014/15 – steady as they go*, “Baltic Transport Journal”, p. 32, [http://www.baltic-press.com/ftp2/baltic\\_ro-ro\\_ferry\\_yearbook\\_201415\\_preview.pdf](http://www.baltic-press.com/ftp2/baltic_ro-ro_ferry_yearbook_201415_preview.pdf) (access 03.09.2015); *Baltic Ro-Ro&Ferry Yearbook 2013 – last year on fairly calm waters?*, “Baltic Transport Journal”, p. 28 (access 03.09.2015).

A list of the key 30 ports in the BSR in the years 2011–2014 in terms of handling freight units (trucks, trailers, containers, wagons) is shown in Table 3. In the analysed years they transshipped a total of 29 785 588 freight units. In 2014 in comparison to 2013 the biggest positive changes in this area related to the following ports: Ust-Luga (+25.0%), Nynäshamn (+21.2%), Karlskrona (+13.6%) and Gdynia (+11.6%), while negative ports were St. Petersburg (–14.3%) and Stockholm (–6.1%).

Table 3

The top 30 ferry/ro-ro Baltic ports in respect of transshipped units  
in the years 2011–2014

Port	Country	2011	2012	2013	2014	2014:2013 (%)
Lübeck / Travemünde	Germany	892 740	730 324	733 391	744 860	+1.6%
Trelleborg	Sweden	670 141	648 991	645 696	670 776	+3.9%
Helsinki	Finland	520 214	501 465	485 816	503 354	+3.6%
Gothenburg	Sweden	517 659	480 979	479 528	497 609	+3.8%
Rostock	Germany	447 563	428 205	424 089	444 781	+4.9%
Puttgarden	Germany	364 903	369 871	389 344	412 151	+5.9%
Rødby	Denmark	364 903	369 871	389 344	412 151	+5.9%
Tallinn	Estonia	292 000	354 300	353 700	377 316	+6.7%
Helsingør	Denmark	388 244	365 833	360 840	375 450	+4.0%
Helsingborg	Sweden	no data	422 922	366 082	369 908	+1.0%
Świnoujście	Poland	282 966	306 446	324 422	341 782	+5.4%
Malmö	Sweden	231 172	226 071	223 640	218 814	-2.2%
Ystad	Sweden	200 587	193 261	214 942	218 790	+1.8%
Kiel	Germany	246 292	208 859	191 951	191 000	-0.5%
Klaipeda	Lithuania	188 849	189 382	185 726	178 627	-3.8%
Stockholm	Sweden	189 896	177 603	188 185	176 677	-6.1%
Hanko	Finland	107 164	120 884	149 340	162 880	+9.1%
Kapellskär	Sweden	173 406	163 032	153 315	159 017	+3.7%
Frederikshavn	Denmark	142 017	157 884	156 041	154 454	-1.0%
Gdynia	Poland	118 890	116 301	126 897	141 670	+11.6%
Hirtshals	Denmark	118 500	125 675	128 199	137 868	+7.5%
Turku	Finland	112 673	116 593	127 805	123 141	-3.6%
Karlskrona	Sweden	80 094	86 868	102 800	116 828	+13.6%
Ust-Luga	Russia	no data	69 000	88 000	110 000	+25.0%
Naantali	Finland	127 863	129 100	102 060	99 454	-2.6%
Gedser	Denmark	90 971	89 966	91 293	96 348	+5.5%
Nynäshamn	Sweden	80 679	80 587	69 103	83743	+21.2%
Esbjerg	Denmark	102 000	102 000	72 000	74 000	+2.8%
Ventspils	Latvia	68 261	69 812	68 100	72 758	+6.8%
St. Petersburg	Russia	no data	49 000	84 000	72 000	-14.3%
TOTAL		7 120 647	7 451 085	7 475 649	7 738 207	

a) – without data for 2011 for Helsingborg, Ust-Luga and St. Petersburg

Source: M. Błuś, M. Rozmarynowska, *Top Baltic ro-ro & ferry ports 2014*, “Harbours Review” 2015, No. 1, p. 42, <http://harboursreview.com/printed-edition.pdf> (access 02.09.2015); *Baltic Ro-Ro&Ferry Yearbook 2013 – last year on fairly calm waters?*, “Baltic Transport Journal”, p. 29 (access 02.09.2015).

In the years 2011–2014 the number of freight units in the top 30 ports in the BSR in this respect increased from 7 039 968 to 7 738 207 (9.92%). Changes of this magnitude in the studied years are described by the function of a linear trend  $y = 187\,724 t + 7\,000\,000$  (Figure 3). The estimated trend in 89.98% describes the development of the dependent variable, and means that in the studied years, the number of freight units transshipped at analyzed ports increased statistically on average by 187 724 from year to year.

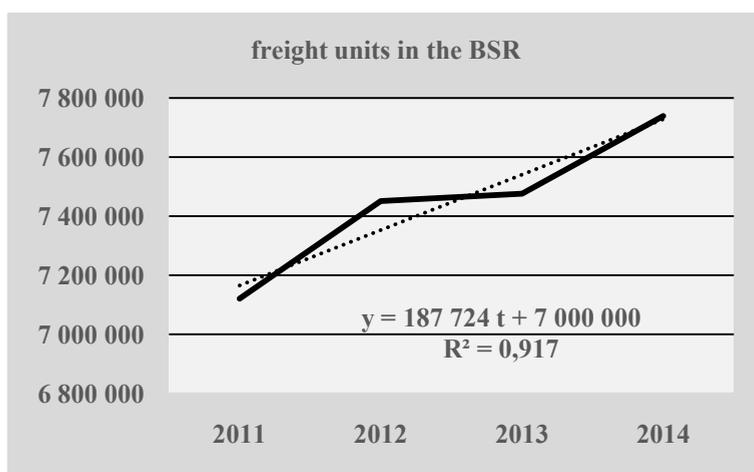


Figure 3. The number of freight units in the top 30 ports of the BSR in this respect in the years 2011–2014. The function of a linear friend

Source: own calculations based on the data from: M. Błuś, M. Rozmarynowska, *Top Baltic ro-ro & ferry ports 2014*, “Harbours Review” 2015, No. 1, p. 42, <http://harboursreview.com/printed-edition.pdf> (access 02.09.2015); *Baltic RoRo&Ferry Yearbook 2013 – last year on fairly calm waters?*, “Baltic Transport Journal”, p. 29 (access 02.09.2015).

The volume of rotation of the key 30 ports in the BSR in handling freight units in 2014 is shown in Fig. 4 and dominated by the 9 ports in Sweden (2 512 162 units; 32.46% of the market), 4 German ports (1 792 792 units, 23.17% of the market) and 6 Danish ports (1 250 271 units, 16.16% of the market). Polish ports of Świnoujście and Gdynia transshipped a total of 483 452 units, which gave them a 6.25% share in the market.

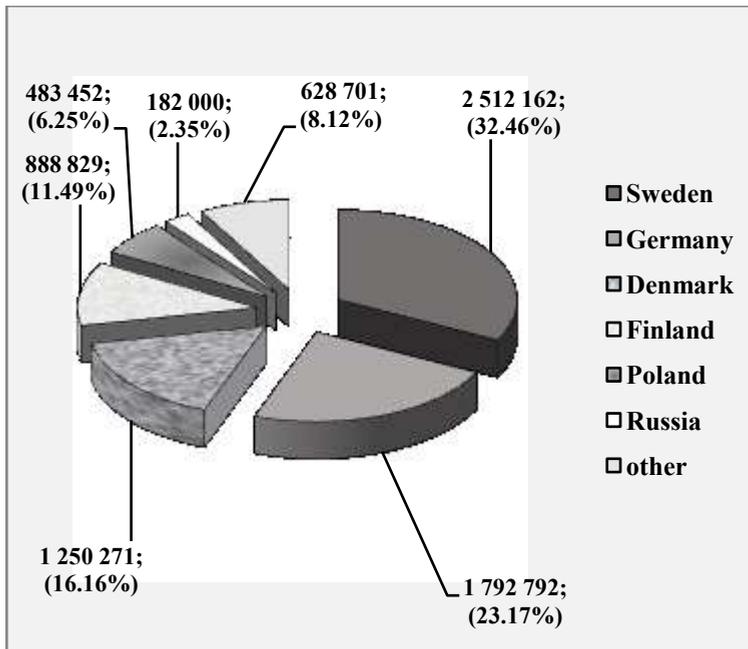


Figure 4. The volume and structure of rotation of freight units in the major 30 ports in the BSR in this respect in 2014 (thousand;%)

Source: own calculations based on the data from M. Błuś, M. Rozmarynowska, *Top Baltic ro-ro & ferry ports 2014*, “Harbours Review” 2015, No. 1, p. 42, <http://harboursreview.com/printed-edition.pdf>; *Baltic RoRo&Ferry Yearbook 2013 – last year on fairly calm waters?*, “Baltic Transport Journal”, p. 29 (access 03.09.2015).

## Conclusion

1. The study shows that in the Baltic Sea Region 34 ferry/ro-ro shipowners functioned in 2011–2014. The rate of ferry/ro-ro market concentration on the Baltic Sea is very large, because 6 operators (Finnlines, Stena Lane, DFDS Seaways, Tallink/Silja, Scandlines and Transfenica) has 90 (of 171) vessels (53% of the fleet), whose total gross tonnage in April 2015 was 2 495 635 GT (60%). The total length of shipping lines served by them amounted to 198 435 km (60%).
2. The most important amongst of 30 major ports of the BSR in terms of passenger numbers are: Helsinki (Finland), Tallinn (Estonia), Stockholm

- (Sweden), Helsingborg (Sweden), Helsingør (Denmark), Puttgarden (Germany) and Rødby (Denmark). In 2014, they took a total of 54 920 thousand passengers, which means 59% market share.
3. In the years 2011–2014 the number of passengers at the top 30 ports of the BSR in this respect increased from 88 804 thousand to 92 865 thousand, so 4 061 thousand persons (4.57%). Changes of this magnitude in the studied years are described by the function of a linear trend  $y = 1\,315.7t + 87\,851$ .
  4. In 2014, following ports dominated in the service of ferry/ro-ro passenger traffic: Swedish (30%), Danish (28%) and Finnish (20%), which gives them a total of 78% of the market. For comparison, the part of the most important Polish port of Gdynia in this respect amounted to 560 thousand persons (0.6%). Nevertheless, the port of Gdynia, as well as the port of Karlskrona, recorded the dynamics of changes of this magnitude in comparison to 2013, as in both cases in 2014 in comparison to 2013 a 10% increase in passenger numbers was reported.
  5. Thirty most important ports in the 2011–2014 of the BSR handled a total of 29 785 588 freight units. Changes of this magnitude in the studied years are described by the function of a linear trend  $y = 187\,724t + 7\,000\,000$ .
  6. In 2014, the highest rotation of freight units was recorded in the ports of Lübeck/Travemünde (744 860), Trelleborg (670 776), Helsinki (503 354), Gothenburg (497 609), Rostock (444 781), Puttgarden (412 151) and Rødby. The total market share of these 7 ports was therefore 3 685 682 units (47.63%). Polish ports of Świnoujście and Gdynia, transhipped a total of 483 452 units, which gave them a 6.25% share of the market.
  7. In 2014, in comparison with 2011, the largest gains in handled passenger traffic in the BSR respect port Aarhus recorded (+90.6%), and next: Odden (+39.4%), Rostock (+21.89%), Karlskrona (in this one case in comparison with 2012, +19.4%), Turku (+15.8%) and Gdynia (+15.5%). The largest decrease in handled passenger traffic in the BSR: Helsingør (−8.5%), Helsingborg (−8.2%), Stockholm (−7.4%) and Riga (−5.8%) recorded.
  8. In 2014, in comparison with 2011, the largest gains in ferry/ro-ro Baltic ports in respect of transhipped units, the following ports: Ust-Luga (in this case in compare to 2013, +59.4%), Hanko (+52%), St. Petersburg (in this case in compare to 2013, +46.9%), Karlskrona (+45.9%), Tallinn (+29.2%), Świnoujście (+20.8%) and Gdynia (+19.2%) recorded. The largest decrease in ferry/ro-ro Baltic ports in respect of transhipped units, the follow-

ing ports: Esbjerg (−27.5%), Kiel (−22.5%), Naantali (−22.2%), Lübeck/Travemünde (−16.6%) and Hirtshals (−16.3%) recorded.

9. In the West region of the Baltic Sea the highest turnover was recorded on the markets of Denmark–Sweden (in recent years, every year about 10 million passengers, 1.8 million cars and 0.5 million trucks have been transported) and Germany–Denmark (7.5 million passengers, 1.8 million cars and 0.5 million trucks). On the Eastern coasts of the Baltic Sea following markets prevail: Finland–Sweden (in recent years, every year roughly 8.5 million passengers, 0.6 million cars and 0.25 million trucks have been transported) and Estonia–Finland (8 million passengers, 1.2 million cars and 0.3 million trucks). In 2015, ferry transport in the BSR did not change significantly in comparison with the previous years). However, the first gas-powered cruise ferries were introduced (2013).<sup>6</sup>

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## **OCENA ZMIAN W WIELKOŚCI I STRUKTURZE TRANSPORTU PROMOWEGO W REGIONIE MORZA BAŁTYCKIEGO W LATACH 2011–2014**

### **Streszczenie**

Celem artykułu było przeanalizowanie zmian, jakie zaszły w wielkości i strukturze przewozów promowych w Regionie Morza Bałtyckiego w latach 2011–2014. W artykule przedstawiono wieloaspektową analizę wielkości i struktury przewozów promowych/ro-ro w Regionie Morza Bałtyckiego (RMB) w latach 2011–2014. Badaniu poddano takie zmienne, jak: wielkość floty 30 największych operatorów, liczbę pasażerów w 30 największych portach, wielkość i strukturę rodzajową przewozów i liczbę jednostek frachtowych.

Do najważniejszych portów RMB pod względem liczby pasażerów zaliczyć należy następujące: Helsinki (Finlandia), Tallinn (Estonia), Sztokholm (Szwecja), Helsingborg (Szwecja), Helsingør (Dania), Puttgarden (Niemcy) i Rødby (Dania). W 2014 roku przyjęły one łącznie 54 920 tys. pasażerów (59% udział w rynku). W tym samym roku największe obroty jednostkami frachtowymi odnotowano w portach: Lübeck/Travemünde (744 860), Trelleborg (670 776), Helsinki (503 354), Gothenburg (497 609), Rostock (444 781), Puttgarden (412 151) i Rødby.

**Słowa kluczowe:** Region Morza Bałtyckiego, promy/ro-ro, transport

**Marcin Klimek\***

## **TIME RESERVATION SYSTEM OF CUSTOMS CLEARANCE – EBOOKING TRUCK**

### **Abstract**

In recent years the Customs Service has been introducing several innovative electronic services (e-services) for clients (entrepreneurs, forwarders). One of the proposed solutions is the system of eBooking TRUCK, which enables clients electronic reservation of the date of customs for the trucks leaving Poland. The article presents basic information regarding this improvement, the aim of which is primarily shortening the time of truck spent on customs clearance (eliminating or reducing queues on the border crossings) and improving the work organisation of customs services. There is presented the concept of the eBooking TRUCK system, the premises of its implementing, the scope of data transmission by the entrepreneurs, the scope of handling notification by the customs officers, architecture of system and the ways of clients communication within the system (SMS, e-mail, CB radio, information panels, infokiosks). At the end, there is presented a description of implementing actions based on the pilot programme carried out from 5<sup>th</sup> October 2015 at Koroszczyn border crossing point (Customs Chamber in Biała Podlaska, Polish-Belarus border) and Grzechotki (Customs Chamber in Olsztyn, Polish-Russian border).

**Keywords:** e-services, electronic administration, customs clearance, e-customs

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## Introduction

In recent years there has been observed an increase in the number of modern electronic services (so called e-services)<sup>1</sup> implemented by the public administration, and meant to improve the work of offices and customers service.<sup>2</sup> The Customs Service is one of the institutions introducing a significant number of innovative e-services for entrepreneurs.<sup>3</sup> The Customs Service Strategy for the years 2014–2020<sup>4</sup> assumes facilitating the legal activities for entrepreneurs, improving customs services and reducing bureaucracy. In the strategy implementation the following 3i development strategies are used: electronic tools (INTERNET), intelligent knowledge use (INTELLIGENCE) along with a continuous striving for introducing innovations (INNOVATION). The solutions applying modern technologies are being implemented, i.e.:

- the systems of electronic customs notifications in exports, imports and transit (100% of customs notifications in 2013 and electronically served),
- the systems of electronic service of Intrastat declaration (over 92% of declarations registered online in 2013),
- the system of notification (booking) the date of customs clearance of coaches and minibuses (eBooking BUS)<sup>5</sup> implemented in 2012,
- the system of notification the time of customs clearance of trucks (eBooking TRUCK) implemented as pilot version in 2015,
- the system of electronic registration of TAX-FREE documents,
- the service of “e-Attachments”<sup>6</sup> – possibility of providing electronic parts of attachments to customs declaration,

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<sup>1</sup> K. Boyer, R. Hallowell, A. Roth, *E-services: operating strategy – a case study and a method for analyzing operational benefits*, “Journal of Operations Management” 2002, No. 20 (2), pp. 175–188.

<sup>2</sup> L. Carter, F. Belanger, *The utilization of e-government services: citizen trust, innovation and acceptance factors*, “Information Systems Journal” 2005, No. 15 (1), pp. 5–25.

<sup>3</sup> Customs Service in Poland is a leader of innovations in EU according to Eurobarometer Report: *The electronic customs implementation in the European Union*, 2014.

<sup>4</sup> *Służba Celna 2020 – strategia działania na lata 2014–2020*, “Wiadomości Celne” 2013, No. 10, (in Polish).

<sup>5</sup> M. Klimek, *System elektronicznej rezerwacji odprawy celnej autokarów i busów (eBooking BUS)*, “Logistyka” 2015, No 1, pp. 48–51 (in Polish).

<sup>6</sup> M. Klimek, *Usługa “e-załączniki” – nowe rozwiązanie usprawniające odprawy celne*, “Logistyka” 2014, No. 6, pp. 46–49 (in Polish).

- using various forms of passing information, communication with clients,<sup>7</sup> i.e.: electronic, information road signs, operating of the nationwide department of Customs Service Information Centre, virtual panoramic guide on the border crossing point, web cameras with online image of border crossing points, notifications on the information panels in the customer service offices, the service of the Customs Service *granica.gov.pl*, the mobile application “Granica”, infokiosks, the Newsletter service etc.,
- centre of official customs procedures CUDO (abbreviation in Polish Centrum Urzędowego Dokonywania Odpraw) – electronic customs clearance of goods in the assigned agency with a simultaneous possibility of introducing the freight in a different agency, etc.

Introducing convenient solutions using modern technologies is possible owing to a high degree of informatisation of the Customs Service and entrepreneurs alike.

One of the innovative electronic services is, introduced as a pilot in 2015, the system of electronic booking of the date of customs clearance of trucks – eBooking TRUCK (in short: eBT), the aim of which is reducing the queues of trucks on the border crossing points in the export direction from Poland. Due to the eBT system it will become possible to shorten the time of customs clearance as well as improving the work organisation on the border crossing points. In the article there is introduced basic information concerning the eBT system. In Chapter 1 there is presented the idea of the system, presumptions of its introduction, the benefits on the part of the client (carrier) and the Customs Service. In Chapter 2 there is described the process of booking and the range of data used during the notification procedure. Chapter 3 presents the architecture of the system and its elements, such as the system of booking the date of customs clearance for the clients, infokiosks, information panels for the clients, the system of serving the officers. There are also presented the ways of the clients communication within the eBT system. In Chapter 4 there is a preparatory description of the piloting activities.

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<sup>7</sup> M. Klimek, *Wybrane nowoczesne formy przekazu informacji wdrażane przez Służbę Celną*, “Logistyka” 2015, No. 3, pp. 2197–2204 (in Polish).

## Description of the eBooking TRUCK system

Introducing the eBT system was led in 2012 by starting the system of electronic booking of customs clearance date of coaches and minibuses eBooking BUS.<sup>8</sup> Owing to this solution the time of customs clearances of buses registered in eBooking BUS was shortened, especially in the periods of more intense bus traffic, e.g.: Christmas time. A shorter time of customs clearance results in the fact that part of the control actions (such as risk analysis) is completed even before a bus arrival to the border crossing point. Additionally, along with a large number of clearances it is possible to plan a bigger crew to serve the coaches.

The concepts that proved to be successful in the customs clearance of buses are used in facilitating the customs clearance for trucks. The Customs Service has prepared a similar system border crossing through eBT (the logo of the system in Figure 1), which is a component of the “e-Customs Program”<sup>9</sup>, an undertaking under the term of Integrated System of Serving the Border CAIFS II.



Figure 1. The logo of eBooking TRUCK system

Source: e-booking.gov.pl.

The requirements behind designing the system of eBT were formulated based on the concept proposed by the Institute of Logistics and Warehousing in Poznań, which made an analysis<sup>10</sup> for the Ministry of Finances of the actual state formulated recommendation of facilitations using the eBT system for customs services of trucks leaving Poland (the supervisor of the expert team preparing

<sup>8</sup> M. Klimek, *System elektronicznej rezerwacji odprawy celnej autokarów i busów (eBooking BUS)*, “Logistyka” 2015, No. 1, pp. 48–51 (in Polish).

<sup>9</sup> Web page of “e-Customs Program”, <http://www.e-clo.gov.pl>.

<sup>10</sup> B. Śliwczyński, M. Stajniak, E. Jurkowska-Kubiak, I. Jeleń, T. Dębicki, M. Foltynski, B. Guszcza, *Analiza stanu aktualnego i opracowanie rekomendacji usprawnień z wykorzystaniem systemu eBooking TRUCK dla procesów obsługi samochodów ciężarowych wyjeżdżających z Polski*, Instytut Logistyki i Magazynowania, Poznań 2013 (in Polish).

the opinion was Professor Bogusław Śliwczyński). Among other things, a survey was carried out on 913 potential clients of the eBT system – forwarders, drivers, custom agents. Nearly 85% of responders were interested in using the system of electronic booking of customs clearance in order to reduce the time spent of the border crossing point. The results of the survey suggest that there is clear potential for success in implementing the eBT system.

As the analyses indicate the reason for building up queues on the Polish border side is above all the lack of possibility of controlling the traffic on the border crossing point and the fluctuating intensity and intermittency of car influx accumulation. A sensible and possible solution of the queuing problem for trucks leaving Poland is methodical affecting the quantity and the stability of the car influx, which could be achieved through introducing the system of electronic booking of customs clearance.

The implementation of eBT system of electronic booking of the date of crossing the border aims at facilitating the process of border checks for trucks leaving Poland. Expected benefits of using eBT are among others<sup>11</sup>:

- shortening the time spent on approaching the border crossing and customs clearance and a better planning by the drivers (forwarders),
- eliminating or significant reduction of truck queues pending at the border crossing points in the exiting direction from Poland,
- integrating all the services involved in serving the clients on the border crossing points (Border Guard, Customs Service, Veterinary Inspectorate, Sanitary Inspection, Phytosanitary Inspection), a better planning of their actions and organising the resources of the border services based on the booking data received beforehand (possibility of planning the number of crew members on a shift, planning their tasks and availability as well as taking an advantage of the infrastructure).

The eBT system collects information about planned by clients the dates of customs clearances, which is meant to enable a balanced distribution of traffic on border crossing points in Poland.

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<sup>11</sup> *Ibidem.*

From the clients perspective the effects of implementing the eBT, such as shortening the time devoted to customs clearance and a possibility of planning its date, are associated with financial benefits:<sup>12</sup>

- shortening the working time for drivers, lower costs of work for the employees,
- cutting costs since the assets are frozen for a shorter time,
- improving the promptness and reliability of deliveries to the recipients,
- limiting the cases of lowering the use-by date of transported goods and their quality,
- a better rotation of the means of transport and higher revenues on selling transport services for forwarders,
- more comfort for the truck drivers, possibilities of resting in the pending areas.

### **The process of booking in the eBooking TRUCK system**

The booking procedure in the eBT system from the client's perspective can be described in the following steps:

- registration of a user (this step does not refer to a one-time booking),
- booking a convenient date of customs clearance personally or by a representative, i.e. a customs agent,
- receiving a confirmation of the booking date on the given email address,
- arrival to the pending area on the boarding crossing point, e.g. an hour before the planned time of customs clearance,
- calling from the pending area and customs clearance in the time booked beforehand.

The process of booking the date of customs clearance starts with logging into the portal of the electronic customs services PUESC<sup>13</sup> (abbreviation in Polish Platforma Usług Elektronicznych Służby Celnej), which is a platform built as part of the “e-Customs Program”, on which there are being developed other services for clients, ultimately meant as the only point of accessing the e-services of the Customs Service) and finishes with confirming the start of the customs

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<sup>12</sup> *Ibidem.*

<sup>13</sup> Web page for PUESC service, <https://www.puesc.gov.pl>.

clearance on the main customs clearance station in the SOC-T system (abbreviation in Polish System Odpraw Celnych – Towarowy).

While registering to the new booking system on the PUESC portal, a client fills in a form with such details as: the border crossing point (the code and the name of the customs branch), the type (priority, multiple choice, current), the booking date (the date choice and the time range in the booking calendar), the number of customs requests, the registration number of the means of transport, the driver's telephone number, etc. Having completed the required information, if the booking on the requested date is possible, then the number of reservation is generated (e.g. for Grzechotki in GRZ/xxxxxx/xx/xx format), the booking status is displayed and sent to the email address of the client with a confirmation of booking.

The booking calendar (Figure 2) includes 24 one-hour time windows per day in the planning horizon (30 days by default).

OC Koroszczyń					
Time window	27.11.2015	28.11.2015	29.11.2015	30.11.2015	01.12.2015
00:00 – 01:00	available	available	available	available	available
01:00 – 02:00	unavailable	available	available	available	available
02:00 – 03:00	available	unavailable	available	available	available
03:00 – 04:00	available	available	unavailable	available	available
04:00 – 05:00	available	available	unavailable	available	available
05:00 – 06:00	unavailable	unavailable	available	unavailable	unavailable
06:00 – 07:00	unavailable	available	available	unavailable	unavailable

Figure 2. Booking calendar in eBT

Source: own elaboration using e-booking.gov.pl.

For the respective time windows there is marked their availability (red colour on the website [www.e-booking.gov.pl](http://www.e-booking.gov.pl) – reserved, “unavailable” window, green colour on the website [www.e-booking.gov.pl](http://www.e-booking.gov.pl) – “available” window), with the information of service capacity per one hour included (the indicator service capacity/hour) and determined for each border crossing point. In the planning of the booking the customs clearance date there can be distinguished various cases, depending on the type of booking:

- for priority booking (e.g. due to transportation of livestock, dangerous goods, humanitarian aid, highly perishable products etc.) – the client can choose “the red” time windows,
- for multiple choice – the client can tick only green data field (available) in the whole planning horizon of the booking calendar,
- for current booking – the client confirms the data field indicated by the eBT system as the first available date of booking taking into account the displayed information on the remaining time to the customs clearance.

### **Architecture and components of eBooking TRUCK system**

The electronic system of booking customs clearances for trucks done via the internet portal are available to all the clients. A further service of customs clearances is continued in SOC-T, locally for customs officers in the selected border crossing point (customs branch). In the customs departments there is used the integrated system of border service CAIFS II. The eBT system is a subsystem of CAIFS II. The eBT modules are integrated on the central level with the SKR subsystem (abbreviation in Polish System Kontroli Ruchu) and on the local level with the subsystem of truck customs clearances SOC-T. The subsystem SKR is a repository of the collected data and attributes with the central database. It shares the common mechanism of processing and data replication originated in the local subsystems (among others SOC-T). SKR includes report modules, administration, risk analysis etc. The subsystem SOC-T is responsible for serving the customs clearances in the cargo border crossings, local storage and processing data, managing the traffic on the check-in desks etc. SOC-T provides a risk analysis and report modules as well as the mechanism of truck customs clearance services on the entrance station, the main customs clearance station and the exit station.

Integrating the eBT system with CAIFS II system comes down to:

- development of SKR by “eBT Administration” module (possibility of eBT configuration, e.g. texts of regular messages appearing on the information panels) and the new parameters and permissions included in the database.
- adding to SOC-T an option the eBT booking service, new functionalities in SOC-T are, among others, a possibility of checking whether a given

vehicle is booked in eBT, presenting eBT booking data in the SOC-T format in each stage of the customs clearance, queuing the customs clearances and assigning automatically the first vehicle in a row for the main customs clearance based on the booking data,

- adding to SOC-T in the Reports module a new overview presenting eBT booking statistics,
- implementing and handling new equipment components, i.e. tv sets, LED panels, infokiosks, CB radios, all used for communicating with a client based on the data from the local SOC-T and eBT databases.

Along with launching the eBT booking system several interfaces for entering data and communication channels have been made available:

- portlet within the PUESC Portal,
- infokiosks,
- communication channels (type A and B information panels, SMS messages, CB radio announcements, e-mail notifications).

In the portlet [www.e-booking.gov.pl](http://www.e-booking.gov.pl) on the PUESC portal it is possible to book a new date of customs clearance for trucks along with edition and overview of the previous notifications. There are placed basic information about the eBT booking system (the aim, functioning and instructions for the user) and the current situation on the border crossing points (the range of customs service, calendar of booking, information about problems). The client (booking the dates of customs clearances) is provided with time windows schedule, which enables planning of a truck arrival to the border crossing point and its customs clearance without waiting in a queue. In order to use eBT it is advised, but not obligatory to sign up on the website [www.ebooking.gov.pl](http://www.ebooking.gov.pl).

The infokiosk (Figure 3) is an interactive information point (a computer with Windows 8 interacting with a user with a help of a standard keyboard, an indicating device and a touchable pad) placed in the clients pending area, with which the information about the eBT system can be checked upon, and after data authentication (by automated reading the number on the electronic transit card or completing it in hand-writing) the current date of booking can be viewed and modified, e.g. changing a phone number for SMS notifications, declaring the earlier readiness for customs clearance, etc. In the infokiosk it is also possible to check the current position in the queue and the estimated remaining time for the customs clearance.



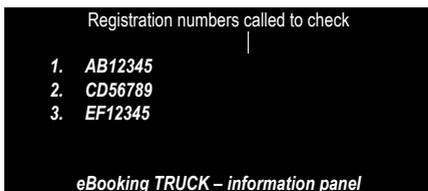
Figure 3. Infokiosk with touchpad interface

Source: own elaboration based on System eBooking TRUCK – Szkolenie dla administratorów lokalnych.

Information panels are LED panels or tv sets, on which the information data is displayed for eBT clients. There are two types of the panels (Figure 4):

- type A panels, which are located in the pending areas and customs clearances rooms, display registration numbers of the vehicles in the pending area in the order arranged based on the data in the eBT system,
- type B panels, located in the customs clearance rooms, displaying the registration numbers with the assigned numbers of the main customs service stations.

a)



b)

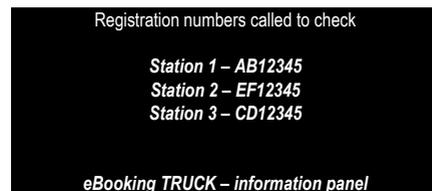


Figure 4. Information panels type A (Fig. 4a) and type B (Fig. 4b). In the figure informations presented in Polish

Source: own elaboration based on System eBooking TRUCK – Szkolenie dla administratorów lokalnych.

The panel information is updated in the moment of changing the order of calling the vehicles for customs clearance. On the type A and B panels in the heading section and footer there are areas, for which the content for particular panels is set up in SKR.

In addition to the presentation of data on the information panels communication with clients in the eBT system also involves:

- SMS messages sent to clients in the moment of adding a new booking or to inform about necessity to prepare for customs clearance;
- voice announcements sent via CB Radio (in Polish and in English) used to calling out the driver for the customs clearance room based on the content included in the templates defined in SKR;
- announcements sent through emails to clients at the moment of adding new booking or editing the already existing one (in PUESC portal).

### **Pilotage of eBooking TRUCK system**

Implementing the eBT service proceeds in stages. Initially there is conducted a pilot version of the system, which was launched on October the 5<sup>th</sup> 2015 on the border crossing point in Kukuryki – cargo terminal in Koroszczyn (the Customs Chamber in Biała Podlaska, Polish-Belarusian border) and in Grzechotki (the Customs Chamber in Olsztyn, Polish-Russian border). Along with the piloting programme there were carried out promotion and information actions (meeting with transport companies, much information in the media, newsletters, information videos, virtual guides on the border crossing points). Further implementation works depend on the effects of the pilot actions.

The Customs Service introduces eBT gradually with respect to high costs of implementing the system, which include:

- the costs of designing, implementation and introduction of the information system,
- the investments necessary for building the infrastructure and purchase of the equipment (building buffer parking places, purchase of infokiosks, purchase and installation of the electronic information panels in the pending area, on the access roads and the customs clearance rooms),
- the costs of running and maintenance the eBT system, the costs of promotional campaigns.

While launching eBT there have to be undertaken organisation works, analytical and legal and legislative connected with introducing necessary changes in the regulations. The changes in law and organisation regulations of the customs departments, which eBT requires are primarily:<sup>14</sup> establishing and executing an obligation of electronic registration of customs clearance (denial of serving trucks without a prior booking), adequate organisation of trucks entering the pending area and managing the vehicle queue in the pending area, and what is more, adequate organisation of trucks leaving the pending area and their arrival to the border crossing point, etc.

In the pilot there are assessed, among others, the influence of introducing eBT on functioning and organisation of the work at a border crossing point, the level of users satisfaction (clients, customs officers), the current level of integrating the information systems of the Customs Service with eBT and a possibility of using the infrastructure of the border crossing points, e.g. for a proper organisation of the pending area, which could have a strong impact on rationalisation of customs clearances with the usage of the eBT system. There will be also carried out research surveys on the clients and customs officers, in which they will express their opinion on the advantages and disadvantages of eBT, options of further improvements, etc.

The essential condition of implementing the eBT system on all the border crossing points is ensuring proper infrastructure (the border crossing points selected for the pilot all have proper infrastructure) along with taking into account the eBT booking data in the process of planning the customs clearance by all the border services taking part in it. Organising the pending areas on the buffer parking areas equipped with proper infrastructure requires cooperation of all the border services, can imply a necessity of bearing considerable investment costs connected with obtaining grounds, building parking areas.

## Conclusion

In the article there has been described the eBooking TRUCK service launched as a pilot version by the Customs Service in October 2015. The main

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<sup>14</sup> B. Śliwczyński, M. Stajniak, I. Jeleń, B. Guszczak, T. Kawecki, *Warunki i wymagania wdrożenia Projektu systemu elektronicznej rezerwacji obsługi granicznej samochodów ciężarowych wyjeżdżających z Polski eBooking TRUCK wraz z uzasadnieniem biznesowym Projektu*, Instytut Logistyki i Magazynowania, Poznań 2014 (in Polish).

aim of introducing the system of electronic booking of customs clearance service eBT was getting rid of or significant reduction of trucks queuing on the border crossings, waiting to leave Poland. The eBT system makes it possible for the client to book the date of customs clearance electronically on a chosen border crossing point and is meant to lead to greater stability of distribution of trucks entering the road border crossing points. Additionally, it introduces a continuous communication and coordination of contacts with a client in the process of booking, at the entrance to the pending area as well as the main customs clearance.

The system of eBT is an innovative solution, which can improve the capacity on the border crossing points, improves predictability of the process of customs clearance that leads to bringing clear benefits to transport companies, both organisational and financial.

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## SYSTEM REZERWACJI CZASU ODPRAWY GRANICZNEJ – EBOOKING TRUCK

### Streszczenie

W ostatnich latach Służba Celna wprowadza coraz więcej innowacyjnych usług elektronicznych (e-usług) dla klientów (przedsiębiorców, spedytorów). Jednym z proponowanych rozwiązań jest system eBooking TRUCK, który udostępnia klientom możliwość elektronicznej rezerwacji terminu obsługi granicznej dla pojazdów ciężarowych wyjeżdżających z Polski. W artykule przedstawione są podstawowe informacje dotyczącego tego usprawnienia, którego celem jest przede wszystkim skrócenie czasu odprawy ciężarówek (wylimitowanie lub zmniejszenie kolejek przed przejściami granicznymi) i poprawa organizacji pracy służb granicznych. Zaprezentowana jest koncepcja systemu eBooking TRUCK, przesłanki do jego wdrożenia, zakres przesyłanych danych przez przedsiębiorców, zakres obsługi zgłoszeń przez funkcjonariuszy, architektura systemu i stosowane w nim sposoby komunikowania się z klientami (SMS, e-mail, CB Radio, tablice informacyjne, infokioski). Na koniec przedstawiona jest charakterystyka działań wdrożeniowych na podstawie pilotażu prowadzonego od 5 października 2015 roku na przejściach granicznych w Koroszczynie (Izba Celna w Białej Podlaskiej, granica polsko-białoruska) i w Grzechotkach (Izba Celna w Olsztynie, granica polsko-rosyjska).

**Słowa kluczowe:** e-usługi, elektroniczna gospodarka, odprawa celna, e-cło

Andrzej Montwiłł\*

## CHANGE MANAGEMENT IN SUPPLY CHAINS IN THE CONTEXT OF CHANGES IN DEMAND

### Abstract

The article presents issues related to change management in supply chains as a response to changes in demand from end customers or consumers. The modern economy foundation for the development of enterprises includes an ability to respond appropriately to changes in demand. Because supply chains have become one of very important components in achieving a competitive advantage of enterprises, a response to changes in the market must be a component in managing a supply chain as well as changes taking place in it. Depending on the nature of changes in demand, change management in demand for final products can relate to supply processes, production, distribution as well as logistic processes - both at the level of one supply chain participant and numerous supply chain participants.

**Keywords:** Supply chain, management, change

### Introduction

The presentation of the P. Krugman's theory in 1991, which explained the phenomenon of economic globalization in a model form, is regarded as the beginning of a "new economic geography" (NEG). When at the turn of the 80s and 90s of the 20th century this and other theories related to economic phenomena emerged, they were a response of the scientific environment to the phenomenon of the world economy globalization in which spatial arrangement of the producer and consumer markets ceased to be a barrier to the global

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development of trade. With specialized production, an increase in the production volume, which resulted in the reduction of unit costs, as well as lower labor costs in the developing countries and new tools used for managing enterprises and processes, a new, global economic system was built. As a result, what was created was a global economy with a network of enterprises which, by means of outsourcing processes, concentrate their resources in the primary area of their operations and develop a number of organizational and legal connections with suppliers, logistics operators or transport companies.

The development of “supplier-consumer” network connections as well as competition among production enterprises on a global scale are only two components which formed a base for supply chains in which enterprises connect with each other in their shared operations aiming at optimizing processes which range from acquiring raw materials to supplying final goods to the end customer/consumer. The aim of creating long term connections among companies in a supply chain and establishing a logistic system is to achieve a competitive advantage in the market.

Efficient company operations and the entire supply chain require management both at an enterprise level and chain level. What is created is a certain duality of management in which a number of processes at a level of particular enterprises must depend on the entire supply chain management. Hence, what is pointed out in academic discussion is the issue of a new paradigm in management sciences which is related to answering a question of whether or not supply chain management has become a new sub-discipline within a discipline of management?<sup>1</sup>

Regardless of what is discussed in the scientific environment, it should be noted that logistic chain management covers a much larger area and bigger range of tools which are necessary for developing efficiency of processes which occur “across” internal processes of particular enterprises and chain participants, which aims at providing efficiency of a supply chain as a whole as well as of its particular participants.

One necessary area of enterprise and supply chain management is change management. Although a few years passed, since 2008 the global economy has been still struggling with the problem of crisis in which trade fluctuations result

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<sup>1</sup> A. Łapińska, *Potrzeba tworzenia nowych paradygmatów w naukach o zarządzaniu – implikacje dla zarządzania łańcuchami dostaw* (part 1 and part 2), “Logistyka” 2014, No. 1, 2.

in market demand fluctuations, both globally and locally. Therefore, in the regional markets it is difficult to determine long term trends in the area of sales, which means that there is a necessity for change management in a supply chain, which guarantees its efficiency expressed by way of maintaining a competitive advantage or at least maintaining the final goods position in the consumer/end customer market.

## Supply chain management

“A supply chain is a relatively new term and its definition is ambiguous. That is why some logisticians use the terms ‘logistic chains’ and ‘supply chains’ interchangeably. [...] In the concept of a logistic chain, enterprises, which are part of it, concentrated their efforts mainly on efficiency and effectiveness of the flow of goods. What prevails in the concept of a supply chain is a philosophy of close integration of a producer with suppliers and consumers in order to achieve market success. [...] What is assumed, when it comes to a supply chain, is that it is customers who initiate decisions which are made in a supply chain. Hence, a customer is the beginning of a supply chain, but decisions flow in the opposite direction to the supply of products.”<sup>2</sup>

In the analysis of the above statement, presented by E. Sołtysik, it should be recognized that a supply chain is a system providing an effective and efficient flow of goods, which is determined by the consumer’s/end customer’s needs, utilizing broad logistics, which in this case is a multi-functional tool for managing processes in a chain. The definition presented by C. Bozarth, R.H. Handfield is especially worth pointing out. According to this definition a supply chain is defined as a “[...] network of producers and providers of services, who cooperate with each other in order to process and transfer goods – from a raw material stage to an end user level. All these entities are connected by flows of material goods, information as well as money.”<sup>3</sup>

The concept of a network nature of supply chains is explained by M. Ciesielski who indicates the nature of connections among enterprises which are established in order to exchange resources, gain a scale benefit or launch a new product onto

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<sup>2</sup> E. Sołtysik, *Rozwój koncepcji logistyki*, in: *Logistyka*, D. Kisperska-Moroń, S. Krzyżaniak (eds.), Biblioteka Logistyczna, Poznań 2009.

<sup>3</sup> C. Bozarth, R.H. Handfield, *Wprowadzenie do zarządzania operacjami i łańcuchem dostaw*, Wydawnictwo Helion, Gliwice 2007.

the market. These connections make up a network with horizontal and vertical connections. But it is the vertical networks, where relations “supplier-consumer” are created, that define what supply chains are all about.<sup>4</sup> In actual fact, extending such a network layout with connections including raw material suppliers, a logistic operator, whose area of concern is supplies to the market, as well as network of 3rd, 2nd and 1st class suppliers with a final producer is the essence of creating network connections in order to achieve a competitive advantage in the final product market where operations and processes in a supply chain make it possible to provide a specific added value which is the essence of business activity. The amount of this added value determines the chain participants’ profit and how legitimate their shared actions are.

The C. Bozarth i R.H. Handfield’s definition, which is presented above, addresses the issues of a network nature of a supply chain with a number of connections among its participants and indicates the forms of flows of goods, information and money in a chain. Therefore, it should be regarded as an integrated series of operations which occur in two directions, where the following factors are of importance:

- targeting the end customer/consumer and the market they represent;
- minimization of production costs and costs of delivering the final product to the end customer/consumer, and as a result optimization of the operational costs of chain participants;
- integration of alternate economic processes of production and services;
- shared information systems;
- principle of benefits for each participant of a supply chain as a basis for establishing organizational and legal connections over a long period of time, which guarantees that a supply chain is stable.

The supply chain structure depends on numerous factors. One of them includes a type of a produced good in the context of its durability and how frequently it is purchased by the consumer. In general, in these supply chains, where durable goods are produced, the leading position is occupied by the producer (assembler) of the final product where on the supply side suppliers of the 1st and 2nd class are distinguished (3rd class suppliers are also present in numerous supply chains) and on the distribution side there are consumers of the 1st and 2nd class, where the latter can be end customers, but not consumers. However, leaders in the supply

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<sup>4</sup> *Instrumenty zarządzania łańcuchami dostaw*, M. Ciesielski (ed.), PWE, Warszawa 2009.

chains of frequently used products are generally retail networks where the chain is formed differently – with a network system in which on the supply side there are the 1st and 2nd class suppliers and the process of distribution is an internal process fulfilled by a retail network.<sup>5</sup>

As a scientific discipline management is part of economic sciences. Since the attempts were made to provide a scientific basis for management it has been regarded as an activity which covers:

- planning, organizing, staffing, directing and controlling – according to the Anglo-Saxon approach,
- planning, organizing, stimulating and controlling – an approach presented by management classic H. Fayol and approaches of other management schools, including the Polish school as well.

Currently, no model of management exists. Because this process is more and more individualized an old definition given by an unknown author is used: management is a form of art or practice which involves reasonable application of resources for achieving formulated objectives. This definition is simple and provides an opportunity to have an individual approach to each economic phenomenon which requires management.

Figure 1 illustrates a chart showing management tools and concepts which are used in a comprehensive supply chain management. What is worth noticing is a multitude of management tools and concepts which are applied for establishing and maintaining efficiency of a supply chain and developing a competitive advantage in the consumer/end customer market.

One of the first definitions of supply chain management was formulated by M. Christopher who regarded it as: ‘management of relations with consignees and suppliers as well as customers with the aim of delivering the highest value to the customer at lower costs for the entire chain.’<sup>6</sup> This definition emphasizes the issues in connection with developing relations among the participants of a supply chain and satisfaction of the customer who is a beneficiary of the goods which are made in the chain. This approach is in accordance with what M. Porter indicates in his studies – that it is the consumer/end customer who must

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<sup>5</sup> *Ibidem*.

<sup>6</sup> M. Christopher, *Logistics and supply chain management: Strategies for reducing costs and improving service*, “Financial Times” 1998, Prentice Hall, London; in: S. Kot, M. Starostka-Patyk, D. Krzywda, *Zarządzanie łańcuchami dostaw*, Częstochowa University of Technology, Częstochowa 2009.

be subject to the actions performed by the participants of a supply chain, because in the modern, global economy she represents the “power of the market” which “wields in its hand” the most important tool: demand.

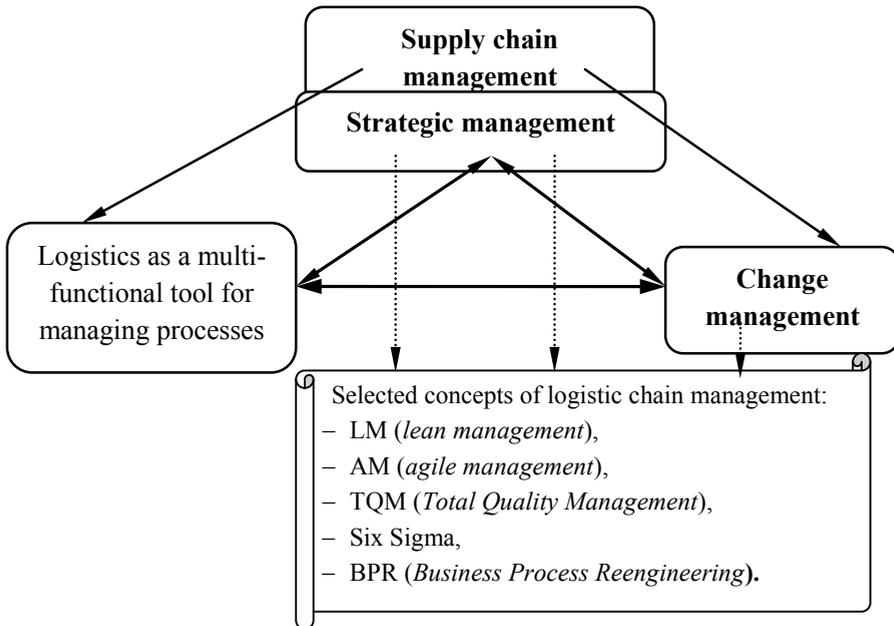


Figure 1. Supply chain management

Source: own work based on *Instrumenty zarządzania...*

Logistic chain management includes a number of tools and concepts of process or enterprise management. Because of the changeable and tumultuous nature of the environment a traditionally viewed enterprise management, which aims at efficiency of internal processes and optimal use of resources, must be extended with the issues of constant adaptation of operations to the changeable environment. Nowadays, strategic management, with an analysis of the environment and anticipation of changes taking place in it (in demand, for example) as one of the key components for building and maintaining a competitive advantage in the market, is an indispensable system for achieving the above objectives. It is even more important in supply chain management, because long-lasting interrelations established by the participants of a chain are one of the bases for long

term economic efficiency and increasing market share with regard to the product/final products which are made in it.

With the changeable environment a long term market success and financial success require such a strategic management which allows to quickly respond to changes taking place in it. Therefore, change management in a logistic chain must be a management subsystem whose aim is to introduce such transformations in the fulfillment of processes which will be an appropriate response of the organization (which a logistic chain is) to changes in the environment, particularly in the area of demand.

### **Change management in supply chains in relation to the nature of changes in demand**

Although this article does not investigate the determinants of changes in demand in the end customer/consumer market, it should be noted that changes in demand are of continuous nature. Their direction (increase/decrease), extent and durability depend on many factors which have their impact on demand. Since, as indicated before, it is the end customer/consumer who must be subject to the operations of supply chains, it is therefore clear that the ability to respond to changes in demand is one of the key components of chain management in which the nature of response is dependent on the nature of changes in the area of demand.

In order to indicate the key areas of changes in supply chains the model approach to changes in demand, with an analysis based on two variables, was applied in this article. One variable is change durability (short term and long term), another one is direction (increase in sales and decrease in sales). Figure 2 illustrates a diagram showing the areas of changes in a supply chain in relation to how the two demand variables alter. On the left side of the diagram are primary operations in the case of short term changes in demand, both in the event of an increase and decrease in sales. On the right side are the areas of changes in a supply chain in the case of long term changes and various directions of changes in demand.

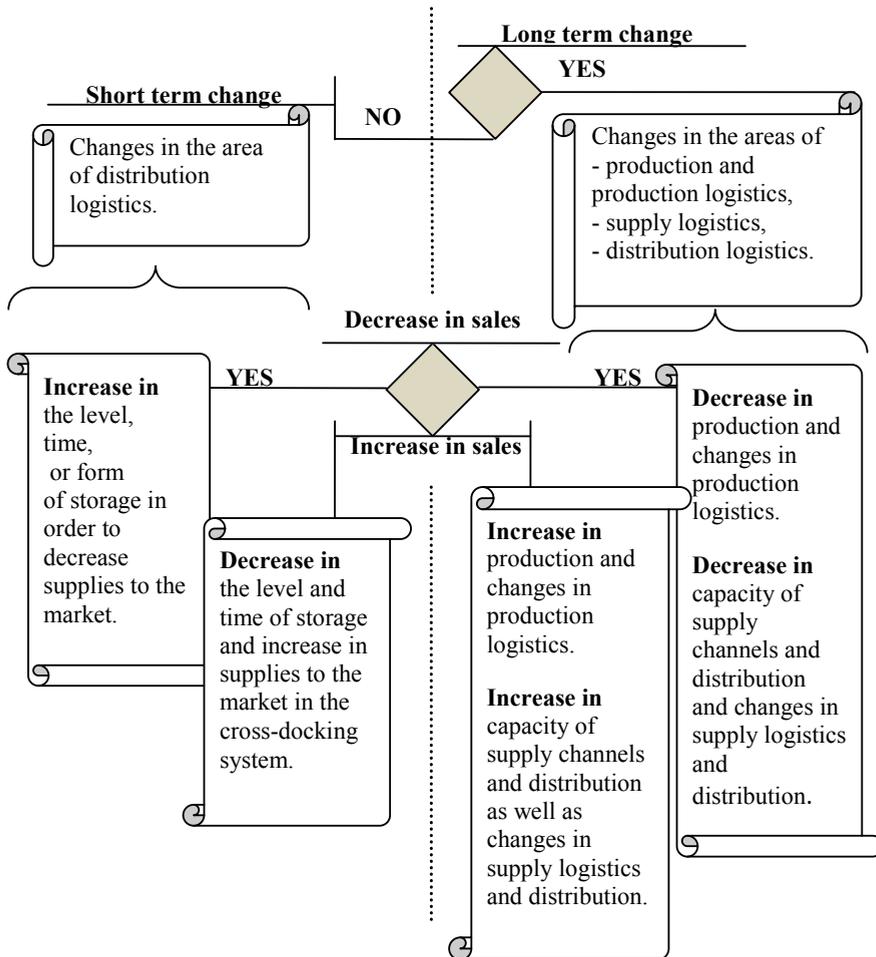


Figure 2. Scenarios of responses in supply chain to market changes in demand

Source: own work.

Short term changes in demand, both in the case of its increase and decrease, force changes in the area of final product distribution. The main actions aim at providing continuity of supplies to the market (short term increase in sales) at an unchanged level of production. However, in the case of short term decrease in demand the actions are narrowed down to increasing the level of storage at an unchanged level of production as well. Therefore, changes and their management relate to only one area of supply chain operations. This area is distribution

logistics in which processes aim at providing continuity of supplies to the final product market, independently of the direction of short term changes in demand. And it is in the situation in which application of a number of tools and concepts of management with the aim of building a competitive position of a particular supply chain (and consequently its participants) have resulted in a “lean” level of final products in stock reserve (LM – *lean management*: a commonly used concept of enterprise and supply chain management).<sup>7</sup>

What is regarded in distribution logistics as “lean” stock reserve is its possible low level maintained in accordance with the rule of JiT (*Just in Time*). JiT is a memorial methodology, i.e. it is based on the analysis of demand from the past and on building stock on this basis. In the case of a rapid, temporary increase in demand, which has not been reported before, continuity of final product supplies to the market can be broken, which should not take place in the philosophy of a supply chain which targets the requirements of the customer. That is why what is nowadays used in supply chain management is a combination of numerous management tools and concepts in order to fulfill the customer’s requirements on the one hand (also in the sense of providing continuity of supplies to the market) and, on the other hand, to continuously seek to build a competitive position in the market.

The ECR (*Efficient Consumer Response*) strategy, for example, aims at ‘lean’ stock of final products on the one hand, and on the other hand it provides continuity of supplies to the frequently used products market. A distribution strategy, which was introduced by American companies in the 90’s of the 20th century, which integrates producers, distributors and tradesmen in a supply chain with the aim of building a cost-effective system which responds to the changes in demand creates an added value for the participants of the chain at the same time. This system is driven by real demand. As a result the cost of entire stock reserve level is reduced and at the same time continuity of supplies to the end customer/consumer is provided.<sup>8</sup>

By means of combining the concepts of LM and AM (*agile management*) in the ECR strategy it is possible to maintain the possible low stock of ready goods,

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<sup>7</sup> E.D. Arnheiter, J. Maleyeff, *The integration of lean management and Six Sigma*, “The TQM Magazine” 2005, No. 17 (1), pp. 5–18, Emerald Group Publishing Limited, <http://www.emeraldinsight.com/toc/tqmm/17/1> (access 28.07.2015).

<sup>8</sup> A. Baraniecka, *ECR – Efficient Consumer Response. Łańcuch dostaw zorientowany na klienta*, Instytut Logistyki i Magazynowania, Poznań 2004.

which leads to a reduction in the supply costs. The AM concept translates to a possibility of a quick response by producers, distributors and salesmen to changes in demand. It is especially important in a situation when demand rises sharply and reserve stock is below a temporary demand (idea of LM). If this is the case, the supply process participants' response consists in targeting the market (salesmen area) with two simultaneous streams of products. One stream flows from distributors' warehouses, the other one does directly from producers. Thanks to that the level of stock reserve does not have to include extrema in a temporary demand, which results in the reduced costs of storage of final products over a long period of time, and therefore in benefits obtained by the supply chain participants on the one hand, and on the other hand by the consumers who have continuous access to the products at prices which are lower than before the ECR system was reduced.

What is presented above is change management in the area of distribution logistics in the case of short term changes in demand, which is a normal phenomenon occurring independently of long term changes in demand. Consequently, it is related to demand cycles with stages of decline, which are expressed by economic crises, and growth stages which are often termed economic booms (changes in GDP – macroeconomic approach). An example of economic crisis, which ended the stage of growth in a demand cycle was the year of 2008 when the property market in the USA slumped and as a result problems of the financial sector in the United States of America led to a world crisis which was, among others, manifest in a considerable decrease in demand in numerous markets and sectors of final products. One market of this kind, which experienced a sales slump with a several dozen percent decrease in demand from 2008 to 2009, was the American personal cars market which forced numerous producers, in particular American ones, to make changes in the areas of production (at a level of 3rd, 2nd and 1st class suppliers and final producers), supply and distribution.

On the right-hand side of the chart in Figure 2 are scenarios of actions in supply chains when changes in demand are over a long period of time. Regardless of its direction, processing of the processes in a supply chain is related to practically each area: production and production logistics, and consequently to the operations of the entire chain (with its network nature) and each of its participants. This situation means that there is a necessity for applying a number of tools and concepts of management within the process of holistic chain management bearing in mind the fact that changes cannot have negative

influence on the value in the form of a final product received by the consumer/end customer.<sup>9</sup> It is the value which indicates how the chain works and how the consumer's requirements are met, also defined as the customer's economic system. Therefore, chain management cannot be only expressed by means of a logistic approach of making processes efficient, but it must take into account the quality of a product and processes leading to its development, and delivery to the market as well.

A long term decrease in demand is a necessity for lowering the level of production at the suppliers' and end producer's, reduction in the storage and transport potential, both at particular stages of supply and processes distributing end products. They are changes in distribution channels as well. On the one hand, all changes aim at reducing the costs of operations in order to correlate them with a decline of sales income with maintaining efficiency of a supply chain, and on the other hand, maintaining the current value obtained by the customer. In the case of a long term increase in demand the area of changes is similar to what is presented above, but it aims at meeting an increase in sales, and therefore rising a potential level of a supply chain by means of increasing production capacities and the corresponding potential in the areas of supply and distribution.

In the case of long term changes in demand change management in supply chains requires a mixture of tools and management concepts. The primary tools include marketing mix, logistics and SCM (*Supply Chain Management*). The most appropriate concepts include: LM, AM, Six Sigma and BPR (*Business Process Reengineering – reengineering*). Figure 3 illustrates a chart representation of the above mentioned tools and concepts, which, due to their qualities and anticipated effect of implementation, should be used in change management of supply chains. What is important is that while adjusting a supply chain to changes in demand each concept and tool should be used appropriately with determining the tasks of change management as well as combine particular tools and concepts into one process or decision process.

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<sup>9</sup> A.J. Slywotzky, D.J. Morrison, B. Andelman, *Strefa zysku*, PWN, Warsaw 2000.

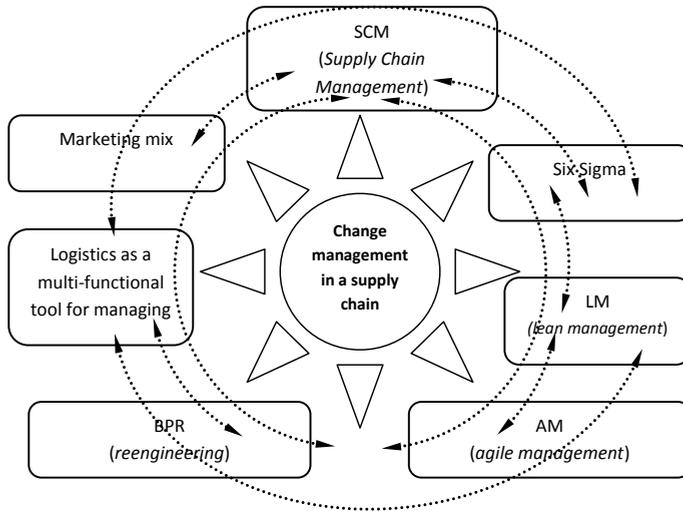


Figure 3. Mix of primary tools and concepts in change of supply chains

Source: own work.

The task of marketing mix in change management of supply chains is to analyze changes in demand, their duration and directions. The conclusions drawn from this analysis provide a basis for making decisions related to changes in the area of production, supply and distribution and connections among the participants of a supply chain and, therefore, how the processes in connection with manufacturing the final product and information support unfold.

As a multifaceted management tool, logistics aims at optimizing production processes, supply and distribution in a supply chain at each stage of the product or information flow.

Another tool, which is commonly applied in supply chains, is the SCM system regarded as a high class information system which supports supply chain management. As a data processing and communication tool in a supply chain it supports optimization of supply processes, production and distribution, which corresponds with increasing economic efficiency of a chain by optimizing prices of materials, components and other material factors of production or storage minimization. In SCM, which is often connected with internal ERP systems (*Enterprise Resource Planning*) of the participants of a chain, it, on the one hand, enables to collect data and its processing, which supports decisions made by managers of a higher level.

With the development of supply chains the LM concept, which was originally used for making the structures and production processes costs 'lean', was applied in their management, which benefited the areas of storage economy (supply and distribution), production, productivity, reduction in the personal costs and quality improvement of products at each stage of their processing<sup>10</sup>. The AM concept, which provides similar benefits as LM, aims at elasticity in adjusting internal processes to changes in the external environment of a supply chain, while taking into account, among other things, the maximum reduction in the time of response to the above processes. Both of the concepts, which are often used as a mix of tools provided to the managers, allow to correlate the costs of functioning of a chain and responses to changes in demand.

Six Sigma, like LM and AM, is a concept of management which was originally implemented in production processes with the aim of seeking to achieve their perfect quality, and consequently of what is produced – all of that with the aim of meeting the customer's requirement. It is a method based on the broad database possible, which allows to define a problem, measure it and analyze in order to perfect it. The last tool of the Six Sigma concept is control on changes in a process.<sup>11</sup> By extending application of the concept with regard to a supply chain it is possible to achieve a similar result – not only in the area of production, but also in the area of supply and distribution with maintaining the value which is expected by the end customer/consumer. In reference books it is pointed out that efficiency of Six Sigma application requires a very large dataset, which can result in slowing down processes of changes as well as decision processes. It seems, however, that if the data is processed in the SCM system connected with ERP systems used by the participants of a chain, this problem will not occur. In turn, what can also be a task of SCM is decision scenarios which are a ready background for decisions made by higher level managers of a leader in a supply chain.

The last concept, suggested by the author, suitable for managing changes in a supply chain in the circumstances of long term changes in demand is BPR. And in this case the concept was originally used to redesign processes in enterprises when changes in the external environment required decisions made by an enterprise with regard to significant changes in its operations – not only

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<sup>10</sup> *Instrumenty zarządzania łańcuchami dostaw*, M. Ciesielski (ed.), PWE, Warszawa 2009.

<sup>11</sup> [http://mfiles.pl/pl/index.php/Six\\_sigma](http://mfiles.pl/pl/index.php/Six_sigma) (access 29.07.2015).

in the context of changes in processes, but also in the philosophy of its functioning. Hence, reengineering is defined as a concept of redesigning all areas of enterprise operations. Similarly, according to E. Stawiarska, BPR should be used in supply chains, which allows it to be redesigned with the aim of coordinating and simplifying processes which take place in all of its chains.<sup>12</sup> What is key in this case is agreement on who in a supply chain should be a leader of changes. However, it seems obvious that it should be a chain leader who should be responsible for change management. In the age of outsourcing, it does not matter who actually develops redesigning.

## Conclusion

As a result of the modern globalized economy competition has become a world scale phenomenon and changes in a particular region often have their impact on changes in general. Since the global economy is demonstrated in supply chains, they also have to be adjusted to changes which take place locally, regionally, and globally as well. This means that they have to be prepared for these changes and their various nature. Supply chain management, regardless of whether or not it is actually different in nature to a single enterprise management,<sup>13</sup> requires application of numerous tools and concepts which, on the one hand, allow to build a competitive advantage and, on the other hand, provide the end customer/consumer with a value in the form of the highest quality product which provides economic and operational benefits expected by her.

The tumultuous environment, in which modern enterprises operate, requires that they implement strategic management in which the key components include: an analysis of the environment and developing scenarios of changes in the external environment with the aim of adjusting an enterprise to them and management of changes so that reengineering of operations performed by an enterprise corresponds with the requirements of the market and customers who represent it. It is no different in the case of supply chains which, within the framework of strategic management, must include changes in the environment and actions which are related to it.

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<sup>12</sup> E. Stawiarska, *Reengineering w zarządzaniu łańcuchem dostaw*, "Gospodarka Materiałowa i Logistyka" 1999, No. 11, pp. 233–237.

<sup>13</sup> A. Łapińska, *Potrzeba tworzenia...*

The focus of this article is indication of what management tools and concepts, which originally were used in the case of enterprises, are necessary for managing changes in a supply chain in the event of short term and long term changes in demand. In particular, in the case of the latter, marketing mix, logistics, SCM, LM, AM, Six Sigma and BPR are used in specific configurations and areas of changes in supply chains should guarantee such a reengineering of operations and processes in a supply chain that, on the one hand, a competitive advantage in the final product market is maintained, and on the other hand, the end customer/consumer is provided with a value she expects.

## Summary

The article presents issues related to change management in supply chains as a response to changes in demand from end customers or consumers. The modern economy foundation for the development of enterprises includes an ability to respond appropriately to changes in demand. Because supply chains have become one of very important components in achieving a competitive advantage of enterprises, a response to changes in the market must be a component in managing a supply chain as well as changes taking place in it. Depending on the nature of changes in demand, change management in demand for final products can relate to supply processes, production, distribution as well as logistic processes – both at the level of one supply chain participant and numerous supply chain participants. The article aims at presenting the most important tools and concepts of change management in the above mentioned areas over long term and short term changes in demand.

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## ZARZĄDZANIE ZMIANAMI W ŁAŃCUCHACH DOSTAW W KONTEKŚCIE ZMIAN W OBSZARZE POPYTU

### Streszczenie

W publikacji zaprezentowano zagadnienia związane z zarządzaniem zmianami w łańcuchach dostaw jako reakcja na zmiany w obszarze popytu po stronie klientów finalnych lub konsumentów. We współczesnej gospodarce podstawą rozwoju przedsiębiorstw jest między innymi umiejętność właściwej reakcji na zmiany po stronie popytu a skoro łańcuchy dostaw stały się jednym z bardzo ważnych elementów budowania przewagi konkurencyjnej przedsiębiorstw to reakcja na zmiany na rynku musi być elementem zarządzania łańcuchem dostaw i zmianami w nim. Zarządzanie zmianami, w zależności od natury zmian po stronie popytu na produkty finalne, może dotyczyć procesów zaopatrzenia, produkcji, dystrybucji jak również procesów logistycznych zarówno na poziomie jednego z uczestników łańcucha jak również wielu z nich. Celem opracowania jest zaprezentowanie najważniejszych zagadnień z zarządzania zmianami w powyższych obszarach.

**Słowa kluczowe:** łańcuch dostaw, zarządzanie, zmiany

Krystian Pietrzak\*

## EVALUATION OF SELECTED COMPETITIVENESS FACTORS OF THE FREIGHT RAIL MARKET IN POLAND<sup>1</sup>

### Abstract

The article presents the results of selected research carried out among freight train operators operating in Poland. The main aim of the article was to identify, evaluate and prioritize the factors which, according to actors participating in research, currently affect the role and place of rail transport on the freight transport market. Moreover, the research covered indication of the factors which, under certain conditions, can positively affect the development of rail freight in the future.

The research results clearly indicated that today the role of rail transport in the market significantly depends on external factors, which are beyond (or of limited) control of market representatives.

**Keywords:** transport, rail transport, freight transport, competition in transport, transport liberalization

### Introduction

The transition from a centrally planned economy towards a free market has brought changes also in the field of transport business activity. It has become noticeable in the transport market that the state interference was significantly limited in favor of market factors; State has limited its market share primarily to taking care for ensuring the safety and development of infrastructure. Rules

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of running business activity by rail operators evolved as a result of economic changes – e.g. reduction of existing subsidies and artificial movements of cargo flows in favor of the free market and the competitive fight for providing services (both intrasectoral as well as intersectoral).

In recent years the market of transport services in Europe, including Poland, has undergone dynamic changes. The increasing importance in selecting modes of transport plays – next to the price and sometimes the service – quality, flexibility and customization. It becomes extremely important for the freight owner that the transport service is made at the full range, ensuring timely delivery in the door-to-door system. According to practitioners representing the transport market, these are new customer demands, and not only change to the structure of goods on the market, that contribute to the marginalization of railway in freight transport.

Deteriorating infrastructure, low commercial speed, or large railway market volatility, caused a decrease in trust in the railways of customers or forwarders representing them, or preferring car transport.<sup>2</sup> Limited and unsuited to the requirements of the customer offer of rail carriers also caused further loss of transport market share.<sup>3</sup>

It is interesting to point out the role of rail transport liberalization. Processes in the functioning of tight national rail markets assumed the overall evolution of the existing rules of functioning. It should be noted that the introduction of intrasectoral competition constituted only an intermediate goal in the EU policy – assuming that rail transport market acting on the basis of free competition will be able to start the market fight against other sectors<sup>4</sup>, including road transport.

## **Research on competitiveness of freight rail market in Poland**

The role and place of individual modes of transport in the competitive market of transport services is determined by a number of factors, among which

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<sup>2</sup> G. Rosa, *Usługi transportowe. Rynek – konkurencja – marketing*, Wydawnictwo Naukowe Uniwersytetu Szczecińskiego, Szczecin 2006, pp. 120–121.

<sup>3</sup> J. Engelhardt, *Transport kolejowy*, w: *Uwarunkowania rozwoju systemu transportowego Polski*, Wydawnictwo Instytutu Technologii Eksploatacji, Warszawa–Radom 2007, pp. 157–158.

<sup>4</sup> K. Pietrzak, *Funkcjonowanie rynku kolejowego transportu towarowego w Polsce w aspekcie jego liberalizacji*, Zeszyty Naukowe Uniwersytetu Szczecińskiego, Problemy Transportu i Logistyki, No. 18, Szczecin 2012, p. 229.

stands out both internal, as well as external conditions. In this article the author focused on trying to identify some factors that affect, or may affect in the future, the place of railway in general freight transport market.

In order to identify, prioritize and evaluate the determinants of competitiveness of rail freight services in Poland the research involved carrying out the survey among rail operators implementing cargo transportation in the country. Due to the nature of the rail market and rules for the collection and development of statistical material by the Office of Rail Transport, the research was divided into two stages.

In the first stage (November 2013), a preliminary determination of the target population was made on the basis of a document published by the Office of Rail Transport “Wykaz licencjonowanych przewoźników kolejowych” [The list of licensed railway operators] (acc. to data of 2013). That document contained a list of all entities possessing the legally required license, where it could affect rail transport of people, rail transport of goods as well as the provision of traction services.

Among the 103 entities on the list, 82 entities with an active license for the carriage of goods (regardless of whether they had the licenses of the other groups) were selected. Questionnaire were sent to this group by post or delivered personally. At this point, it must be noted that the phrase “active” does not guarantee that the entity actually realized transport operations in a given year. Information on the number of operators actually providing transport services in the year are available in the following year, after the Office of Rail Transport verifies their number based on the mandatory reports submitted by railway operators.

In the first stage of research, completed questionnaires were received from 35 entities (all the questionnaires have been completed properly). After information of the Office of Rail Transport in 2014 on detailed data on the number of entities, which actually implemented the freight transport on the basis of a valid license for the carriage of goods in 2013, there was a need to revise the research population, as well as all questionnaires received from railway operators.

After an appropriate adjustment made in 2014 by the Office of Rail Transport, the number of entities, which were actually providing transport services in 2013 was determined as 61. This was the final number of the population for the research carried out among railway operators. In this case, in addition to changing the number of operators providing freight services, there was also a need to verify the received questionnaires. Out of the 35 properly completed questionnaires, 6 were rejected as not meeting the assumptions of the actual implementation of transport

(not just having active licenses in that period). Thus, the final number of properly completed questionnaires was 29 (out of 61 authorized entities). In percentage, the research sample represented approximately 48% of the population. Taking into account the actual participation in rail transport services market in 2013, the entities participating in the research constitute as follows:

- approx. 83% of the market – according to transported cargo weight,
- approx. 82% of the market – taking into account transport performance.

### Selected competitiveness factors of the freight rail transport

One of the basic elements of this research was to evaluate the extent to which the various modes of transport are a threat to rail freight. Each competitive mode of transport could be rated by respondents by weight in the range from 0 – for no threat to 3 – for a strong threat. Rating concerned the relationship on a national as well as international level.

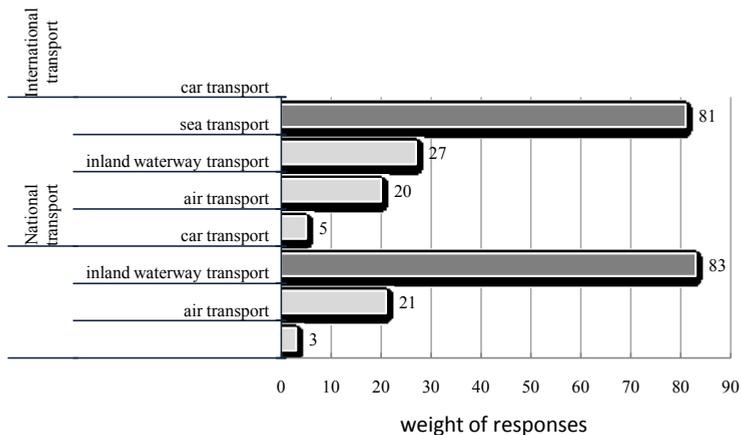


Figure 1. Rating of competitiveness of other modes of transport in relation to rail transport

Source: own study.

The responds clearly indicate that the main competitor to rail transport, both in the case of international as well as national transport, is car transport. On the other hand, according to the respondents the mode of transport, which is not a direct competition for rail freight transport, is air transport. It is mainly due to

the high cost of travel generated by air transport with significantly reduced weight and space capacity, affecting the high unit cost of transportation. These results are consistent with general trends in the market of transport services and are reflected in the statistics for the analysis of the share of individual sectors in the market.

In the next question respondents were asked to indicate factors and the weight of their impact on taking advantage over rail freight transport by other modes of transport. By choosing individual determinants the respondents could rate these factors in a range from 0 – if the factor had no effect on increasing the competitive position of other sectors, to 3 – for the key impact of this factor on the indicated phenomenon. Figure 2 presented the results obtained.

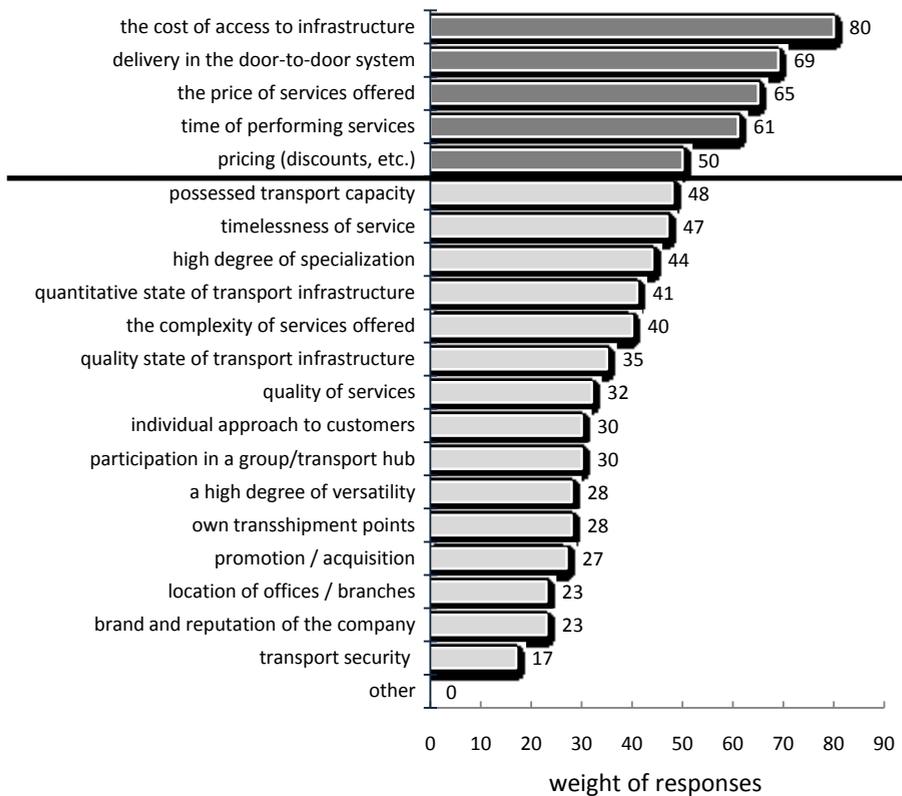


Figure 2. Factors (for the other sectors) affecting the higher competitive position of other modes of transport in relation to rail transport

Source: own study.

Another question was related to an attempt to identify and rate the factors that negatively affect the role of rail transport and its share in the total transport market. Operators could choose from a group of factors indicated by the author. There was also additional space for any other idea proposed by the carriers. In rating respondents used the corresponding weight value from 0 to 3. In this case, 0 meant no impact and 3 meant the key impact of a factor. To complete the research, the author also asked to indicate the factors which may in the future (after making appropriate changes) have a positive impact on the growth of competitiveness of rail transport in relation to other sector. The rules for selecting and rating these factors were the same as in the previous question. The results of the preferences of the respondents (selected factors with the biggest weight) are illustrated in Figure 3.

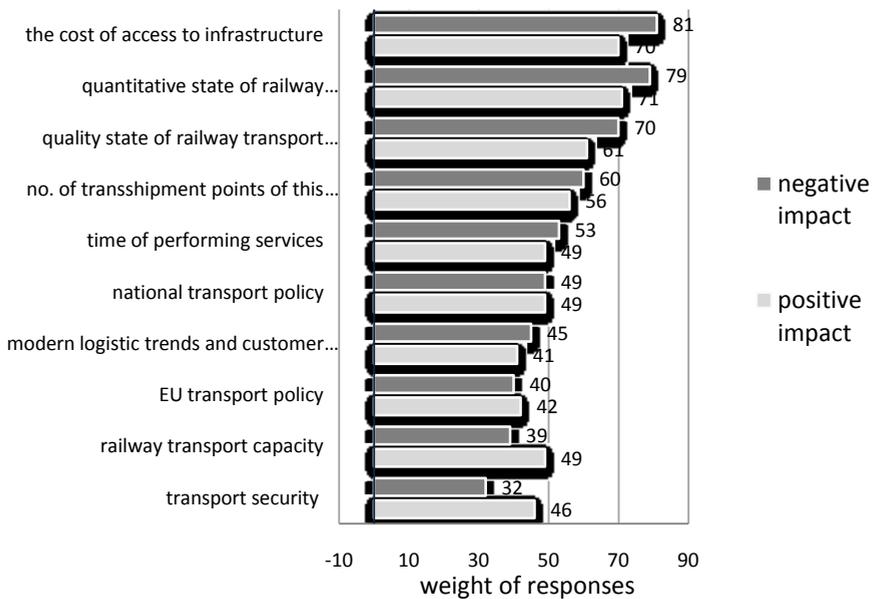


Figure 3. Selected factors affecting negatively (which may have a positive impact in the future) the level of competitiveness of rail transport compared to other modes of transport

Source: own study.

According to respondents, increasing the competitiveness of rail transport in relation to other modes of transport and consequently – increase its share in the transport market for freight transport services – requires taking a number of actions. Actions indicated by respondents are closely related to the results of previous questions. Their hierarchy is indicated in Table 1.

Table 1

Hierarchy of actions constituting a condition of increasing the level of competitiveness of rail transport in relation to other modes of transport

No. in the hierarchy	Criterion required to increase the competitiveness of rail transport in the intersectoral transport market
1.	modernization of railway lines of national importance
2.	reduction of rates of access to railway infrastructure
3.	modernization of other railway lines
4.	change in national transport policy
5.	construction of transshipment points, including the points necessary for the development of intermodal transport
6.	aiming to increase the interoperability of Polish rail transport
7.	introduction of fees for each of the modes of transport also taking into account external costs
8.	construction of new sections of railway lines
9.	change of priorities in determining the rail timetable for the benefit of rail freight transport (for lines designed primarily to handle freight transport)
10.	recognition by the Office of Rail Transport of licenses granted to modes of transport in other EU countries
11.	change in the method of financing the railway infrastructure manager PKP PLK SA (e.g. financing as in the case of the General Directorate for National Roads and Motorways – GDDKiA)

Source: own study.

In addition to answering questions prepared by the author, respondents also had the opportunity to provide their own additional comments and observations on rail freight market. Respondents drew attention to the broad spectrum of issues related to railway infrastructure in Poland. They highlighted that after many years of neglect, the ongoing process of modernization of infrastructure is a factor that will fundamentally determine the future of the railway market. A significant improvement in the technical condition of the network will increase the speed limit, the liquidation of restriction points, which extend the route and increase demand for fuel, as well as improve network capacity. Therefore, these elements

are necessary to increase the competitiveness of railway transport in relation to other branches through e.g.: reduced travel time, minimized delays, and even a reduction in freight rates. Improving network capacity can also contribute to improving the conditions of the offer addressed to the customers, reflected e.g. in a more flexible customization of the train departure times from the point of origin, or increase in the number of trains.

According to the operators participating in the research, an extremely important, and often overlooked problem, is for the infrastructure manager to take care of the development of the rules for modernization, which shall not disturb the travel of trains or disturb it to the minimum extent. Carriers drew attention to the fact that any closing of lines has an adverse effect on their business, which is related to the implementation of the agreements concluded with customers. These agreements provide legal obligations for the parties to provide services in a given time and at a given cost of delivery. Modernization of the network, and therefore often need to choose another, often longer routes, destabilize the time conditions, as well as previously developed costs of service.

Respondents also stressed that the characteristics of rail transport, which today could be used in the conduct of transport in line with the objectives of sustainable development, face many barriers that inhibit or impede effective competition of rail transport in the transport market. Therefore, it becomes important to make efforts to harmonize conditions for the functioning of individual entities and modes of transport; harmonization is in fact an essential element of free competition<sup>5</sup> in the market. In this respect attention was paid to the necessity of building a multi-criteria system of charging for the use of infrastructure by the various sectors, in which the calculation should take into account primarily external costs generated by these sectors.

Moreover, in addition to the existing lack of harmonization of conditions between modes of transport, there are also problems of a lack of interoperability between the railway markets in individual EU Member States, which significantly reduces the possibility of providing international rail freight transport services.

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<sup>5</sup> E. Załoga, *Kształtowanie jednolitego rynku usług transportowych w Unii Europejskiej*, Zeszyty Naukowe US No. 393, Problemy Transportu i Logistyki, No. 2, Szczecin 2006, pp. 10–11.

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## Conclusion

The modern market of transport services was mostly shaped by changing needs and preferences of customers. Due to the growing requirements for time, quality, timeliness, accessibility, immediacy and complexity of services provided by the operators in the transport market, the offer of carriers has been gradually changed. As a result, there has been a transformation of the transport market in the form of partial marginalization of services and sectors that were not able to meet the new needs. Due to its specificity and natural barriers (e.g. the limited availability of infrastructure) rail transport lost some market share in favor of more flexible sector – car transport.

Despite the increase in public awareness of issues of environmental threats and the negative impact of transport on the environment, the features of rail transport, such as:<sup>6</sup> a significant capacity, performance, safety and relatively low impact on the environment, have not so far led to changes in the share of individual sectors of the transport market.

When evaluating current and future role of rail transport on the market of transport services, the respondents indicated and rated e.g.:

- factors determining higher competitiveness of other modes of transport,
- factors limiting the competitiveness of rail transport, and thus its role in shaping the market,
- range of activities to be undertaken as a prerequisite for a broader than currently, use of rail transport in the transport market.

The aggregated research results made it possible to verify the generally accepted in the literature opinion on the fundamental determinants affecting the rail transport services market. In addition to the most commonly indicated in the literature factors, such as price and time, respondents also drew attention to the importance of quality and timeliness of services, quantitative and qualitative state of transport infrastructure and the degree of accessibility to it. Attention was also drawn to the importance of government policy in creating sustainable transport, in particular for a method of calculating the cost of access to transport infrastructure in the various sectors depending e.g. on the degree of negative impact of each of the sectors on the environment.

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<sup>6</sup> A. Mężyk, *Uwarunkowania i efekty reform kolei*, Wydawnictwo Politechniki Radomskiej, Radom 2011, p. 12.

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## OCENA WYBRANYCH CZYNNIKÓW KONKURENCYJNOŚCI TOWAROWEGO RYNKU KOLEJOWEGO W POLSCE

### Streszczenie

W artykule dokonano prezentacji wybranych rezultatów badań zrealizowanych wśród towarowych operatorów kolejowych wykonujących przewozy na obszarze Polski. Głównym celem artykułu była identyfikacja, ocena i hierarchizacja czynników, które zdaniem podmiotów uczestniczących w badaniach wpływają obecnie na rolę i miejsce transportu kolejowego na towarowym rynku usług transportowych. Ponadto, w ramach badań dokonano również wskazania czynników, które, przy spełnieniu określonych warunków, mogą w sposób pozytywny wpłynąć na rozwój towarowego transportu kolejowego w przyszłości.

Uzyskane wyniki badań wskazały jednoznacznie, iż współczesne miejsce kolei na rynku w znaczny sposób uzależnione jest od czynników zewnętrznych, na które przedstawiciele rynku nie mają wpływu, bądź też wpływ ten jest ograniczony.

**Słowa kluczowe:** transport, transport kolejowy, transport towarowy, konkurencja w transporcie, liberalizacja transportu

Oliwia Pietrzak\*

**THE ROLE OF LOCAL SELF-GOVERNMENT  
IN SHAPING THE PASSENGER TRANSPORT SYSTEM  
IN THE REGIONS ON THE EXAMPLE OF WEST POMERANIA PROVINCE<sup>1</sup>**

**Abstract**

The article presents selected results of research carried out among the local self-government units in the West Pomerania Province. The aim of the article was to identify the main tasks of local self-government in shaping the passenger transport system in the region and an analysis of the status and scope of its realization in the studied region. The research method applied involved critical analysis of literature, documentary method and the method of the survey using a questionnaire. The results indicated an unsatisfactory level of involvement of local self-government units in West Pomerania province in the process of developing the passenger transport system in the region in reference to the needs of its users. Actions taken by local self-governments in this area come down only to the minimum provided in the Act on public transport (and often taken with a significant delay).

**Keywords:** transport systems, passenger transport, regional transport, local self-government, West Pomerania Province

**Introduction**

Transport policy conducted at European, national and regional level, which is focused on the implementation of the concept of sustainable development,

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cohesion and supporting the mobility of society, determines the need to develop ways of shaping transport systems conducive to its implementation. For this purpose it is necessary to make rational solutions affecting the rational division of transport tasks between public transport and individual transport. These activities are reflected in the process of meeting and shaping communication needs and behavior of users of passenger transport systems in the regions. The implementation of such measures requires the cooperation of all actors operating within the transport system, in particular local self-governments as organizers of public transport, passenger transport system users, as well as experts of transport market. Such cooperation should result in coordination of plans and decisions taken in this regard by those actors.

### **The tasks of local self-government in shaping the passenger transport system in the regions under applicable legislation**

Region (province), as an economic and spatial system, maps one isolated segment of the economy. It is an object permanently and continuously inhabited, developed and controlled by a specific community and authority appointed for that area. On its territory operates a number of units, which are important components of the region as a system, creating a real area of this system – enterprises, households, and regulatory area – government agencies, local self-governments and institutions.<sup>2</sup>

Local self-government as a basic form of decentralization of public administration, and more specifically – decentralization of the administration,<sup>3</sup> participates in the exercise of public authority, and it is entitled to a substantial part of public tasks performed on its own behalf and on its own responsibility. The detailed scope of activities and responsibilities of local self-governments at various levels of public administration are defined respectively in the following acts:

- Act of 8 March 1990 on Gmina local self-government,<sup>4</sup>

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<sup>2</sup> A. Szewczuk, M. Kogut-Jaworska, M. Ziolo, *Rozwój lokalny i regionalny. Teoria i praktyka*, Wydawnictwo C.H. Beck, Warszawa 2011, p. 17.

<sup>3</sup> A. Borodo, *Samorząd terytorialny. System prawno-finansowy*, Wydawnictwo Prawnicze LexisNexis, Warszawa 2006, p. 37.

<sup>4</sup> *Act of 8 March 1990 on Gmina local self-government*, “Journal of Laws” 1990, No. 16, item 95, consolidated text of 12 October 2001, “Journal of Laws” 2001, No. 142, item 1591.

- Act of 5 June 1998 on Powiat local self-government,<sup>5</sup>
- Act of 5 June 1998 on Province local self-government.<sup>6</sup>

In terms of organization and management of passenger transport system, the appropriate legal acts regulate the responsibilities for the different local self-government units in terms of spatial extent, where:

- gminas (municipalities) are responsible for all public matters of local importance, not reserved by law for other entities, in particular meeting the needs of the community, including the local public transport;<sup>7</sup>
- powiats (districts) are responsible for public tasks provided by the law, which are beyond gminas, including tasks in the field of public transport and public roads;<sup>8</sup>
- provinces are responsible for tasks at a provincial level provided by the law, in particular tasks in the field of public transport and public roads.<sup>9</sup>

In addition, the act regulating the rules of organization and functioning of public transport is the Act of 16 December 2010 on public transport.<sup>10</sup> In particular, it defines the rules of organization and operation of the carriage of passengers in the public transport, carried out on Polish territory and in border areas of road, rail, different rail, ropeway, funicular, sea and inland waterway transport.<sup>11</sup> In accordance with the provisions of the Act, public transport shall be understood as widely available and regular transport of passengers carried out at specified intervals in the specified communication line, the communication lines or communication network<sup>12</sup>.

The Act on public transport defines the tasks for the various levels of local self-government (in the case of rail transport – public administration) in the field

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<sup>5</sup> *Act of 5 June 1998 on Powiat local self-government*, “Journal of Laws” 1998, No. 91, item 578, consolidated text of 27 October 2001, Journal of Laws 2001 No. 142, item 1592.

<sup>6</sup> *Act of 5 June 1998 on Province local self-government*, “Journal of Laws” 1998, No. 91, item 576, consolidated text of 18 September 2001, “Journal of Laws” 2001, No. 142, item 1590.

<sup>7</sup> *Act of 8 March 1990 on Gmina local self-government*, Art. 6, par. 1 and art. 7, par. 1.

<sup>8</sup> *Act of 5 June 1998 on Powiat local self-government*, Art. 4, par. 1, point 6.

<sup>9</sup> *Act of 5 June 1998 on Province local self-government*, Art. 14, par. 1, point 10.

<sup>10</sup> *Act of 16 December 2010 on public transport*, “Journal of Laws” 2011, No. 5, item 13.

<sup>11</sup> *Ibidem*, art. 1, par. 1.

<sup>12</sup> *Ibidem*, art. 4, par. 1, point 14.

of transport development planning, as well as organization and management of public transport. These tasks were assigned to Organizer of public transport, which are the following entities:<sup>13</sup>

- gmina, on the communication line or network in the transport carried out within the relevant gmina or wider area under the agreement with other gminas;
- association of gminas, on the communication line or network in the transport carried out within the relevant area of gminas forming the association;
- powiat, on the communication line or network in the transport within the relevant powiat or wider area under the agreement with other powiats;
- association of powiats, on the communication line or network in the transport carried out within the relevant area of powiats forming the association;
- province, on the communication line or network in the transport carried out within the relevant area of the province, on the communication line or network in the transport carried out within this and other provinces, if the longest stretch of line is located in this province (in agreement with the other involved provinces), on the communication line or network in the area of transport carried out in the area relevant in terms of line/network of provinces, under the agreement;
- the minister responsible for transport, on the communication line in interprovincial and international passenger rail transport.

It should be noted that the task implemented by different levels of government administration in planning, organizing and managing passenger transport cannot be in conflict with each other – they should be complementary and consequently constitute a coherent and effective system.

Especially important tasks of local self-government units under the Act on public transport concern the obligation to prepare the so-called Transport Plan. Article 9, paragraph 1 of the analyzed Act sets the conditions, under which local self-governments as organizers of public transport in the area concerned are obliged to prepare such a plan. This obligation concerns:<sup>14</sup>

- gminas in the area inhabited by at least 50 000 people,
- powiats in the area inhabited by at least 80 000 people,
- the province regardless of the number of inhabitants.

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<sup>13</sup> *Ibidem*, art. 7, par. 1, point 1–6.

<sup>14</sup> *Act of 16 December 2010 on public transport...*, art. 9, par. 1, point 1–5.

In addition, in accordance with the provisions of the Act, Transport Plan should be made by local self-governments under agreements concluded:<sup>15</sup>

- between gminas, if the area is inhabited by at least 80 000 people,
- between powiats, if the area is inhabited by at least 120 000 people,
- between provinces regardless of the number of inhabitants.

It should be noted that the Transport Plan can also be developed by units with less inhabitants than indicated in the Act. It seems that this provision is particularly important from the point of view of local self-governments, which see drawing up such a plan as necessary for the proper organization of the transport system in their territory.

Especially important tasks of local self-government units arise directly from the provisions of the Act on public transport in the field of elements to be included in the Transport Plan. In accordance with Article 12, Transport Plan should specify:<sup>16</sup>

- communication network, which is a base for planned public transport,
- assessment and forecast of transport needs,
- projected financing for transport services,
- preference regarding the choice of mode of transport,
- rules for the organization of public transport market,
- the desired standard of transport services in the public transport,
- expected way of organizing information system for the passenger.

It should be noted that a kind of directory provided in the Act is informational only and seems to be too general. From the point of view of a consistent, tailored to the needs of the community passenger transport system in the whole region, it seems that this directory there lacks details e.g. in terms of frequency, scope and methodology of research on communication needs, preferences and behavior of system users. This may result in a lack of coordination in carrying out similar research in different parts of the region (by various gminas and powiats), and prepared plans in the given region may be characterized by a different time horizon, a different structure, different degrees of detail and the limited ability to compare the results of the market research conducted.

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<sup>15</sup> *Ibidem*, art. 9, par. 1, point 1–5.

<sup>16</sup> *Act of 16 December 2010 on public transport...*, art. 12, par. 1.

## **The research on local self-government units in West Pomerania province in shaping the regional passenger transport system (selected results)**

Market research and marketing research are an integral element of a mature market economy. This maturity is associated with an increase in needs for analysis and information resources, necessary for legislative authorities and any economic organization interested in evolution of market conditions.<sup>17</sup> Research is a tool to obtain information about the market and its surroundings,<sup>18</sup> or the system and its environment. In terms of shaping a system of passenger transport responding to the needs of its users, conducting such research in the regions seems to be essential also in view of the changes taking place in the field of passenger transport market consumer behaviors and preferences.

The research on local self-government units in the West Pomerania province was conducted in the period from January to June 2013. This included all the offices representing local self-government units in the province at all levels of the administrative division of Poland – gmina, powiat and province. The questionnaire was sent to 136 agencies in the province. 101 questionnaires were sent back, representing 74% of the research population, and therefore the sample was representative.

Questions included in the questionnaire concerned, e.g.:

- obligation to draw up a Transport Plan by the relevant unit,
- type of actions undertaken by the local self-government unit to draw up a Transport Plan,
- reasons for any lack of action by unit to draw up a Transport Plan.

When analyzing the CSO (Central Statistical Office – GUS) data concerning the number of people living in the West Pomerania province divided into powiats and gminas as of 1 January 2013,<sup>19</sup> it should be noted that apart from the province, the obligation to draw up a Transport Plan was imposed on three country powiats – Goleniów powiat, Gryfino powiat and Stargard powiat, two

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<sup>17</sup> D. Rucińska, A. Ruciński, D. Tłoczyński, *Transport lotniczy. Ekonomika i organizacja*, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2012, p. 179.

<sup>18</sup> *Badania rynkowe i marketingowe*, J. Kramer (ed.), Polskie Wydawnictwo Ekonomiczne, Warszawa 1994, p. 102.

<sup>19</sup> *Powierzchnia i ludność w przekroju terytorialnym w 2013 r.*, Informacje i opracowania statystyczne, Central Statistical Office, Warszawa 2013, pp. 27, 165–171.

cities with powiat rights – Szczecin and Koszalin, and Stargard Szczecinski gmina – therefore a total of 7 local self-government units. Additionally, in West Pomerania province there are areas whose population is close to the minimum specified in the Act imposing an obligation to prepare a Transport Plan; these are Kolobrzeg powiat and Szczecinek powiat with more than 79 000 inhabitants, as well as Kolobrzeg gmina with a population of over 46 000 people. Given the touristic and spa nature of Kolobrzeg powiat and gmina, it seems reasonable to consider the issue of the development of such a document by these particular units.

Out of 101 local self-government units in the research, the obligation to draw up a Transport Plan was indicated only by 5 units, including 3 country powiats, 1 city with powiat rights and 1 gmina. As the basis for the obligation laid down in the Act all units indicated the number of inhabitants, and 1 unit indicated additionally agreement between gminas. Thus, analyzing the responses of local self-government units, there is a noticeable lack of initiative on their part to conclude agreements or associations, and hence, lack of interest in drawing up a Transport Plan for the area comprising the territory of the unit in conjunction with neighboring units.

Among the units, which indicated in the questionnaire the lack of obligation to prepare a Transport Plan in accordance with the Act (96 units), only 4 indicated that they are considering developing such a plan; the remaining 92 units have declared no plans in this respect. Interest in developing a transport plan by local self-governments, which are not obliged to do so under the Act on public transport, was therefore negligible and amounted to just a little above 4%.

Among the units, which are obliged to draw up a Transport Plan and units, who do not have such an obligation but consider it, only 4 declared taking specific actions aimed at drawing up such a plan. Due to the fact that the provisions of the Act on public transport came into force on 1 March 2011, and the survey for local self-governments in the West Pomerania province was conducted two years later, it was necessary to understand, on the one hand, the reasons for the lack of action towards the preparation of a Transport Plan (Table 1), and on the other hand – in the case certain actions were taken – what were their types (Table 2).

Table 1

Reasons for the lack of actions taken by local self-government units of the West Pomerania Province to draw up a Transport Plan (TP)

Reasons	No. of indications
It is too early to take such actions	3
Lack of financial resources to develop TP	2
The lack of uniform guidelines for the development of TP	2
Lack of relevant bodies responsible for this matter within the local self-government unit	2
No deadline for developing TP	2
Lack of technical knowledge in the development of TP	1
Lack of appropriate implementing acts	1

Source: own study based on surveys.

As shown in Table 1, the reason most often indicated by the local self-governments was the declaration that it is too early – the answer was given by 75% of the surveyed units. As the reason half of the respondents indicated: lack of financial resources, lack of uniform guidelines, lack of relevant bodies responsible for this matter within the local self-government, and no deadline for the development of the Plan. In addition, 1 unit indicated the lack of technical knowledge and the lack of appropriate implementing acts. It should be noted that the Article 84 paragraph 2 of the Act on public transport provides the deadline for developing a National Transport Plan by the minister responsible for transport (18 months from the date of entry into force of the Act). In the case of local self-government units it is a period of 3 years from the date of entry into force of the Act. However, it was not specified whether there are any consequences arising from failure to meet the above-mentioned deadline. The motivation shall be the fact that without it, the organizers of public transport are limited by the capabilities of its organization – a contract for the provision of public transport can then be concluded for a period not longer than three years.<sup>20</sup>

<sup>20</sup> *Act of 16 December 2010 on public transport...*, *op. cit.*, art. 84, par. 2, point 2.

Table 2

Actions taken by local self-government units of West Pomerania Province  
to draw up a Transport Plan

Type of action	No. of indications
Determination of a communication network covered by TP	2
Research on transport needs	2
Forecast of transport needs	1
Identification of sources of funding transport services	1
Development of information system for the passengers	1
Discussions/actions taken with other local self-governments to develop a joint TP	1
Other – development of initial TOR* documents to begin the tender procedure aimed at selecting the TP contractor	1
Determination of preferences for modes of transport	0
Determination of the rules for organizing transport market	0
Determination of the required standard of services in public transport	0
Analysis of the legal conditions	0
Organization of appropriate organizational body within the local self-government unit responsible for preparing a TP	0

\* TOR – Terms of Reference

Source: own study based on surveys.

As shown in Table 2, until 30 June 2013 none of the surveyed local self-government units has developed all the elements of the Transport Plan provided in the Act. One of them has taken initial steps to hold a tender to select a contractor for drawing up the Transport Plan. As shown by surveys, during the period of more than two years since the Act on public transport has entered into force, the progress of actions taken for the preparation of Transport Plans of local self-governments is disappointing.

In connection with the necessity to take into account the provisions of the documents prepared at the higher self-government level, when drawing up the Transport Plan, the units participating in the survey were also asked about knowledge of the intentions of the higher level units in the organization of public transport. In response to this question, only less than 12% of units indicated that they know intentions of higher units. More than 88% of units answered that they do not know the plans of higher units in this area. More precisely, units were asked about obligation to draw up the Transport Plan by higher local self-government units and their knowledge about taking or not actions in this

regard. Almost 36% of the local self-government units declared lack of knowledge with regard to both issues. These results clearly indicate limited knowledge of local self-governments on their basic obligations arising from applicable legislation.

When analyzing the progress of works for drawing up Transport Plans by local self-government units of West Pomerania province as of 30 June 2014, it should be noted that this document was adopted by 5 out of 7 units obliged by the law to do so (Table 3).

Table 3

Progress of works on developing the Transport Plan in local self-government units in the West Pomerania province, as of 30 June 2014

responsible body	transport plan	progress of works
province	plan for sustainable development of public transport for the West Pomerania province	adopted – resolution of West Pomeranian regional assembly of 24 June 2014
country district (powiat ziemski)	plan for sustainable development of public transport for Gryfino country district	under development; after the public consultation
country district (powiat ziemski)	plan for sustainable development of public transport for Goleniow country district	adopted – resolution of Goleniow country district council of 26 June 2014
country district (powiat ziemski)	plan for sustainable development of public transport for Stargard country district	no information
township (powiat grodzki)	plan for sustainable development of public transport for the city of Szczecin for the years 2014–2025	adopted – resolution of the city of Szczecin of 26 May 2014
township (powiat grodzki)	integrated public transport development plan for the city of Koszalin for the years 2006–2013	adopted (requires updates) – resolution of the Koszalin city council of 26 April 2007.
commune (gmina)	plan for sustainable development of public transport for the Stargard and other communes under agreement on public transport organization	adopted – resolution of the Stargard city council of 27 May 2014

Source: own study.

As shown in Table 3, there is a lack of coordination between units and bodies at different levels in terms of deadlines for adopting documents and periods that these documents shall cover. Individual documents also differ with research methods adopted for their preparation. As indicated by K. Grzelec and O. Wyszomirski, it results from no clear legal interpretation regarding the content

of Plans.<sup>21</sup> In view of the foregoing, there is a concern for coherence and complementarity between the provisions of Transport Plans adopted at different levels of public administration, which can affect the limitations in the process of shaping a sustainable and integrated passenger transport system in the studied region.

## Conclusion

Surveys conducted among local self-government units indicate significant problems and limitations in the process of shaping a sustainable and coordinated system of passenger transport in West Pomerania province. Analysis of the results obtained in this regard indicates:

- incomplete level of knowledge of legislation relating to the organization of public passenger transport and the resulting obligations, including in particular the provisions of the Act on public transport;
- insufficient flow of information between the various levels of local self-governments in relation to their actions to organize public passenger transport in the region;
- the lack of coordination of actions taken towards the development of the passenger transport system, responding to the needs of its users;
- limitation of actions taken by local self-governments only to meeting a specific law obligation in this respect, and thus lack of taking initiatives by local self-governments as organizers of public transport that go beyond the “legal minimum”;
- too long implementation of the provisions of the Act on public transport.

To achieve and maintain a significant share of public passenger transport in handling transportation needs, it seems necessary to conduct an active organization policy by public administration.<sup>22</sup> All levels of local self-governments should notice a significant role in shaping the passenger transport system, not only within their territory, but also throughout the region.

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<sup>21</sup> K. Grzelec, O. Wyszomirski, *Plan zrównoważonego rozwoju transportu publicznego*, in: *Współczesne uwarunkowania rozwoju transportu w regionie*, M. Michałowska (ed.), *Zeszyty Naukowe Wydziałowe Uniwersytetu Ekonomicznego w Katowicach*, Katowice 2013, p. 70.

<sup>22</sup> K. Fiedorowicz, *Aspekty regionalne polityki transportowej państwa – szanse i zagrożenia*, in: *Transport 2000*, *Zeszyty Naukowo-Techniczne Oddziału Stowarzyszenia Inżynierów i Techników Komunikacji w Krakowie*, No. 39 (81), Wydawnictwo PiT, Kraków 2000, p. 268.

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**ROLA JEDNOSTEK SAMORZĄDU TERYTORIALNEGO  
W KSZTAŁTOWANIU SYSTEMU TRANSPORTU PASAŻERSKIEGO  
W REGIONACH NA PRZYKŁADZIE WOJEWÓDZTWA  
ZACHODNIOPOMORSKIEGO**

**Streszczenie**

W artykule przedstawiono wybrane wyniki badań zrealizowanych wśród jednostek samorządu terytorialnego na obszarze województwa zachodniopomorskiego. Celem artykułu była identyfikacja głównych zadań jednostek samorządu terytorialnego w kształtowaniu systemu transportu pasażerskiego w regionach oraz analiza stanu i zakresu ich realizacji w badanym regionie. Do osiągnięcia założonego celu wykorzystano metodę krytycznej analizy literatury, metodę dokumentacyjną oraz metodę badań ankietowych, zastosowaną przy wykorzystaniu kwestionariusza ankiety. Uzyskane wyniki wskazały na niezadowalający poziom zaangażowania jednostek samorządowych w województwie zachodniopomorskim w proces kształtowania systemu transportu pasażerskiego regionu, odpowiadającego potrzebom jego użytkowników. Podejmowane przez jednostki samorządowe działania w tym zakresie sprowadzają się jedynie do wykonania założonego w Ustawie o publicznym transporcie zbiorowym minimum (częstokroć z dużym opóźnieniem).

**Słowa kluczowe:** systemy transportowe, transport pasażerski, transport regionalny, jednostki samorządu terytorialnego, województwo zachodniopomorskie

