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THE ECONOMIC GROWTH AND DEVELOPMENT OF INTERMODAL TRANSPORTATION – A COMPARATIVE ANALYSIS OF POLAND AND TURKEY

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Abstract

Once the companies were national. The products of the companies were sold inside country. But as the economy and technology developed in the world, the companies had to change from national to international. Now, the products are being produced where the raw materials and labor are cheap and are being sent to the places where they needed. The products are sold between countries and continents. To be a competitive company the goods must be transported to the customers cheap and fast. Transportation had to be changed from one mode (road, sea, air, railway transportation) to intermodal. In this study, the economic growth and development of intermodal transportation are examined and the intermodal transportation of Turkey and Poland are compared.

Key Words: Economic growth, Intermodal transport, Transportation.

KARMA TAŞIMACILIĞIN EKONOMİK GELİŞİMİ VE BÜYÜMESİ- POLONYA VE TÜRKİYE'NİN KARŞILAŞTIRMALI ANALİZİ

Öz

Önceleri şirketler ulusaldı. Bu şirketlerin ürünleri ülke içinde satılırdı. Fakat dünyada teknoloji ve ekonomi büyüdükçe şirketler de ulusal olmaktan uluslararası olmaya geçiş yaptılar. Şuanda ürünler, hammadde ve işgücünün ucuz olduğu yerlerde üretilmekte ve ihtiyaç duyulan bölgelere gönderilerek satılmaktadır. Ürünler ülkeler hatta kıtalar arasında satılmaktadır. Bu durumda iddialı bir şirket olmak için ürünler müşterilere hızlı ve ucuz olarak ulaştırılmalıdır. Ulaştırma da tek yönlü taşımacılıktan (karayolu, denizyolu, havayolu, demiryolu) karma taşımacılığa dönüşmüştür. Bu çalışmada karma taşımacılığın ekonomik değişimi ve gelişimi incelenmiş, Polonya ve Türkiye'nin karma taşımacılık sistemleri karşılaştırılmıştır.

Anahtar Kelimeler: Ekonomik Büyüme, Karma Taşımacılık, Ulaştırma.

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INTRODUCTION

The main role of transport and also the infrastructure in each national economy is to ensure appropriate to the needs and expectations both of domestic and international mobility of people and goods. It is also used as an international integration element, when combined transport systems, using all sorts of transport can bring closer the individual countries in terms of social, economics and politics. Awareness of the extent of environmental threats caused by transport and the desire to improve processes of transport and reduce the congestion level, makes that new solutions for the freight transport should be sought. One such solution is the intermodal transport, which becomes more and more common form of freight transport while being most environmentally friendly form of movement. Its development depends on several factors, where the most important is the economic situation of the country.

The aim of this article is an attempt to show the relationship between the development of intermodal transport (especially rail intermodal transport), economic growth and trends in this area. The analysis will be carried out on the basis of Poland and Turkey. Poland and Turkey are very fast developing countries in Europe. Both countries use its national money unit rather than Euro. Therefore it is decided to compare Poland and Turkey with respect to economic development and intermodal transport.

ECONOMIC GROWTH AND DEVELOPMENT OF INTERMODAL TRANSPORT IN POLAND AND TURKEY

Identification of the intermodal transport

In the literature, it is possible to find a variety of definitions of intermodal transport. It is often used interchangeably and identified with the combined transport. Therefore, it is necessary to define some concepts in this area in order to avoid misunderstandings in terminology.

Although there are various definitions of intermodal transport, there is not one generally accepted definition of intermodal transport. Nevertheless, many of them are based on the document entitled „*Terminology on combined transport*" prepared in 2001 by the European Conference of Ministers of Transport (ECMT) and the European Commission (EC), where were adopted basic terminologies relating mixed forms of freights transport. In accordance with the guidelines drawn in this document are distinguished: multimodal, intermodal and combined transport. Therefore, definition which is concluded in this paper specifies

intermodal transport as a movement of goods in one and the same loading unit or road vehicle, which uses successively two or more modes of transport without handling the goods themselves in changing modes (UN/ECE, 2001). From a range of definitions which have been proposed by various authors dealing with issues of transport, deserves attention the definition proposed by J. Neider. who describes the intermodal transport as a transport of goods in cargo units using the means of at least two different modes of transport, on the basis of uniform conditions, arising from the contract of intermodal carriage concluded between the customer and the operator of intermodal transport (Neider, 2012). Another definition which is worthy of approximations was proposed by L. Mindur, which this term defines as a carriage of cargo using means of transport various modes of transport, but in the same load unit along all the route from sender to receiver (Mindur, 2006). From the quoted definition results that the condition for the existence of intermodal transport is the use of one of unit loading which are not subject to tampering. In addition, during the performance of transport occur one agreement of carriage and one operator, which are responsible for the organization and conduct of the entire transport process (Neider et al., 2006). It is also obvious that the characteristic feature of these definitions is use of various modes of transport.

Intermodal transport is characterized by several strong points that make it more and more popular in freight. The undeniable advantages of intermodal transport can include it that combines and utilizes the strengths of various modes of transport. Along with the trend of reducing road transport only to the feeder services this form of transport seems to be the ideal solution for countries and cities struggling with the problem of excessive number of cars on the roads. To effectively perform this type of freight transportation a well-developed and maintained road and rail network is not enough. It is necessary to build and modernize the existing handling points which will able to handle a load unit as soon as possible. This also requires handling a wide variety of devices, which is due to the fact that statistically speaking the 97% of the cargo containers are 20' or 40'. In addition, semi-trailers and swap bodies are used. Modes of transport used for the intermodal transport are ships, trucks and rail. Intermodal transport is cost effective especially in carriage over long distances. It should be also noted that the fundamental idea of intermodal transportation is to consolidate load for efficient long-haul transportation, while taking advantage of the efficiency of local pickup and delivery operations by truck (Bektas and Crainic, 2008). Therefore, the majority of cargo is carried in international relations over long distances often using all modes of transport,

as part of one the logistics chain (Brylinski et al., 2010). The growing exchange trade countries of the European and Asian continent should continue to increase the use of intermodal transport.

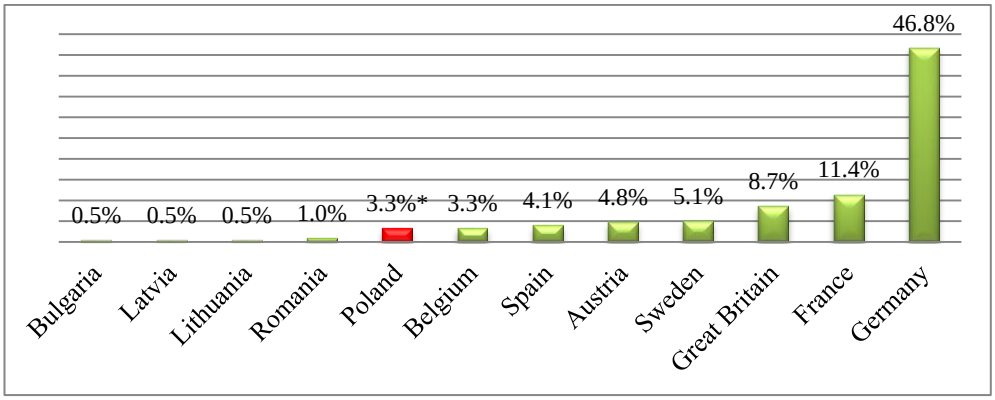
Economic conditions as a determinant of the development of intermodal transport in the specified countries

It is proposed in this study that there is a close relationship and dependency between the transport and economic development. It creates here a kind of flywheel, because an increase in demand for transport services stimulates the economy, while the GDP (Gross domestic product) growth intensifies this need. It should be pointed that the development of transport, both in terms of the communication network, as well as in terms of transport capacity, should outpace overall economic development, so as to become a motivating factor, rather than inhibiting the overall economic and social development (Madeyski et al, 1978). In our analysis, we will focus primarily on economic factors which affecting the development of intermodal transport, omitting organizational, legal and technical and technological aspects, which also determine the development of this type of transport.

In recent years, the Polish-Turkish cooperation in the field of freight begins to grow. There are plans to develop an intermodal transport corridor, called **Copernicus Intermodal**, between Poland and Turkey, with the extension to the Germany, Russia, Georgia, Iran and Armenia. This connection will be used by the services of railways, ships and cars. It should be noted that the initiator of the corridor is Polish company Laude Smart Intermodal S.A., which deals with the transportation and logistics service. Thus, it is worth drawing attention to the state and prospects of development of this type of connection in these two countries. We begin our analysis from the assessment of Polish intermodal transport and after that we will analyze Turkey in this area.

From the report prepared by the International Union of Railways (UIC) entitled „*2012 Report on Combined Transport in Europe*" follows that in 2011 in Europe (EU-28 countries including Norway, Switzerland, Croatia and Turkey) transported about 19 127,1 thous. TEU, which is 15% more than in 2009 and about 29% more than in 2005. Nearly 95% of the carriage carries out 135 licensed operators, intermodal transport operators, logistics providers and other entities involved in the organization of cargo in intermodal units transport (containers, trailers and bodies) (Pieriegud, 2013). Against the background of the EU, Poland has one of the largest rail markets, which follows both of considerable length of the railway network (6.6 km per 100 km^2). This is influenced by the high volume of carriage and

the number of licensed operators. Nevertheless, Polish participation in intermodal freight transport, measured to by transport work amounts less than 2.8%, which means that it is on the eighth position among the EU countries. At the forefront of this rankings are located, among others.: Germany, France, Great Britain, Sweden, Austria and Spain (fig. 1.).



* figures for the 2012 year

Figure 1. Participation of selected countries in the intermodal transport market in 2010 (by transport work) Source: (Urząd Transportu Kolejowego, 2012)

In recent years in Poland, rail freight in containers is characterized by intensive development. This is reflected in the transport work, which cited the period 2007-2012 increased by an average of 13,1% per annum (Marcu et al., 2013). It should be noted, that for several years there has been an almost permanent increase in volume of intermodal transport in Poland. Exception is 2009, when there was a momentary collapse of the market, due to the economic crisis. However, since seven years (counting to 2012) maintained the upward trend in the transport of intermodal transport, as evidenced by an almost fivefold increase of these carriage in 2004-2012. (fig. 2.).

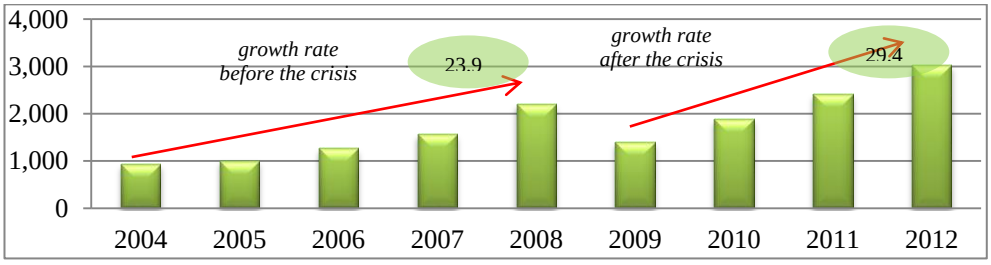


Figure 2. The development of intermodal transport market in Poland, 2004-2012 (in million tkm) (Marcu at all, 2013).

In order to indicate the relationship between economic development and intermodal transport in Poland, was used the Pearson correlation coefficient based on the years of 2004-2012, which describes the direction and strength of the relationship of two studied traits. The results obtained indicate statistical interdependence of these two variables. It can be concluded that there is a relatively strong correlation because it amounts to 0,79 (its value is in the range: -1;0; 1). Thus, the Polish economy, as well as intermodal transport is growing at a similar rate. This strong correlation is confirmed depending on the size of TEUs transported by rail intermodal transport. And so, compared to the years before the crisis, the number of transported TEU's increased by half (fig. 3.).

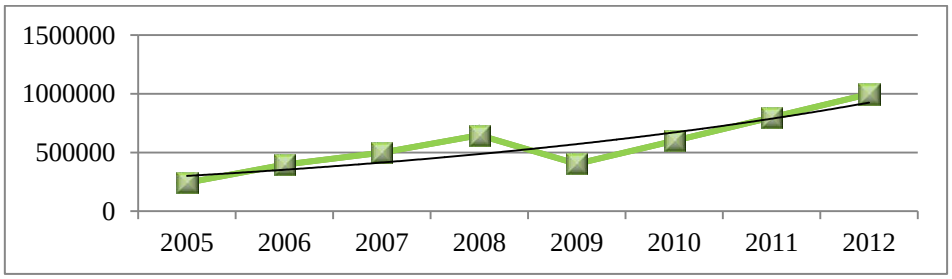


Figure 3. Volume of intermodal rail transport in Poland in the years 2005-2012 (in TEU) (Pieriegud, 2013).

The reason of sustained growth in intermodal transport in Poland is mainly a good level of foreign trade with European countries, which use the rail transport services. It has directly affects in growth demand on transport services and in particular the carriage in international transport. When it comes about international communication, at the end of 2011 it accounted 79,7% all carriage in this segment of the market (by transport work). It is worth emphasizing the relationship between the dynamics of Polish trade and the dynamics of intermodal transport. It may be noted a strong relationship of export, import and intermodal transport in subsequent years (fig. 4.). Should be pointed out that the dynamics of international and intermodal transport is a kin, mainly due to the large share of the international traffic in transport containers (Pieriegud, 2013).

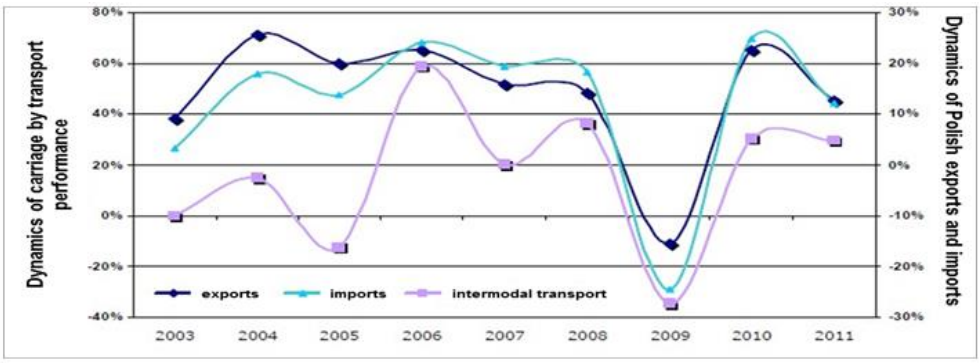


Figure 4. Dynamics of intermodal transport on the background of Polish trade exchange. Source: (Urząd Transportu Kolejowego, 2012)

Intermodal transport in Turkey is also a way of transporting freights but there is very limited information about intermodal transport. Therefore we can refer the total transportation data in Turkey to have a sense about the intermodal transportation in Turkey. As can be seen on figure 5 the export and import amount via transportation modes in Turkey are increasing as the years passed. Turkey is one of the most fast growing countries in the world. With parallel to this growth, the transportation is also growing. Figure 5 shows the amount of trade of Turkey with respect to all transportation modes totally.

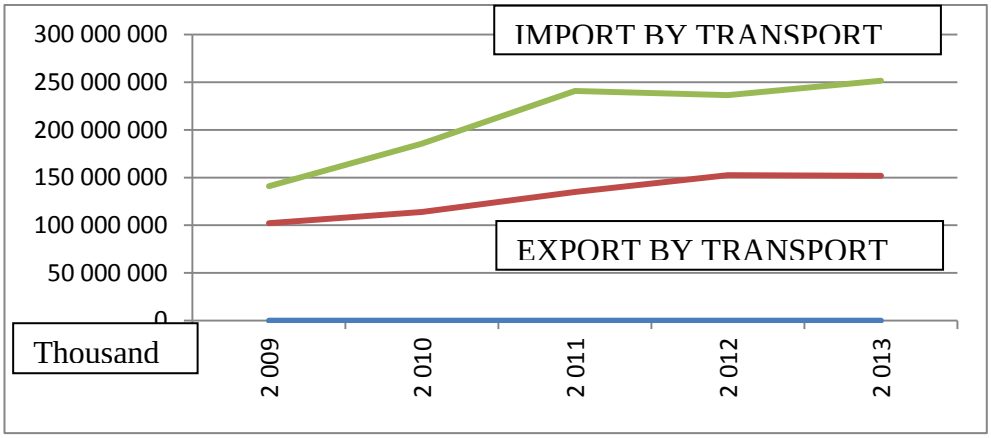


Figure 5. The Import and Export of Turkey (thousand dollars) with respect to all transportation modes.
(http://www.turkstat.gov.tr/PreTablo.do?alt_id=1046)

To carry goods from source to destination the countries must have ports, a good road and rail network and logistics centers. As one can see the Table 1, Turkey has a very good road network. The freight and passengers transportation of Turkey is mostly depended on roads.

Table 1. Road and Railway Distances of Turkey, Poland and EU Total in 2011 (Marcu et al., 2013)

Country	Area (m2)	Population (million)	Length of Road (km)	Length of Rail (km)
Poland	313000	39	47000	20228
Turkey	785000	74	65000	9642
EU	4323000	502	1825000	224393

Table 2. shows the freight transport by countries. Although freights can be transported with greater amounts and with less money by using railway rather than roads, it can be understood from the table that Turkey has a very low proportion of freight transportation via railway (only 4,7%).

Table 2. Freight Transport by Countries and Transport Modes in 2010 (in tkm)

COUNTRY AND CODE		RAIL WAY		ROAD		Inland Waterwa		OIL PIPILIN		TOTAL
TÜRKİYE-Turkey	TR	11,3	4,7	190,4	78,9	0,0	0,0	39,6	16,4	241,3
İNGİLTERE-England	GB	18,6	11,2	137,8	82,6	0,2	0,1	10,2	6,1	166,8
YUNANİSTAN-Greece	GR	0,6	2,3	25,3	97,7	0,0	0,0	0,0	0,0	25,9
ALMANYA-Germany	DE	107,3	24,5	252,5	57,6	62,3	14,2	16,3	3,7	438,4
ITALYA-Italy	IT	18,6	10,4	149,2	83,4	0,1	0,1	11,1	6,2	179,0
İSPANYA-Spain	ES	9,2	5,6	146,2	89,4	0,0	0,0	8,2	5,0	163,6
FRANSA-France	FR	30,0	13,5	164,3	74,2	9,5	4,3	17,7	8,0	221,5
AVUSTURYA-Austria	AT	19,8	45,9	13,9	32,3	2,4	5,6	7,0	16,2	43,1
ÇEK CUMH.-Czech Republic	CZ	13,8	44,8	14,8	48,1	0,0	0,0	2,2	7,1	30,8
POLONYA-Poland	PL	48,7	30,6	86,2	54,1	0,1	0,1	24,2	15,2	159,2
MACARİSTAN-Hungary	HU	8,8	34,2	11,3	44,0	2,4	9,3	3,2	12,5	25,7
BULGARİSTAN-Bulgaria	BG	3,1	19,9	6,1	39,1	6,0	38,5	0,4	2,6	15,6
ROMANYA-Romania	RO	12,4	31,2	12,1	30,4	14,3	35,9	1,0	2,5	39,8

Source: (EU Energy and transport in Figures, 2012)

Table 3. shows the freight transport in Turkey. From 2000 to 2011 railway transportation was not changed. Therefore the goods were continued to be transported mostly by roads. To increase the intermodal transport rate in total transportation, Turkey should urgently enlarge railway network. Turkey should also improve the currently used railway conditions.

Table 3. Freight Transport by Transport Modes in Turkey (in million)

Years	ROAD		RAILWAY		MARITIME		Air Transport		PIPELINE		Grand TOTAL
2000	161.552	71,0	9.761	4,3	14.631	6,4	310	0,1	41.319	18,2	227.573
2001	151.421	72,8	7.486	3,6	15.001	7,2	285	0,1	33.925	16,3	208.118
2002	150.912	69,6	7.169	3,3	10.627	4,9	275	0,1	47.691	22,0	216.674
2003	152.163	80,4	8.615	4,6	10.001	5,3	276	0,1	18.128	9,6	189.183
2004	156.853	84,5	9.334	5,0	7.277	3,9	321	0,2	11.927	6,4	185.712
2005	166.831	88,5	9.078	4,8	6.439	3,4	392	0,2	5.736	3,0	188.476
2006	177.399	88,8	9.545	4,8	7.084	3,5	0	-	5.841	2,9	199.869
2007	181.330	84,9	9.755	4,6	9.573	4,5	0	-	12.893	6,0	213.551
2008	181.935	75,8	10.553	4,4	11.114	4,6	0	-	36.402	15,2	240.004
2009	176.455	72,6	10.163	4,2	11.397	4,7	0	-	45.111	18,6	243.126
2010	190.365	75,0	11.300	4,5	12.570	5,0	0	-	39.636	15,6	253.871
2011	203.072	73,8	11.303	4,1	15.959	5,8	0	-	44.690	16,2	275.024

Source: (TURKSTAT, Summary Statistics on Transportation)

The sea-railway modes are more common for intermodal transport in Turkey. Table 4 shows the totally handled freight from ports to railway. These ports are operated by TCDD(The governmental organization for railway transportation which is responsible for all railways of Turkey).

Table 4. Freight handled in TCDD Ports (in 2007)

				Tonnes Handled (000)		
	General Cargo, Break Bulk (000 tonnes)	Containers (000 tonnes)	Containers (000 TEU)	Outbound	Inbound	Total
Haydarpasa	651	3277	397	1376	2552	3928
Derince	3027	4	1	845	2186	3031
Samsun	1616	0	0	2276	3329	5605
Mersin	3177	2428	232	367	1480	1847
Iskenderun	1846	0	0	538	1078	1616
Bandarma	8465	0	0	3799	4666	8465
Izmir	3210	8858	898	7740	4328	12068
Totals	21992	14567	1528	16941	19619	36560

Source: ("TCDD Annual Statistics", 2007)

Prospects for the development of intermodal transport in Poland and Turkey

Many cities have been wrestling with congestion and insufficient bandwidth of transport corridors. Nevertheless, intermodal transport in the analyzed countries is of marginal importance in freight transport. Taking account existing conditions the development of intermodal transport in Poland, the main goal should be the creation of the technical, legal, economic and financial implications for this type of transport (Mindur, 2008).

In the coming years rail intermodal transport in Poland should grow at a rate of several percent per annum. It should be noted, that the growth

rate will depend on many factors, including economic and development activities. According to the main Polish infrastructure manager - PKP PLK S.A., until 2015 intermodal trains should generate nearly 9% of cargo traffic on the rail network (currently around 6-7%). Furthermore, the total value of the exploitation work may rise to the level of 6,5-7 million train-km. Taking into account a gross transport work on the network, part of intermodal transport due to the lower weight of the composition of the train, till 2015 may exceed 6% (currently about 4,5%) (Urząd Transportu Kolejowego, 2012).

According to a study of the Polish Office of Rail Transportation (Polish abbreviation UTK) ,which were published in 2012 the dynamics of the further development of intermodal transport depends largely on the amount of fees for access to the tracks (Marcu et al.,2013). Intermodal transportations should increase its market share of rail transport. By 2020, taking into account the transport work made, they may exceed level of 10% of the transport market, while in terms of weight can approach the level of 6%. (fig. 6.). The rate of growth to a large extent will depend on the actions which aimed at the financial support of the development of intermodal transport (Urząd Transportu Kolejowego, 2012).

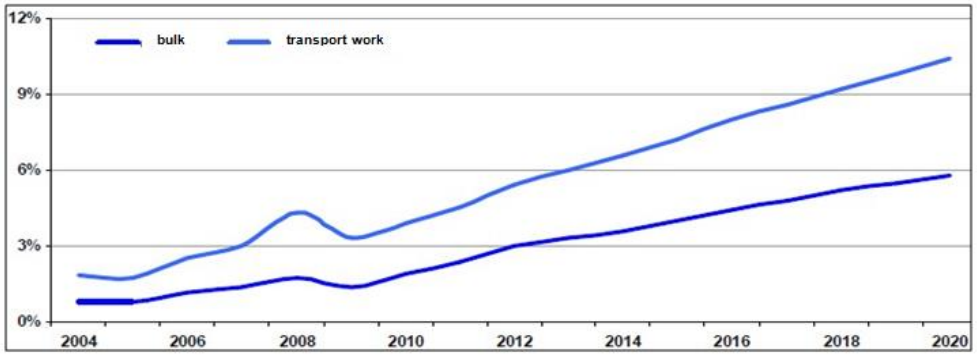


Figure 6. Current and future participation of intermodal transport in the Polish rail market in years 2003-2020.

Source: (Urząd Transportu Kolejowego, 2012).

The rate of growth to a large extent will be depend on the actions which aimed at the financial support of development the intermodal transport (Urząd Transportu Kolejowego, 2012).Assuming the most optimistic forecast presented by the UTK, since 2011 the transport performance in the field of container transport by rail will increase more than three times by 2020, with the average annual growth rate at the level of 14,3%. Taking as the starting point the average level of growth in recent years, we can expect an increase on the level of 10,1%. Importantly, even in

the pessimistic scenario, the intermodal transport sector also will increase, although at a slightly lower level of 8,4% per year (Marcu et al., 2013) (fig. 7.).

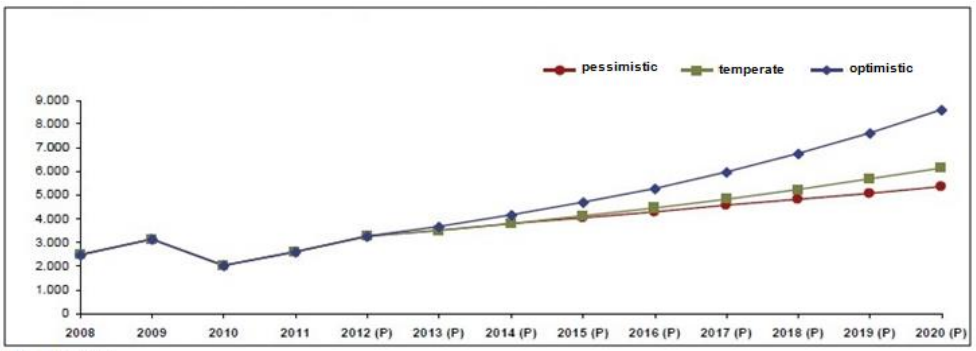


Figure 7. Forecast of market development of intermodal transport in Poland (in million ton-km) Source: (Urząd Transportu Kolejowego, 2012).

Poland currently has 26 intermodal terminals, which are distributed all over the country. In terms of country area their average density is about 0,8 terminal at 10,000 km^2. This ratio is close to the EU average (0,9/10,000 km^2). Turkey has definitely worse result in this regard, because this ratio amounts to 0,1 terminal at 10,000 km^2, which results from high area of the country and a small numbers of intermodal terminals (Tab. 5.).

Table 5. Number of intermodal terminals in Poland and Turkey

Country	**Number of intermodal terminals**	**Number of terminals in the 10,000 km^2**
POLAND	26*	0,8
TURKEY	8	0,1

* Actively used by rail transport. Source: (Urząd Transportu Kolejowego, 2012).

It should also be noted, that without modern terminals and logistics centers we can't talk about the development of intermodal transport in Poland. Therefore, these developments in the Polish area are necessary in the coming years.

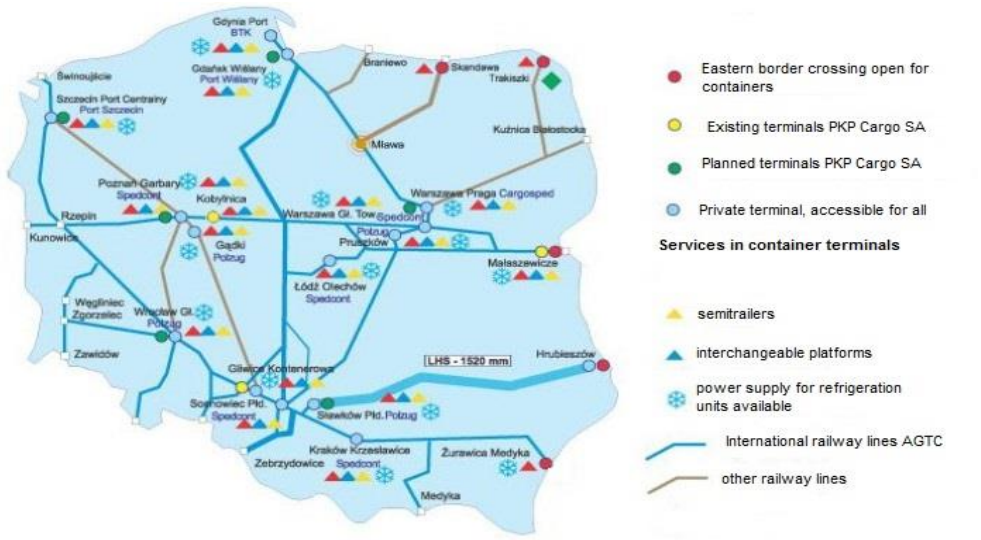


Figure 8. Existing and planned intermodal terminals in Poland
Source: (http://www.skyscrapercity.com/showthread.php?t=347021)

Turkey is located in a position where it connects continents. So, in order to take the advantage of this strategic position it is vital that Turkey must have a good network for freight and passenger transportation. Only a good road infrastructure would not be enough for Turkey. Therefore, the government began to spend money on railways and logistics centers. To improve intermodal transport in Turkey new railway networks and logistics centers are needed. Table 6. and figure 9. show the investment of road and railways of Poland and Turkey.

Table 6. Railway investments of Poland and Turkey in 2003-2011

Country / Year		2003	2004	2005	2006	2007	2008	2009	2010	2011
POLAND	GDP (1000 billion)	92	04	44	72	11	63	11	55	70
	Population (thousand)	8205	8182	8165	8141	8121	8126	8152	8184	8216
	Investment in Railway (million Euros)	94	20	36	53	47	04	50	90	25
TURKEY	GDP (1000 billion)	68	15	87	19	72	99	40	50	55
	Population (thousand)	6339	7236	8143	9064	9993	0924	1846	2752	3640
	Investment in Railway (million Euros)	16	22	26	51	99	72	56	493	470

Source:http://www.internationaltransportforum.org/Pub/pdf/13SpendingTrends.pdf

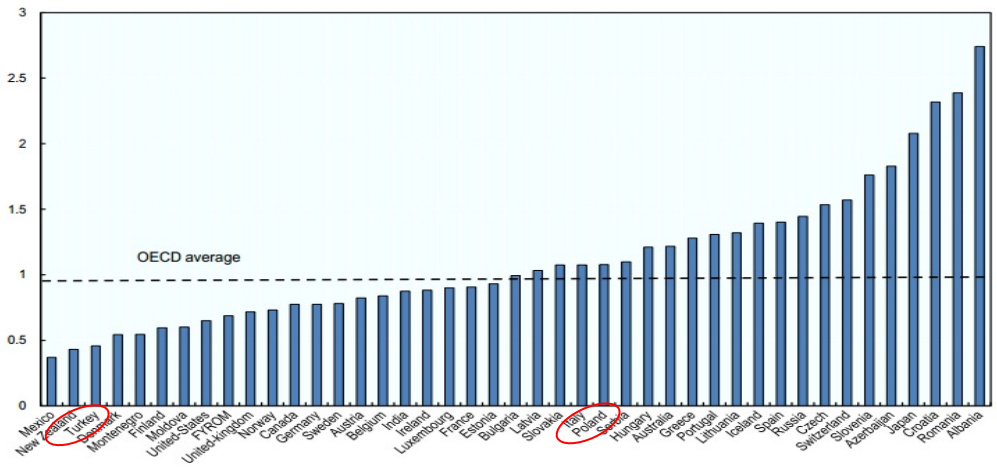


Figure 9. Investment in road and rail infrastructure as a share of GDP (average 2000-2010). Source: (International Transport Forum at the OECD.)

Turkey discovered that to make the transportation of freights easy and fast, there must be logistics centers. So, 4 logistics centers were opened by the end of 2012, while 18 logistics centers will have been opened by 2023.

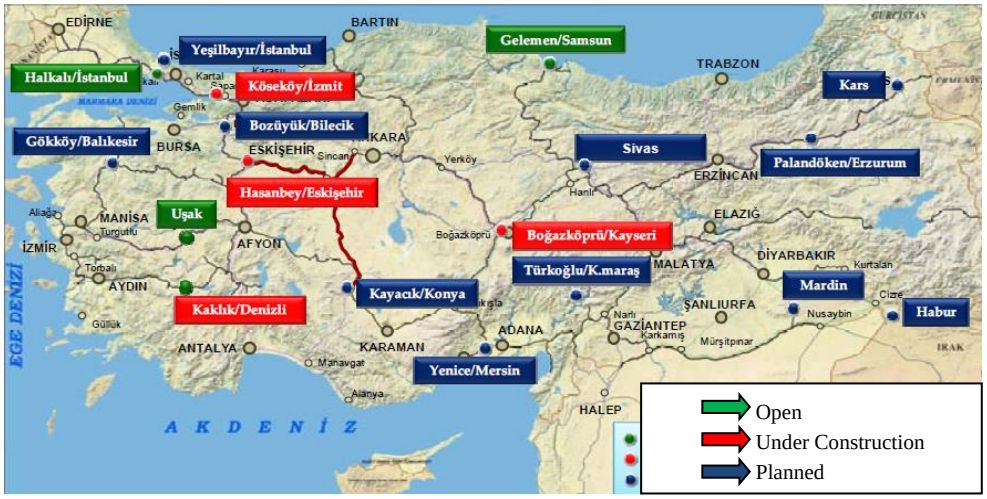


Figure 10. Logistic Centers operated by TCDD. Source: (www.**tcdd**.gov.tr/)

Turkey has an extensive High Speed Rail investment program, including construction of new lines and double-tracking, renewal and rehabilitation of existing tracks. The High Speed Rail projects will significantly reduce the journey time between major cities. Construction of new conventional lines and double-tracking projects involve nearly 5000

kilometers of new tracks. By the year 2023 there will be 25940 km of railway network in Turkey. The details of railway investment can be seen in figure 11.

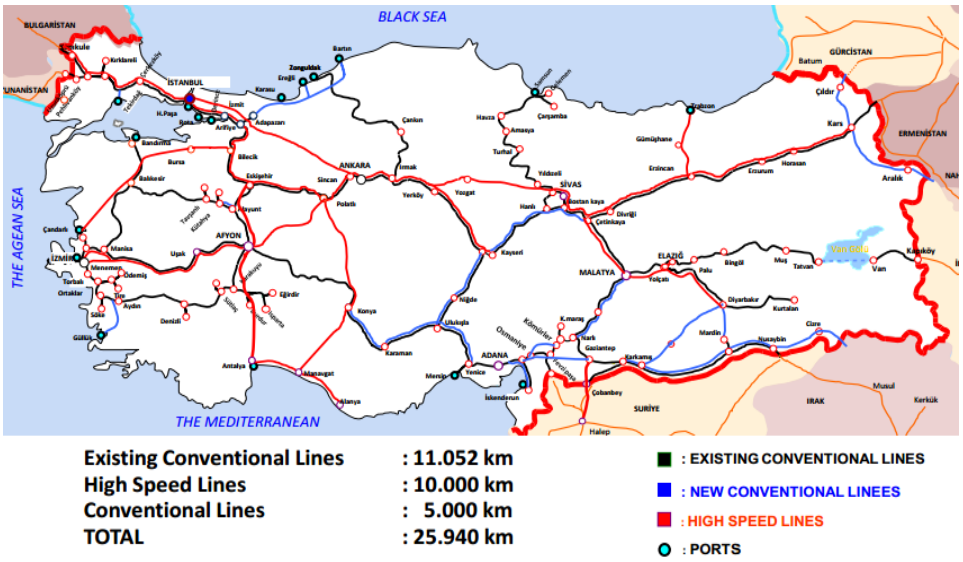


Figure 11. Railway Network by the Year 2023. Source: (www.**tcdd**.gov.tr/)

Turkish ministry of transportation has a strategic aim to rebuild transportation system so as to serve at technical and economic efficiency and be more balanced. Primarily, remaining Ankara at the center:

- Ankara-İstanbul,
- Ankara-Konya,
- Ankara-Sivas high-speed railway projects and,
- İstanbul (Halkalı) Edirne (Kapıkule) railway projects to be completed.
- Ankara-İzmir high-speed railway project to be launched.
- New Ankara Railway Station to be built.

Besides:

- To carry out relevant engineering, auditing and consultancy works for the construction of 4984 kilometers high-standard new railway line.
- To improve the railway net and raise the amount of transport of goods by railway 100% and passenger transport by 50%.

- To shorten the voyage distance and to maintain the continuity of the travel time, building a railway and two highways connecting with the tube passage.
- Towards generalizing the combined transport. Halkalı, Ispartakule (Istanbul) , Köseköy (Izmit), Kaklık (Denizli), Eskisehir, Bogazköprü(Kayseri), Balıkesir, Yenice (Adana), Palandöken(Erzurum), Konya and Uşak as centers, building 11 logistic villages on these centers.
- According to improve the combined transport, finishing all hinterland connection of ports with highways and railways.
- Improving railway side-sector (fast train sets, railroad track, Wheel, rail switch, traverse, connection elements etc.) and increasing domestic production rates and avoiding foreign dependence.

Turkey has a great potential for intermodal transportation (Deveci, 2010). Kars-Tiflis railway projects, Marmaray railway tube channel which connects Europe with Asia via railway, Mersin-Çandarlı-Filyos port projects and many logistics centers projects are some investment projects which will have a great contribution of Turkish intermodal transport system. It is expected that by connecting sea, road and railway systems with the contribution of logistics centers intermodal transportation will have a great percentage among freight transportation in Turkey.

CONCLUSIONS

The economies of countries are changing from local to global. The goods are produced in different countries and demands to these goods are all over the world. These demands require many logistics facilities together. Especially the transportation of these goods has a great importance in logistics. The companies must think about the most economical way of transporting their goods. All these needs make the intermodal transportation a must rather than a preference.

In this study, first of all the definition of intermodal transport is mentioned, since there are variety of definitions of intermodal transport and it is often used interchangeably with combined transport. Next, the Polish and Turkish intermodal transport systems are examined and compared. In Poland, the intermodal transport system has great importance and as the economy of Poland developed the intermodal transport is also developed parallel to economy. While railway usage for freight transport in Poland was

%30, for Turkey it was only %4.7 in 2010. It is encouraging in Turkey that, the importance of railway transport is understood in recent years and Turkey now has been spending huge amounts of money for improving and enlarging railway system. The amount of money for railway investment is being greater with respect to improve of GDP in Turkey and Poland.

Over the past several years, both in Poland and Turkey, there is a noticeable increase in intermodal transport in the railway market. Certainly, this may be considered as a positive trend, however, in both the one and the second country must continue the activities, which contribute to further development of intermodal transport. It is important to note that undertake a comparative analysis of Polish and Turkey in this area is extremely difficult task that results from barriers of economic, geopolitical, spatial or legal. However, the effort must be made that will allow a look at the issue more broadly.

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GENİŞLETİLMİŞ ÖZET

Karma Taşımacılığın Ekonomik Gelişimi ve Büyümesi- Polonya ve Türkiye'nin Karşılaştırmalı Analizi

Giriş ve Karma Taşımacılığın Tanımlanması

Önceleri şirketler ulusaldı. Bu şirketlerin ürünleri ülke içinde satılırdı. Fakat dünyada teknoloji ve ekonomi büyüdükçe şirketler de ulusal olmaktan uluslararası olmaya geçiş yaptılar. Şuanda ürünler, hammadde ve işgücünün ucuz olduğu yerlerde üretilmekte ve ihtiyaç duyulan bölgelere gönderilerek satılmaktadır. Ürünler ülkeler hatta kıtalar arasında satılmaktadır. Bu durumda iddialı bir şirket olmak için ürünler müşterilere hızlı ve ucuz olarak ulaştırılmalıdır. Ulaştırma da tek yönlü taşımacılıktan (karayolu, denizyolu, havayolu, demiryolu) karma taşımacılığa dönüşmüştür. Bu çalışmada karma taşımacılığın ekonomik değişimi ve gelişimi incelenmiş, Polonya ve Türkiye'nin karma taşımacılık sistemleri karşılaştırılmıştır.

Taşımacılığın ve ulaştırma altyapısının ana amacı ülkelerdeki yolcu ve yükün hem ulusal hem de uluslararası olarak hareketlilik ihtiyacına cevap vermektir. Bu aynı zamanda uluslararası entegrasyon aracı olarak da düşünülebilir. Çevresel faktörler düşünüldüğünde de ulaştırma için karma taşımacılık modelininin çevre dostu bir çözüm ürettiği aşikârdır.

Literatüre bakıldığında karma taşımacılık ile ilgili birçok tanım yer almaktadır. Genellikle karma taşımacılık, çoklu taşımacılık ile karıştırılmaktadır. Bu çalışmada karma taşımacılık; ürünlerin aynı taşıma ünitesi veya aracıyla iki ve daha fazla taşıma modunu kullanarak ve modlar arasında herhangi bir elleçleme olmadan taşınması olarak tanımlanacaktır (UN/ECE,2001).

Karma taşımacılık için genellikle gemiler, kamyonlar ve trenler kullanılır. Bu tür taşımacılık daha ziyade uzun mesafelerde maliyet etkindir. Bu yüzden uzun mesafeli uluslararası taşımalarda ürünlerin büyük bölümü lojistik zincirinin bir parçası olarak tüm ulaştırma modları kullanılarak taşınır.

Belirlenen Ülkelerdeki Karma Taşımacılığın Gelişiminde Belirleyici Olan Ekonomik Durumlar

Ulaştırma ile ekonomik gelişme arasında yakın bir ilişki ve bağlılık bulunmaktadır. Çalışmamızda, karma taşımacılığın gelişimini etkileyen ekonomik faktörler üzerinde yoğunlaşılmıştır.

Son yıllarda, Polonya ve Türkiye arasında yük taşımacılığı alanında işbirliği artmaya başlamıştır. "Copernicus International" ismiyle Polonya ve Türkiye arasında ve Almanya, Rusya, Gürcistan, İran ve Ermenistan'ı da kapsayacak şekilde karma taşımacılık koridoru oluşturulması planları vardır. Bu bağlantı demiryolu, gemiler ve araçlar tarafından kullanılacaktır.

Uluslararası Demiryolu Birliğinin (UIC) hazırladığı rapora göre 2011 yılında 28 Avrupa Birliği ülkesinde (Norveç, İsviçre, Hırvatistan ve Türkiye de dahil olmak üzere) toplam 19127,1 bin TEU yük taşınmıştır. Bu, 2009 yılına göre %15, 2005 yılına göre ise %29 fazladır. Taşınan yükün %95'i lisanslı firmalar, karma taşıma şirketleri ve lojistik sağlayıcılar tarafından yapılmıştır.

Polonya demiryolu ağı konusunda Avrupa'da en önemli ülkelerden birisidir. 100 km^2 de 6,6 km demiryolu ağı bulunmaktadır. Polonya'nın karma taşımacılığa katkısı %2,8 dir. Avrupa Birliğinde sekizinci sıradadır. Karma taşımacılık 2009 yılındaki ekonomik kriz dönemi hariç Polonya'da giderek büyümektedir. Polonya'daki karma taşımacılık ile ekonomik gelişmedeki ilişkiyi göstermek için 2004-2012 verilerine dayanarak Pearson korelasyon katsayısı kullanılmıştır. Sonuç olarak 0,79 (değer -1;0;1 aralığındadır) gibi arada güçlü bir bağın olduğunu gösteren sonuca ulaşılmıştır. Böylece Polonya ekonomisinin karma taşımacılık ile benzer bir oranda geliştiği söylenebilir. Karma taşımacılığın Polonya'da gelişiminin en büyük nedeni Avrupa ülkeleriyle olan ticaret hacminin büyümesidir. Ticaret taşımacılık ihtiyacını artırmış, mesafenin uzunluğu da karma taşımacılığın %79 pay almasını sağlamıştır.

Türkiye'de ise ürünlerin taşınmasında karma taşımacılık çok yaygın değildir. Bu yüzden de karma taşımacılıkla ilgili çok az bilgi ve istatistik bulunmaktadır. Türkiye özellikle karayolu taşımacılığı ile ilgili 65000 km lik yol ağına sahiptir. Türkiye, Polonya ve Avrupa Birliğinin karayolu ve demiryolu uzunlukları aşağıdaki tabloda verilmiştir.

Ülke	Alan (m2)	Nüfus(million)	Karayolu Uzunluğu (km)	Demiryolu Uzunluğu (km)
Polonya	313000	39	47000	20228
Türkiye	785000	74	65000	9642
AB	4323000	502	1825000	224393

Karma taşımacılık için birden fazla taşıma modunun kullanılması gerekmektedir. Aşağıdaki tablo ülkelerin her taşıma modununda yaptıkları taşıma miktarını göstermektedir. Türkiye'nin karma taşımacılık verileri tutulmamakla birlikte bu tablo Türkiye'nin karma taşımacılıkta da nasıl bir konumda olması için fikir vermektedir.

ÜLKE ve KODU Country and Code		DEMİRYOLU Railway	%	KARAYOLU Road	%	İÇ SUYOLU Inland Waterways	%	PETROL BORUHATTI Oil Pipeline	%	TOPLAM Total
TÜRKİYE-Turkey	TR	11,3	4,7	190,4	78,9	0,0	0,0	39,6	16,4	241,3
İNGİLTERE-England	GB	18,6	11,2	137,8	82,6	0,2	0,1	10,2	6,1	166,8
YUNANİSTAN-Greece	GR	0,6	2,3	25,3	97,7	0,0	0,0	0,0	0,0	25,9
ALMANYA-Germany	DE	107,3	24,5	252,5	57,6	62,3	14,2	16,3	3,7	438,4
ITALYA-Italy	IT	18,6	10,4	149,2	83,4	0,1	0,1	11,1	6,2	179,0
İSPANYA-Spain	ES	9,2	5,6	146,2	89,4	0,0	0,0	8,2	5,0	163,6
FRANSA-France	FR	30,0	13,5	164,3	74,2	9,5	4,3	17,7	8,0	221,5
AVUSTURYA-Austria	AT	19,8	45,9	13,9	32,3	2,4	5,6	7,0	16,2	43,1
ÇEK CUMH.-Czech Republic	CZ	13,8	44,8	14,8	48,1	0,0	0,0	2,2	7,1	30,8
POLONYA-Poland	PL	48,7	30,6	86,2	54,1	0,1	0,1	24,2	15,2	159,2
MACARİSTAN-Hungary	HU	8,8	34,2	11,3	44,0	2,4	9,3	3,2	12,5	25,7
BULGARİSTAN-Bulgaria	BG	3,1	19,9	6,1	39,1	6,0	38,5	0,4	2,6	15,6
ROMANYA-Romania	RO	12,4	31,2	12,1	30,4	14,3	35,9	1,0	2,5	39,8

Avrupa Ülkeleri tarafından, Toplam Havayolu ve Denizyolu Ton -km istatistikleri yayımlanmadığından tablodaki veriler Havayolu-Denizyolu hariç verilerdir.
Air and Maritime transportation are excluded in this table since Total Air and MaritimeTransport Tonne-km figures are not available in European Countries.
Kaynak: Avrupa Birliği Ulaştırma ve Enerji İstatistikleri Kitabı 2012

Polonya ve Türkiye'de Karma Taşımacılığın Gelişimi

Karma taşımacılık konusundaki gelişim ülkenin ekonomisine ve büyümesine bağımlı olacaktır. 2015 yılına kadar Polonya'da karma taşımacılık oranının %9'un üstüne çıkması beklenmektedir. Polonya'nın demiryolu taşımacılık kurumunun 2012 yılında yayınladığı rapora göre 2020 yılı itibariyle karma taşımacılığın demiryolu taşımacılığındaki payı %10'lara ulaşacaktır. Polonya hâlihazırda 26 karma taşımacılık terminaline sahiptir. Bu miktar Türkiye'de ise 8'dir. Bu sayılar ülkelerin kapladığı alanlara göre değerlendirildiğinde 10000 km^2 de Polonya 0,8, Türkiye ise 0,1 terminale sahiptir.

Türkiye kıtaları birleştiren bir noktada konuşludur. Bu konum Türkiye'nin yük ve yolcu taşımacılığı için önemini artırmaktadır. Sadece karayolu taşımacılığı giderek artan yolcu ve yük taşıma ihtiyacını karşılamakta yeterli ve maliyet etkin olmayacaktır. Bu nedenle demiryolu taşımacılığı için önemli yatırımlar yapılmaya başlanmıştır. Aşağıdaki tabloda Polonya ve Türkiye'nin nüfusu, gayri safi milli hâsılası ve demiryolunun gelişimi için harcadığı para miktarı verilmektedir. Polonya her yıl için belirli miktar para ayırırken Türkiye özellikle 2010 ve 2011 yıllarında demiryolunun gelişimi için önemli yatırım yapmıştır.

Ülke / Yıl		2003	2004	2005	2006	2007	2008	2009	2010	2011
POLAND	GSMH (1000 milyar)	192	204	244	272	311	363	311	355	370
	Nüfus (bin)	38205	38182	38165	38141	38121	38126	38152	38184	38216
	Demiryolu Geliştirilmesi (milyon Avro)	194	220	236	353	647	904	650	690	925
TURKEY	GSMH (1000 milyar)	268	315	387	419	472	499	440	550	555
	Nüfus (bin)	66339	67236	68143	69064	69993	70924	71846	72752	73640
	Demiryolu Geliştirilmesi (milyon Avro)	116	222	226	451	499	672	756	1 493	1 470

Karma taşımacılığın daha iyi yapılabilmesi için Türkiye'de lojistik merkezlerin kurulması üzerinde durulmaya başlanmış ve 2012 yılı itibariyle 4 lojistik merkezi kurulmuştur. 2023 yılı itibariyle ise 18 yeni lojistik merkezin daha faaliyete geçmesi planlanmaktadır.

Karma taşımacılıkta zamanında ürünlerin istenilen yere ulaştırması öne çıkmaktadır. Bu nedenle de son yıllarda özellikle demiryolu sistemi Türkiye'de yenilenmekte, hızlı tren seferleri hızla yayılmaktadır. Türkiye karma taşımacılık için büyük bir potansiyele sahiptir. Kars-Tiflis demiryolu projesi, Avrupa ve Asya kıtalarını demiryolu kanalıyla birleştiren Marmaray demiryolu tüneli, Mersin Çandarlı-Filyos limanları projeleri Türkiye'nin demiryolu taşımacılığına büyük katkı sağlayacaktır.

Sonuç

Ülkelerin ekonomileri yerellikten küreselleşmeye doğru değişmektedir. Farklı ülkelerde üretilen ürünler, diğer ülkelerdeki talep noktalarına iletilmekte, bu ihtiyaç da lojistik tesisler ve ulaşım tesisleri gereksinimini arttırmaktadır. Şirketler, ürünlerini taşımak için en ekonomik modelleri düşünmek durumundadırlar. Bu da karma taşımacılığı tercih olmaktan çıkarıp zorunluluk haline getirmiştir.

Son yıllarda Polonya ve Türkiye'de özellikle demiryolu pazarındaki karma taşımacılıkta kayda değer bir yükseliş göze çarpmaktadır. Bu pozitif bir etki olsa da her iki ülke de karma taşımacılık konusunda çalışmalarına devam etmek durumundadırlar. Polonya ve Türkiye'nin kısıtlı veriler ışığında karşılaştırılması zor olsa da konuya geniş bir bakış açısı getirmesi anlamında bu çalışmanın katkı sağlayacağı değerlendirilmektedir.