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Master thesis

Conditions, problems, and tendencies in the Bulgarian railway sector with relation to the current regional socio-economic environment

Agenda

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Chapter 1

The importance of the topic

The present topic, in my view, encompasses the current situation in the Bulgarian railway sector and the areas the most attention is needed. The rail is a branch of the national transportation system that has been developing for numerous decades. It has passed through different hardships, regimes and yet, it is still playing an important role in the logistics of Bulgaria - moving cargo and passengers within and across national borders. As of 2007, the national rail network has become a part of the greater European Union network, allowing the expansion of the latter to the southeastern part of the continent and granting direct access to the Black Sea ports and route corridors to the East.

However, for some years now the sector has been under-performing, thus losing its importance and role as a paramount player in the transport sector despite its relatively developed infrastructure, huge amount of personnel and immense inventory. Moreover, the ongoing global financial crisis has already affected the Bulgarian economy and, respectively, would influence the transport sector, which together with telecommunications, is the part of economy that links the separate businesses and makes it possible for trade to be conducted by exchange of an array of products and services. Any drop in demand for use of the transportation service translates into less revenue and net income for the operators. In order to avoid financial disturbance and crisis, optimization and better allocation of resources of the current structure is needed.

The Bulgarian railway system includes parts of the Trans-European Network and CETC, which are among the priorities of the EU to develop in the long run in order to solve future bottlenecks and rebalance the shares of different modes of transport. Integration of the Bulgarian network to the Trans-European Network would translate into greater railway infrastructure optimization and establishment of uniform standards, interoperability, and compatibility. Once these conditions are present, the Galileo satellite navigation system and other technologies that facilitate JIT (Just-In-Time business model) and under good management, railways could assist in other businesses' timely processes, thus competition abilities for freight services and passengers between road and rail to rise. Introduction of new state rail management system of timing and time slots allocation to different types of trains sharing the common network – the European Railway Traffic Management System (ERMTS) would take care for the optimal distribution of traffic on a single infrastructure and commands trains of different type and origin. Funding of the ERMTS and not only, is possible via the various funding schemes and knowledge opportunities available since the accession of Bulgaria into the European Union, besides the easier rail operators cooperation for management best practices, know-how and restructuring processes. Among interested in railway has been also the IMF, which has made research on the macroeconomic effects of EU fund transfers to member states and from what has been concluded, the Bulgarian rail sector could benefit in both financial opportunities, and soft skills, as well as policy outcomes, the sector becoming more competitive and open, with improved service quality at lower costs and higher levels of safety (Willoughby & Anderson 2005).

Optimization of the sector is highly desirable, since at present some of the resources of the railways are not utilized enough (which creates underperformance), while fixed costs remain high. It is possible for them to go down and/or yet cover higher output. And though the sector, as in some other European counties, benefits from national subsidies, it would be desirable through the optimization and modernization processes, this subsidies factor to become obsolete in the long run and the sector to be more financially independent.

Environmentally speaking, the topic is also important because the improved speed, comfort, reliability, and travel time with the rail would relieve road bottlenecks and stimulate people to use it by providing better service on inter-city routes, thus lowering CO_2 and fine dust levels. Besides, it would all comply with stringent EU environmental standards (decrease of CO_2

emissions threshold to encourage electricity-driven transport) and provide cleaner environment to stakeholders one more level of alignment to the EU strategy on rail popularization and creation of freight freeway. Together with efficiency planning and improved logistics, the rail share could rise again, as argued by Jevtić and Radmanovac (2008) from the Belgrade University, dealing with logistics in EU traffic policies. Still, due to the ongoing development of the Union and the increasing multitude of nations makes financial distribution and decision-making slower and more difficult (Schneider 2008).

Developing intermodal transport is yet another important point to consider for the sector as a tendency it could work towards. This is not limited to software and hardware compatibility, but also to data transferability, flexibility, punctuality, and comfort. A further lag of the railways' competitiveness has the real potential to affect the whole economic competitiveness of the country due to slow-performing and poorly managed infrastructure and operators, non-punctuality and lack of interoperability. Regardless of the efforts to modernize and regain customers, one may judge from the information present so far that the sector is still losing its share, especially if compared to the road transport in Bulgaria, which has, on the other hand, been improving significantly in the recent years. Lastly, the present human resources needs revision, so that skills and competencies of the average employee rise and become in-line with those of colleagues abroad, service improves, and overstaffing is eliminated for the reasons of more stringent financial conditions and need to adapt to the desired improvements in the sector.

1.1 Background

So far, I have tried to find sources that provide me with enough information to both decide on what I would like to research, and get an idea on what is available regarding my point of research on the Bulgarian railways sector.

1.1.1 EU level

Data shows that since the 70's, railways all around Europe have been losing popularity, especially from the road transport, which in spite of the fact of being more expensive and dangerous, as well as an incomparable environmental polluter (Commission of the European Communities 2001, p.22), has managed to take over as the predominant freight/passenger mode of transportation. This is why the 2001 White Paper by the European Commission (subsequent references follow), has established long-term goals for the sector until 2010 and it is a good starting point to see where and why rail sector stands. More importantly, there is an array of under-explored opportunities for the sector to regain share (EXTRA Consortium European Transport Networks, 2001) and become more competitive. Numerous studies point out the importance of cargo within the railways and its importance for the growth of the sector, including specific policy recommendations, so that sustainable future-oriented growth states could go after in either passenger, or logistics sector (Jevtić, & Radmanovac 2008, p.520). Either ways, with the help of various funding options (due to the inability of the Union tools to totally support initiatives) and various policy strategies for modernization, education and optimization, the railway network could be reformed, so that it becomes a greater player in the transportation of people and goods.

The EU pushes the rail sectors towards a creation of a bottleneck-free Trans-European Network that would facilitate the exchange of goods and mobility of people, be centralized in terms of management tools and practices, so that it could effectively compete with the road transport to regain shares. There have been strategies laid out for achieving that goal - from different sources of financing to software management and support (Commission of the European Communities 2001, p.58). Different financing methods have been discussed, recommended, and used. Such are the Cohesion and Structural funds, European Investment Bank, as well as some innovative measures for toll allocation in Switzerland (Commission of the European Communities 2001, p.61) that may aid the financing process, as construction or rehabilitation of a rail network is a complex engineering task, involving numerous agencies and factors (social, financial, environmental). Most of these schemes foster the participation of PPPs (Public-Private Partnerships) and that is yet another obstacle for the sector of interest, as there has overall been limited experience with such arrangements – including management issues of ownership, delegation of responsibility, sharing the design and demand risks (Nikolic 2006, p.5), etc. Yet, beneficial research on the topic of policy effectiveness exists, including the 2008 research on assessment of TEN-T and financial, regulatory and other obstacles (Informal Transport Council, 2008, p.13) it faces.

What have also been discovered so far are the problems the rail sector is facing, i.e. speed, flexibility, reliability, financial stability, and punctuality. Numerous statistics from Eurostat exist on the competitive situation among different transportation modes (modal splits) and among countries have also been uncovered, so that one could understand the trends (past-present-future), act on them in a timely fashion, and try to provide recommendations for the sector's revitalization.

On the EU level, official sources focus on recommendations designed to affect the railway sector in each member state in a way to mitigate and/or solve the most detrimental problems the rail is facing and is to face. Great importance has been given to the TEN-T measure and how it should go on in order for the rails to regain share and become more competitive by effective management of the main costs. Policy-makers and different stakeholders have put emphasis on the development of intermodality, i.e. fast and effective change of transport modes for the ultimate provision of a better service (Salucci, 2006). It is nice to see what part of the concept is possible to implement in the Bulgarian railway sector. Yet, for this to become reality, interoperability and ERMTS are also factors to consider.

1.1.2 National level

The rail sector in Bulgaria dates as back as 1888, when the state company BDZ has been created, which make the state among the first in Europe to carry passengers and cargo via its rail infrastructure and carrier (NOB 2007, p.3). Since 2007, Bulgaria is a member of the EU. Therefore, the railway sector could benefit and explore the present knowledge from the railway sectors in other member states, as well as align its long-run priorities with the ones of the EU (i.e. tendencies), so that it could react against the ongoing decrease of volume in passengers and freight carried either on a national, or cross-national level. There has been cooperation with DB and other foreign companies regarding timeslot management, maintenance of wagons and infrastructure, etc. The sector has also taken advantage of the educational opportunities the Union grants to members and has won at the end of 2008 a tender under the "Leonardo da Vinci" program for personnel education on current best practices and harmonization of professional knowledge and current standards with those of other EU member states. This is also related to the importance of the rail sector to the Union, since five of the Common European Transport Corridors (Ginev 2008, p.2) - CETC network, run though the territory of Bulgaria (Coordination of Programmes and Projects Directorate - Main 2005, p.9-10) and extends member states' opportunities for trade.

However, what I have found out so far is that the Bulgarian sector is facing numerous impediments that lead to its underperformance and general instability. These vary from bureaucracy to investments, from corruption to skills and infrastructure condition. Also, the past crises in the sector have already destabilized it and considering the current trends in Bulgaria for lowered production volumes and re-increasing unemployment, the railways are facing even more financial constraints and this is why optimization is needed. Irrevocable closure of lines has already happened (hundreds of km tracks) and this is counter-trend to the policies of the Union, where countries enlarge their infrastructure or at least do not shrink it. There have been case studies on best practices aboard that are suitable to benchmark against the current situation and draw conclusion and recommendations, present later in this work.

Due to the long history of the sector, its size and socialist legacy, the railways in Bulgaria currently employ thousands of people with different backgrounds and significance for the operability of the sector, which leads to high fixed costs for the company and requires a measure towards planning on downsizing due to overspending and other financial issues, i.e. investment projects affected by corruption and lack of skills to tackle EU funding. There has been some downsizing on a national level, which at present has not resulted in much improvement, but on the contrary - in a further fall in quality of service and equipment.

Regardless of the ongoing hardships in the sector due to the general state of equipment, management, and the potential shrinkage of freight customers and passengers, the sector is trying to modernize, so that it could provide better services and compete on a cross-national level for passenger and cargo (Plovdiv-Svilengrad route, a project being currently into construction). Cooperation with the German DB has also been made. There have been efforts to liberalize the sector, in particular the freight services, by allowing new entrants for better services and nationwide share-regain potential. The Europe and Central Asia Infrastructure Department, part of The World Bank, has also tracked the reform of the sector and benchmarked against other Balkan states. Yet, the study points out again that there is a lot more to do for the sector to be as stable as it should, including a shift in policy focus away from income support towards productive investment into the sector, considering the long-term financing strategy on European level that has been put into policies for the support of Bulgaria (Willoughby & Anderson 2005, p. 48).

The Bulgarian railway sector is currently carrying a negligible amount of passengers on cross-national destinations. Therefore, it is important for the sector to open up for international passenger transport and compete with the coach lines. Moreover, the geographical crossroad on which Bulgaria is situated makes this opportunity even more attractive.

1.2 My research

In this project, I would try to outline the situation, tendencies, and options for optimization of the sector, so that it could strengthen its long-term viability and regain share as a mode of transport, having in mind the crisis externality and the EU policies on the railway development. In my opinion, the sector has a potential to regain share and become more financially stable, increase profit, if changes are made towards optimizing both the benefits the EU offers, and optimizing the sector on a national level, so that both the crisis effects is managed, and the sector goes after regain of share in the long run.

What optimization opportunities exist for the Bulgarian railway sector, so that it strengthens and develops in the long run, considering the current socio-economic conditions and transport development strategies of the European Union?

- What is the place of the railway in the EU?
  - What are the development trends of the transport sector and the place of the rail within it?
  - What are the pros and cons of the EU rail transport?
  - What challenges the sector faces across the EU?
  - What is the EU strategy for the rail development?

- What is the situation in the Bulgarian rail sector?
  - What is the structure of the sector?
  - What was the path of development of the sector since 1989?
  - What are the main revenues and expenses of the sector?
  - What factors cause bottlenecks in the BG railway sector and hinder the sector's development (freight and passenger)?
  - What is to be taken into account, so that investment risk is lower?
  - Why higher levels of electrification, intermodality, and interoperability are beneficial for the sector?
  - What are the positive effects of the improved rail for the local communities and the general mobility of people?

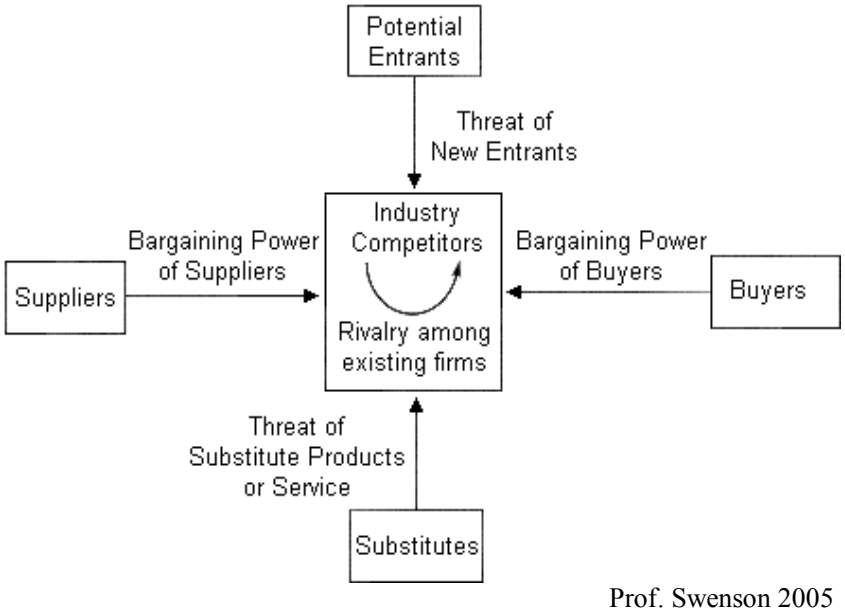
- What are the mutual benefits of the Bulgarian railway sector and the EU and the opportunities that stem from the partnership?
  - Why is TEN-T important?
  - What methods and forms of financing may aid the sector's revival?
  - What know-how from European states could be adopted locally?
  - What EU policy measures require the most attention for the BG sector development?

- What opportunities exist for the sector to develop in the long run?
  - What are the effects of the current economic state?
  - What kinds of infrastructure opportunities exist for increasing the freight and passenger net flow?
  - What is the role of modern hardware and software for the sector's long-term development?
  - What internal measures could be taken for the personnel, so that the sector could become more competitive, flexible, and viable?

1.3 Methodology

I intend to use different methods to answer the main questions of the thesis by aligning my research to Porter's Five Forces Model of Competition to look at the "elements of industry structure" (De Wit & Meyer 2004, p.260) in a systematical and organized manner. The model encompasses the various determinants that once summed up, define the general intensity of rivalry within the sector and intertwining of industry competitors, while considering the main issues of industry attractiveness and the payers' competitive position within the sector. The railways are attractive due to state subsidies, well-developed infrastructure, very few competitors (none in the passenger sector), EU strategies for rail revitalization, bringing along investment and know-how, and more. The geographical location of Bulgaria and the existing intermodal stations also play a key role in the overall industry attractiveness with long-run profitability prospects. The industry is to further liberalize and open up for competition, with the current situation of few negligible private operators. Overall, there is little batter among competitors, but more against substitutes.

Ultimately, the model determines profitability within the industry, since the five forces influence "the prices, costs, and required investment of firms in an industry – the elements of return on investment" (De Wit & Meyer 2004, p.259) - ROI. The threat of new entrants is defined by the barriers to entry under realized economies of scale, efficiency in product cycle, switching costs, access to infrastructure, and government policy. Besides new entrants, the industry is also affected by he bargaining power of buyers – their number, ability to switch to substitute products/services or other competitors, their level of information, and price sensitivity. A third element in Michael Porter's framework is the substitutes - the threat they are to current rivals. In this particular case, substitutes are the other modes of transport that are able to compete for clients and deliver the desired end service. In the thesis, I will focus on road as a substitute for rail, as the EU goal to revitalize the railways looks predominantly at the role of road in this aspect. The threat from substitutes includes the price performance, ease to access, punctuality, and reliability of service (De Wit & Meyer 2004, p.260), just to name a few. A certain role play the suppliers in terms of labor, infrastructure, wagons, repair service within the rail industry and their condition – of stations, tracks, NKJI management style, policies – i.e. inputs for the well-functioning of a firm/sector. Lastly, the rivalry against firms plays a role in shaping the sector's structure, as it is affected by size of industry, potential to grow, competitive advantage, number, size, and market share of players, as well as barriers to exit and economies of scale.



Prof. Swenson 2005

For the first main question "What is the place of the railway in the EU?" I intend to study relevant literature from the European Commission and other official bodies, as well as analyze documents on particular topics for relevant information, such as official brochures, papers on railway, intermodality, etc. I will also use the White Paper to see past, present and near-future trends, plus other pertinent reports for more long-run goals of the sector for the Union.

For the second question I intend to study specific literature on past trends and outcomes from the last 20 years, study specific topics from the Bulgarian specialized websites and media on current problems and current practices. However, to obtain some of the information needed, I will conduct interviews with people currently employed in the sector, with specific knowledge on subjects and access to more detailed information. I think of using a limited number of short case studies for better representation and understanding of the situation. As a whole, this part would require the greatest variety of information sources.

Regarding the third question: “What are the relations of the Bulgarian railway sector and the EU and the opportunities that stem from the partnership?” I consider analyzing specific documents on the financing option, as well as case studies, wherever available, on financing methods and best practices in times of restructuring. Also, I will look for information from more specific literature on the topics of TEN-T and (cross-) national policy implications for the opportunity of the rail to regain its dropping share in both freight, and passenger transport.

Based on the information already acquitted during the research for the previous sections, as well as specific literature analysis and interviews, I will do my best to draft the potential of the sector and the long-run tendencies (until 2030) it could work towards, so that it could become more financially and operationally stable, reliable and able to profit from the new trends in freight and passenger services, so that it regains some of its share from the road transport. I think about looking at the current situation in Bulgaria (interviews, media) and draw a picture of the possible effects, which the rail should cope with. Here, my main focus would be the study of specific documents and interviews, so that I could draft recommendations on both crisis management regarding this particular country and industry, and long-term development.

Regarding sector-specific information, I have decided to look through news, articles, published interviews, plans from the Transport Ministry, and finally, the BDZ newspaper in order to understand the ongoing changes, reforms, planned activities, etc. The national company for rail transport is still the major player on the market (in terms of number of employees, equipment, turnover, revenues) and this is why I intend to conduct interviews with people who work there for information I have not found elsewhere. This is so, because the national carrier has no audit report. Data I could otherwise find in such a report may now prove scarce. Besides, work-related issues and more “internal” information are not possible to uncover without interviewing. I have already found the persons I would like to interview and have their consent to cooperate – 1 person from general administration, 1 person from traffic coordination section and 1 top manager. Moreover, they work on different levels and positions within the sector, so that I would get a better picture by acquiring and analyzing the information needed.

1.4 Outline

For the outline of the paper, I intend to follow the exact order of the research questions and sub-questions as mentioned in 1.2 above. However, the summary of the work, the sources used and the list of content would be represented separately, outside the five chapters. Any additional information, which may be useful for the understanding of the content, I will represent graphically. Case studies would be included in the respective section, focusing on specific know-how and best practices. In the process of writing and modifying, the order of some sections may change, but still conform to the standards of a master thesis work.

Chapter 2

The railway and the EU

In the previous chapter, I have gone into details regarding the importance of the railway across the European Union, the background of the issue at both EU, and national level, with the closer look on tendencies within the sector, often compared with the trends and factors within the road mode, with the idea of more substantial analysis and clearer understanding of the present position and importance of the railways within the cross-border economies. Afterwards, a description of the methodology and general structure of the thesis has been presented for the reader to understand how the work process is to unfold and what is the logic behind this order for the conclusions based on data presented and analyzed. This development is continuing in this chapter, with the closer examination of the railways and the EU, its development trends, advantages and disadvantages, and present/future strategies.

I am **FIRST** going to focus on the development trends of rail. This topic is important, since it will provide a solid basis for understanding the importance of efficient and effective transport for the economies and competitiveness of the EU. The topic will also disclose and benchmark the trends within the rail sector. Bottlenecks the differences between the West and East of Europe are also important, for the complexity of the matter to be broken down.

Once the transportation trend is perceived, I will **THEN** go deeper into more specifics: the advantages and disadvantages of the EU rail. It is important to know, since the thesis focuses on the Bulgarian railways, where the EU development strategies for rail are also valid and thus, one needs to understand what pulls back the development of railways, what are the obstacles to be cleared via TEN-T. It is vital to disclose what criteria for service are not met and this is why the rail share suffers, relating to the theoretical framework in 1.3.

Therefore, in the **NEXT** subsection I will focus on the challenges rail faces across Europe - modernization, financing opportunities, transparency and accountability, timely implementation of TEN-T, technical harmonization, and the central issue of intermodality, which is later in the thesis to be further elaborated. I will discuss the challenges in both West, and East of Europe, distinguishing what is different and what is similar as system and practices.

Once the reader has understood the history, development trends, pros and cons, and challenges for the railways, it should be easier to understand the main policy strategies. **LAST**, the focus will be on strategies for revised project implementation, assistance to rail operators, liberalization, and scarce capacity allocation, amidst the strategies to restructure, modernize services/inventory, and increase the importance of freight. The three railway packages and Marco Polo II & I are also to be discussed as tools for revitalization and increase in competitiveness.

The reader should be familiar with the topics discussed, since it is needed to understand the latest trends in railway transport and the place it occupies, as well as the path the Bulgarian railways would mostly benefit to take – one in accord with strategic EU policies, so that the sector could align itself to international trends, to strengthen and take advantage of financing and policy opportunities developed by the EU, with the consideration of what are the most beneficial approaches to growth, so that it can effectively compete and cease losing modal share. Due to focus limitations, I will omit the comparisons with all modes of transport and disclosure of less relevant factors and trends, as well as regulatory tools and details on policy measures.

2.1 Development trends of the transport sector and the place of the rail within

2.1.1 Road versus Rail
2.1.2 Freight and passenger service trends & main players
2.1.3 Bottlenecks and network density
2.1.4 Two Europes

2.1 Development trends of the EU transport sector and the place of the rail within

Transport is a vital sector of the economy of any member state in the European Union and not only. It is the means for communication and exchange of all kinds of materials and goods, a resource that increases the mobility of people. This is the reason why parallel to the development of human kind, transport developed and nowadays, we may distinguish many kinds of transportation methods. Yet, in the following pages I am going to emphasize on the EU railway. To effectively benchmark its performance, comparative analysis with road share and total share are to be considered.

2.1.1 Road versus Rail

Depending on the particular needs of clients, different modes of transport are preferred, each including a spectrum of different pros and cons, qualities and variables, which determine the choice of the client, regardless of him being a person or a legal entity. Besides costs, which are a main driver and determinant of market economy, other factors include flexibility, reliability, safety, punctuality, comfort, geographical peculiarities, volume of goods/passengers to be carried over just to name a few. However, with the passage of time, road transport has gained popularity over the other methods of transport and is at present the overall dominant mode to carry freight and people across the continent, despite being the mode that harms the environment the most and holds the greatest risk for the life of passengers (in terms of harmful emissions and accident rate, as seen later). Yet, it has proven to be quite flexible and despite its environmental drawbacks, congestions caused and scale of investment needed, it has established itself as the predominant method for either passenger, or freight carriage across the EU. Resent studies from Noreland (2008) confirm this trend, as for only 6 years the amount of cargo carried over road within the EU has scored a two-digit increase in share (25% in 2006), resulting in the rise of road freight transport's overall share up to 73% (measured in tones per km), thus confirming its leadership position within the cargo sector. This tendency is present in all EU-27 except for Latvia and Estonia, where the railway sector is having the leadership position over road, being the predominant mode for freight carriage (Noreland 2008, p.1).

The situation in the modal split for inland passenger road transport within the member sates follows a similar trend, with total share of "almost 5,000 billion pkm, an increase of 16%

compared to 1995" (Noreland 2008, p.1), which resulted in 87% of all passengers in 2004 to have been carried by road – an even greater discrepancy against other modes of transport, comparable to the trend within the cargo sector from above. Road share has by far surpassed any other cargo transport mode in 25 EU member states. In the case of proportional analysis by modal split, road vehicles appear to have carried

- 3 times more freight compared to rail in 2004
- 4 times more freight compared to rail in 2006

2.1.2 Freight and passenger service trends & main players

The Baltic countries have been the only ones where rail surpasses or equals road share. Recently, Germany came out to be another major rail freight user with "an increase of 12% in 2006 compared to 2005" (Noreland 2008, p.1), resulting in ¼ of all cargo carried by rail within the Union. However, if we look at the broader picture and consider the yearly increase of freight carried in total, we see that the rail had in fact lost 1,6% in modal share from 2004 to 2006. Having in mind the limitations of the statistics, such as different modes of data collection of goods carried over road versus the other modes, rounding techniques for incomplete data in 2006, etc. (Noreland 2008, p.2), Eurostat is still rather representative on the general trend in freight transport across the EU, as it does not limit itself to inter-state movement of goods, but spans on cross-border carriage too: "international transport represents more than 40% of total freight transport in half of the Member States" (Noreland 2008, p.4).

In 2006, the "rail passenger transport reached 380 billion pkm in the EU-27" (Noreland 2008, p.3), which is more than 13 times less the respective indicator for road (5000 billion pkm). Even though this comparison has limitations in the sense that it benchmarks 2004 road against 2006 rail, it is still valid in its overall indication of the general trend in the transportation sector within the EU-27, with the rail playing a minor role in the carriage of passengers in most member states despite its long presence on the continent (1835 in Belgium, 1888 in Bulgaria). In the period 2003-2006, the greatest increase in rail passenger transport has occurred in Estonia (41,4%) and Latvia (30,2%), with the greatest decrease in Lithuania (-38%) and Poland (-7,9%) (Noreland 2008, p.3), indicating both the potential, and instability of rail share in non-western member states and the need for deliberative action to support positive trends and counteract negative ones. Larger players like France and Germany have succeeded in attaining around 10% growth for the same period. Overall, there has been a EU-27 average of 6.4% passenger increase from 2003 to 2006 (compared to 11,2% for freight over rail) (Noreland 2008, p.3), translating into insufficient growth in modal share to effectively counterbalance the share discrepancy between the modes.

Rail has managed to stop its downward trend in EU modal share expressed in tkm per year, but has NOT managed to re-gain enough shares to practically reverse the trend by 2006.

Still, it is a good sign for the stability of rail in the passenger sector, as most members (21 out of 27) have managed to realize overall increase in the pkm indicator, thus trying to bring more balance between road and rail. An obstacle towards this goal is the discrepancy in overall rail versus road density per country (Bialas-Motyl 28/2008, p.5), with differences varying from 5 to 45 times denser network in the advantage of road.

The pkm indicator is 13 times less the respective indicator for road (according to recent studies). Rail network density varies from 5 to 45 times less than road at national level.

Such a share distribution is not only attributable to pure market mechanisms of competition and competitiveness, but also to intentional policies on rebalancing the modal shares for both passenger, and freight transport. Deliberative attempts by the EU have emerged since the adoption of the Treaty of Rome and its strategies for common policy on transport. However, the current policy situation in the sector is far from being harmonized on a national or cross-national level regarding the modes of transport, all resulting in the imbalanced growth of the road, rail, and other modes. This is also due to the different specifications of each mode regarding its timely and effective adaptive abilities to the shifts in economy, modes of production, and speed for delivery of goods – just to name a few (Commission of the European Communities 2001, p.7). As a result, the trends discussed above have become the present reality within the EU: road being the dominant mode for transport within states and across borders of goods and passengers, leaving the rail as a second-best alternative far down the ranking, surpassing its share in times, regardless of the greater noise, CO_2 pollution levels, and the former mode's inability to carry huge amounts of freight at a single course. It seems that road has adapted better towards the market needs and in its responsiveness towards clients' demand on flexibility and reliability in service.

2.1.3 Bottlenecks and network density

As a result of the imbalance of modes' popularity and lack of enough policy coordination on balancing the modes of transport, congestions started to intensify from the mid-nineties and are, at present, endangering the economic flexibility, JIT (just-in-time) mode of production of companies, and overall competitiveness of the Union due to centralization of traffic around economic centers and isolation of rural regions. Thus, links among main markets overdevelop and links between main markets and less developed regions remain underdeveloped, threatening the EU "with apoplexy at the center and paralysis at the extremities" (Commission of the European Communities 2001, p.7). What is even more disturbing is that bottlenecks are present not only in the road mode, but also within the rail sector. Statistics reveal that congestions are a common event along 7500km of the total road network, with delays realized over rail being even more widespread – across 16000km, or 20% of the total network (Commission of the European Communities 2001, p.7), despite the immense investments in TEN-T (Trans-European Network) projects and expected release of Galileo satellite navigation system to facilitate punctuality and reliability. If trends within the sector continue undisturbed, the White Paper prognoses extra costs incurred due to transport network bottlenecks to amount to 80 billion euros per annum, or 1% of EU-27's GDP.

"Bottleneck" is a term used to describe traffic constraint. It is a sector/part of the network that has a lower permeability level and can handle, in general, less traffic than the other parts of the network, generally due to infrastructure limitations. As a result of that, the overall capacity and efficiency of the network decrease.

The revolution in production mode, political shifts, and rise in cross-border trade across Europe is not sufficient cause for the discussed general trend of development within the sector. Looking to the east of Europe, states with intensely developed railway networks have reversed the trend in favor of road transport being the dominant mode for freight carriage after the adoption of democracy, resulting in immense investments in new roads, with the simultaneous abandonment of many railway lines in Poland, Hungary, and Romania (Bialas-Motyl 28/2008, p.5). To the West, the United Kingdom and Denmark also follow similar trends since 1990 and in 2005 their rail network density has decreased with 7% on average, leaving only 6 member states with a density of networks above 80 km/1000 km^2 (Bialas-Motyl 28/2008, p.5). According to Eurostat, only the Czech Republic and Croatia have expanded their networks by more than a negligible shift. Finally, improved purchasing power of citizens in many countries, blended with the desire for mobility independence and social status affirmation through demonstration of

economic success, have lead to immense increase in the ownership of private automobiles as the most preferred mode for meeting new transport demands.

20% of the total rail network is paralyzed on a regular basis by bottlenecks. Only 6 member states have a rail network density above 80 km/1000 km^2. Only 2 member states have expanded their networks by more than a negligible shift.

There has been a continuous trend for 3-million-increase in vehicles/year on average for the last 30 years within the Union (Commission of the European Communities 2001, p.9) and despite the recent hardships of the automobile sector due to the economic recession and loan crisis, the volume has long ago surpassed the maximum loading capacity major road arteries across Europe are designed to handle.

2.1.4 Two Europes

Many would think that this situation is more typical for Western Europe, but not that much for Eastern Europe, including Bulgaria. The case is not like that. As we have already seen from studies discussed and analyzed, the development trends, past and present, favor the road transport in either passenger, or cargo sector. Moreover, with the change of political regime, there has been great turmoil within the countries and chaos in the large state-owned companies, where increased corruption and profit interests had ceased the monetary support for the rail and contributed to the halt in development. Despite the ex-communist countries having denser developed rail network (as a whole), rapid decreases of pkm and tkm have been observed, as the monopolistic system that controlled the sector has been unable to adjust itself to the new market economy and mobilize its resources. On the contrary, the large administration drained the resources of the companies and profits did not suffice for adequate maintenance and rehabilitation of rail. As a result, speed and overall condition of the material basis deteriorated. In the same time, the road sector has been easily accessible for newly established private carries that found it easier to compete with the state when sharing road network, than when sharing rail network (due to specifications of each mode, construction and costs to start up, besides licenses, charging, accessibility – barriers to entry). As a result, the rail has fallen for few years into a vicious circle of lower quality and lower income, which has slowed down for Bulgaria becoming part of EU.

Western rail companies have also faced challenges to improve quality and service with the advance of JIT production method across sectors. As bottlenecks started to appear earlier in time, while demand for transport of goods has increased, railway operators started to cooperate on the international routes and so, being comparatively fast and flexible to the high customer requirements. However, the lack of well-developed interoperability and present cross-border regulatory constraints prevented the further development of the initiative to modernize the service (Commission of the European Communities 2001, p.33). Therefore, a strategy on a cross-national level has been developed to improve rail freight punctuality and reliability comparable to the road indicators, which are still far ahead. The situation is the passenger sector is better as a whole, since the cooperation and intensity of rivalry among industry players has been quite successful on (inter)-national routes; especially in the Netherlands, France, Germany, long-distance cross-national passenger rail transport has become rather popular and preferred.

Rail companies in both the West and East of Europe have faced challenges to improve quality and service with the advance of JIT production method and business requirements for greater reliability and punctuality of service.

Deliberate policies in the West have managed to increase the pkm substantially by offering speed and quality, combined with good price for the service: "new high speed services plus greater efficiency in the provision of conventional services as a result of institutional reform and of the partial introduction of competitive tendering have already apparently stabilized rail mode share over recent years" (De Ceuster, Materns & Borken 2005, p.31). Safety statistics have also contributed to this positive shift in international passenger transport, confirming the negligible amount of rail passenger casualties of less than 100 per year, compared to road casualties that have made risk-averse passengers reconsider their mode of transport on shorter distances. Major train accidents have been a rare event, while road victims are heard of on a daily basis, making many consider train as the safest of all. According to Eurostat, there have been

- 1483 rail fatalities for 2004
- 1370 rail fatalities for 2006

for the EU-27 (Pasi 2006, p.3 & Bialas-Motyl 1/2008, p.2). What is encouraging for the potential of rail passenger (inter)-national carriage is not only the low number of injuries, but also the declining number of casualties, as well as the fact that only 5% of the casualties comprise of in-train passengers. To compare the magnitude of fatalities, only in the Czech Republic the number of road fatalities for 2004 has been 1382 (Wren 2005).

2.1.5 Regulatory trends

Lastly, let us briefly look the regulatory trends of the EU transport sector. There are noticed tremendous difference in access to the road and rail networks by private players due to regulatory practices too, not only the already mentioned different costs to operate and work with machines and network in either modes. Regulation is the rail sector has been slower and less efficient compared to road and going further to the EEU, with the end result of rail, and especially freight rail, losing great share of transport activity and profits due to inability to equalize regulatory and taxation practices, besides the lack of interoperability among carriers already discussed. Moreover, the high share of public rail monopolies and the lack of opportunities for competition, as well as the road being a major substitute for the transport services, halt the sector from development, in particular in Eastern Europe. In contrast, "road freight transport (haulage by truck) within the European Union has been totally deregulated and fully open to competition without any quotas or restrictions since July 1, 1998" (Hilal 2008, p.e20). As a result of the economic deregulation, barriers to entry dropped to a minimum and consequently, competition and number of new entrants increased. So did the speed, quality, and reliability of service, from all of which the greatest beneficiary turned out to be the end consumer, despite the stirred policy chaos at a national/EU level. Delay in harmonization of member states' sanctions, tax laws, labor laws, subcontracting, safety requirements and many more caused great confusion for policymakers, state bodies, and labor unions. Yet, the road freight sector has been blooming in economic sense, while the rail freight– struggling, "especially…in international freight traffic where rail should naturally have a competitive advantage over road" (Wheat & Nash 2006, p.1). The extensive road deregulation has also allowed companies like Willie Betz to find legal backdoors and thrive because of the deregulated market. It bought the state carrier of Bulgaria SOMAT in 1994 (Hilal 2008, p.e24), together wish other EEU carriers to operate with them around the EU. Despite the legal and labor clashes, the road sector gained power and drew more and more resources; the rail has only recently managed to halt decline.

2.1.6 Summary

With time flexibility, reliability, safety, punctuality, volume of goods/passengers, geographical peculiarities, and comfort has become determinants for the general preference for choice of transportation mode, besides costs. Such trends have also affected the ex-communist countries with their denser developed rail networks, as rapid decreases of pkm and tkm have been observed due to the inability of state companies to adjust to the new market economy and utilize resources. As a result, road transport has become the dominant mode to carry freight and people across the continent, with 87% of all passengers in 2004 to been carried by road. There has been an increase in both freight modes in 2006, yet insufficient for the rail to balance out the trend when compared to the overall increase in amount of freight carried within the EU-27. The rail has managed to stop its downward trend in EU modal share, but has not managed to re-gain enough shares to practically reverse the trend by 2006. Congestions are a regular event across 16000km, or 20% of the total rail network. Major train accidents have been a rare event, making many consider it as the safest mode of all.

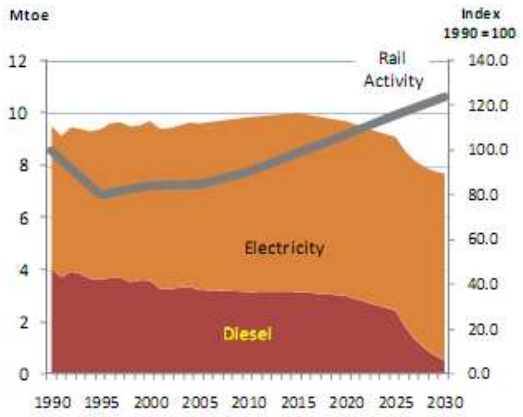
2.2. Pros and cons of the EU rail transport

Like every mode of transport, the rail has its imperfections. Like every business, sector, branch of economy, it holds advantages and disadvantages. In the previous section, many of them have already been discussed. Yet, there is more to say on this issue, so that one could easily structure the sector, understand its strong point and notice where it lags behind the general trend. Knowing the dimensions of the sector EU-wide allows one to grasp its strengths, weaknesses, challenges, and strategic development notions.

2.2.1 Railway advantages

A great plus for the rail sector within the EU is the introduction of a variety of policy measures to strengthen its position and the great investments that are respectively being allocated for the mode. A great prop for the sector all across are the 30 Trans-European Transport Network (TEN-T PPs) priority projects that the Directorate-General for Energy and Transport within the European Commission has prepared and is currently in the process of implementation. The projects are scheduled for realization until 2013. Despite the fact that TEN-T is developed for all kinds of modes, 23 out of 30 projects are designated for high-speed rail, or freight rail lines, or intermodal mix (DGET 2008, p.4), with 85% of the total funds being allocated to rail PPs (Informal Transport Council 2008, p.60). The rail transport has been guaranteed huge findings and projects that have already been developed in the medium-term, with long-term benefits for the people's mobility and freight's reliability. However, TEN-T has its drawbacks mainly in the time frames for completion.

Figure 1: Rail sector energy consumption
Source: Prof. Capros et al 2008, p.55



TEN-T has clear priority for rail: 23 out of 30 projects are designated exclusively or partly for rail, with a total allocation of 85% of funds to rail. Most projects would not be completed on time.

As data on progress reveals, more than half of the projects will not be competed by 2013, with some even extending as far ahead as the year 2020. So far, only 3 projects have been 100% completed (DGET 2008, p.6), indicating that even with strong financial incentives, plans and policies, the sector is unable to develop at the speed required, a speed that is set with the

economic needs of the Union. Even when the current economic turmoil is considered, it is not a reason to slow down the construction, but on the contrary, since it will create jobs and take advantage of the lower prices of construction materials, for example.

2.2.2 Mobility and energy: long-term policy strategies

Mobility is always related to energy. This is what keeps the rail at a competitive advantage and will continue to keep it - its source of power. Electrification of the network is expanding and despite the fact that diesel is still important (making up 1/3 of all energy input) (Prof. Capros, Dr. Mantzos, Papandreou & Tasios 2008, p.54), its role is constantly declining as a result of electrification. Consequently, the lower energy consumption per unit when freight or passengers are carried over by electric locomotives, the lower final costs are. Profit margins grow and more flexible to shrink in case of economic turmoil or higher pressure from other modes to still operate with gross profit realization on a more competitive level. If the current economic conditions do not cause harmful long-lasting effects on the member states and electrification goes according to plan, within the next 20 years the share of diesel would shrink to negligible. "In terms of primary energy, which takes into account energy conversion and losses of electricity, the electric train is 25% more energy efficient than the diesel train per unit of transportation activity" (Prof. Capros et al 2008, p.55). As a result, costs for transportation over rail should decrease. Blended with the general ability to carry more cargo per time when compared to road, rail may positively affect consumer preferences in its benefit.

Lastly, not only energy efficiency of electricity-powered locomotives is higher than of that in internal combustion engines, but also it is more ecological in terms of emissions and general pollution of water, air, and soil. If we draw a comparative analogy between a trolleybus and a diesel bus (the closest equivalents of the locomotives in transport), we see that the former saves 4,8 grams of carbon monoxide (CO), 17,9 grams of nitric oxides (Nox), 3,3 grams of sulfur dioxide (SO2) and 11,1 grams of hydrocarbon (CH) (Dr. Schaden & Mackinger 2008, p.5), eventually affecting the health and well-being of immediate stakeholders. If rail tkm increases as desired, the environmental burden would increase by 80% by 2020 (EXTRA Consortium for DG Energy and Transport 10/2008, p.6). However, such a drastic increase doesn't translate into significant rise of pollution, while it causes significant decrease in road-based pollutants, "from reduced road traffic" (EXTRA Consortium for DG Energy and Transport 10/2008, p.6). The EU rail transport is also at a plus by less dependency on fuel, as international conflicts (such as the winter 2008-2009 gas crisis across the EU).

Not only is energy efficiency of electricity-powered locomotives higher than that of internal combustion engines, but also are the former nature-friendly and less politically dependent.

Such conflicts hinder economies' flexibility by immobilization, as there is high dependency on fuel and in the same time, lack of fuel resources, reserves, or alternatives - like the case of Bulgaria that was 100% cut off from fuel supplies and its economy suffered accordingly. In that sense, rail is relatively independent from foreign energy/fuel conflicts

2.2.3 Drawbacks of the sector

However, despite the low emissions levels, energy efficiency, and relative independence from external suppliers (considering that most EU member states do not rely on electricity imports), the rail sector faces challenges in the face of levels of electrification and uneven distribution and development of the network despite TEN-T. In terms of electrification levels, the fluctuation is immense – from 3% to 95%, being on average for EU-26 44% (Bialas-Motyl

28/2008, p.5). A problem is not only the low level of electrification throughout the EU, but also the unbalanced electrification and overall density of the network, ranging from 17 to 116 km/1000km^2 (Bialas-Motyl 28/2008, p.5). Therefore, even if we have regions of high density, electricity, and options for effective interoperability, the overall strength of the network remains weak, as customers are geographically limited to efficient service delivery. This means that regions within a member state or among member states are rather unevenly developed. As a result, chances for cross-national freight and passenger carriage decreases (volume and efficiency), although some issues with cross-national passenger transport have been partly resolved. In business view, when a company decides to carry freight over rail, it will benefit to do this (over road) only within regions that meet the abovementioned criteria for density, electrification, and availability. If freight is to be carried across borders, the issue complicates more as speed and flexibility of the rail service becomes more unpredictable and is prone to additional decrease, thus discouraging end customers from suing the service of rail at all.

Not having well-developed and evenly developed rail network would prevent people from using it, since if the rail way is not easily accessible where clients want to use it, or time-consuming adjustments are needed (as intermodality would be absent), speed and flexibility (i.e. road) would take over safety and environmental (i.e. rail) concerns. Such conclusions are substantiated by the staggering difference in road network density across member states: from 171 to 3168 km/1000km^2 (Bialas-Motyl 28/2008, p.2), where the difference reaches as many as 46 times (in the case of the Netherlands) in favor of road. Even greater discrepancy between road and rail density is traceable here, yet the magnitudes are quite different, as even the poorest developed road networks excels by 47,4% the best developed rail network. Still, density and availability are not absolute determinants for road triumph, as management skills, freight volume, and infrastructure peculiarities/abilities play a role too.

A problem for the railway is not only the low level of electrification throughout the EU, but also the unbalanced electrification and overall density of the network, where difference is as much as 46 times in favor of road.

If we are to combine this current situation with the JIT business model adopted throughout the Union and the long-term EU goal for lowering the diesel dependency to less than 10% by 2030, a railway modal share regain appears a great challenge for the Union for the next 20 years, in consideration with the experience so far (only 3 TEN-T Priority Projects completed). Considering the ongoing trend of increase in road modal share and time to revive the rail, plus the increase in number of operable personal vehicles, the effective reversal of trend seems even more distant. However, the rail network's general condition across most states is of at least moderate quality, which mostly reflects speed. While speed is crucial for passengers, besides ticket prices, of paramount importance for entrepreneurs are reliability and punctuality of cargo services. Therefore, even at lower speed, the rail is not losing competitive force in cargo. What can be a big plus for the rail is the development of interoperability and intermodality, so that once combined with proper density and electrification would all contribute to lower administrative, time, and capital costs, translating into better financial performance for the operators, better customer service and overall optimization of the process. Hence, current weak points are not only the infrastructure availability and condition in different parts of the Union, but also management practices, since most large operators are still state-owned and restructuring towards higher levels of liberalization is rather sluggish, except for Great Britain (Wheat & Nash 2006, p.3). There are high chances for rail companies to translate private know-how and policy advices into new public management practices and governance models, further imprinted into the state machine from the private sector and so, improve service and general performance at both technological, and non-technological level.

2.2.4 Summary

A great benefit for the sector across the Union are the 30 Trans-European Transport Network priority projects. 23 out of them are designated for high-speed rail, or freight rail lines, or intermodal mix. Electrification is also planned in the long term to shrink the share of diesel to negligible. However, the sector faces internal challenges in the face of low levels of overall network electrification and uneven distribution and development of the network. Besides, the poorest developed road network at present excels by 47,4% the best-developed rail network. The rail network's general condition across most states is of at least moderate quality, which mostly reflects speed. While speed is crucial for passengers, of paramount importance for entrepreneurs are reliability and punctuality of cargo services. New public management practices and innovations into the administrative (governance), technological, managerial field could all deem beneficial for the sector in its quest to regain shares and improve indicators on services.

2.3 Challenges for the EU railway sector

As seen from the previous section, the railway holds a multitude of positive features and advantages comparative to the road mode, yet also falling behind in times of economic growth due to infrastructure and other obstacles despite exiting transportation policies for rail revitalization. An new obstacle to test the adaptability and ability to respond to market changes has now appeared – the current economic crisis.

2.3.1 Modernization in times of economic halt

It has started from the United States credit sector and has spread over the rest of the world via the turmoil in the banking and insurance sector. The Union has not been spared and effects from the crises have already been obvious in terms of unemployment and economic growth of member state. These negative trends put extra challenges for the railways, since operators may not anymore benefit from favorable loans from banks, as many banks are continuously introducing loan restrictions and lowering the ceiling for credit amounts. The risk-averse behavior by locking-up load opportunities is still on the agenda (Gagiu 2008). As a result, modernization of infrastructure and/or inventory is becoming rather difficult (due its capital-intensive character), lowering the chances for providing flexible and competitive services to clients and thus, effectively compete with road.

It is not only the credit opportunities that diminish for many railway companies, but also their revenues may shrink as well due to the lower number of passengers and amount of cargo being transported at (cross)-national level. The economic halt of most EU member states, mixed with the rising unemployment levels in particular in the EEU, where rail-road density ratio is not that striking, is possible to affect the pkm within and across states. Lower production of material-intensive industries, such as the automobile and metal-processing sectors, also affects the volume of services needed by the transport sector, and the rail in particular.

Tourism, local production, and credit opportunities are to suffer from the global financial turmoil and affect the modernization process of the rail, lower its chances to compete.

As a result, both financing and income may suffer accordingly, putting additional tests on the way towards rail revitalization and destabilize its fragile position of not losing share to the other modes. As discussed, the rail has managed to increase the tkm indicator, yet effectively losing 1,6% share on behalf of the road transport in times of rising demand for transportation. With the economic instability, the stability of this indicator is under threat.

2.3.2 Priorities redesign, accountability, and transparency improvement

Besides the financial constraints and risk to further lose its position comparative to road, another challenge for the railways on EU level are the present bottlenecks that hinder on flexibility, speed, and punctuality of railways. This is why among the main goals of the White paper and the TEN-T priority projects are to fix this situation. Yet, unblocking the freight and high-speed passenger priority rail routes is a real challenge not only because of environmental obstacles, but also due to the need for capital (De Ceuster et al 2005, p.20) to be invested in the network throughout Europe. Besides, the supranational nature of EU bodies may trigger administrative and legal problems with national governments due to different power and authority (i.e. legitimacy) to further obstruct the modernization process. Transparency in the financial manipulation of the capital and its proper allocation may be rather subjective, as well as preventing corruption and appropriation of funds once allocated and delegated to national/local governments to control. Monitoring, accountability, and quick adequate control are also a problem due to the polycentric nature of regulatory regimes these funds fall under (Black 2008). It all ultimately turns into a challenge for the railway sector to effectively and timely benefit from the policy measures. Yet, a challenge lies in the policy measures themselves, since there has been a delay in most TEN-T priority projects. Challenge for the EU bodies is also the process of funds allocation, management, and priority redesign of the investment for the projects (De Ceuster et al 2005, p.112) due to the different importance each has at supra-/national level, as national governments would like to use to the most allocated financial resources and develop the projects that pertain to the individual nation-state.

Lack of harmonization in cross-national rail policies, higher levels of financial transparency, improved monitoring and control, and potential authority clashed between national and supra-national bodies put extra challenged for the rail to develop.

Considering the issue of financial transparency at both international and national level, it is quite important to guarantee the proper management of capital also because many of the railway sectors "require high levels of subsidy; less that half of the total costs of rail transport in Europe are borne directly by passenger and freight customers" (Wheat & Nash 2006, p.2) due to the inability to match costs with quality for superior, competitive benchmark against other modes of transports. Transparency is linked with tools for control and regulatory principles, which are also not equalized across borders and the need for separate licenses, documentation, and inventory lists incurs extra efforts for operators and clients to use the railway service on an international level. For combating this trend, regulatory principles should be harmonized.

2.3.3 Technical harmonization & interoperability

Technical harmonization in multiple fields is yet another challenge for the sector – software, infrastructure, skills, etc, which the EU policies in the face of three Railway Packages aim to improve. By introducing equal standards for railway operators in terms of software control and navigation systems via the European Rail Traffic Management System (ERTMS), interoperability is fostered "by allowing trains to cross borders easily and therefore increase the competitiveness of railways on international corridors for freight and passengers" (Dr Tilière, Emery & Curchod 2003, p.5). However, integration is still far from complete, as most international trains today (like Thalys) are equipped with multiple navigation systems, needed when the train crosses national borders. The high costs of software purchase, the installation, management, and maintenance, human resource cost, and travel time – all of them increase (Dr Tilière, Emery & Curchod 2003, p.5) without compensating the clients in terms of price, quality,

flexibility, or speed. As a result, rail competitiveness at international level is suffering in the current boom of low-cost airlines and coach liners.

The same is valid for the freight side of the rail. As elaborated, network density is rather uneven across borders, obstructing the efficient use of opportunities that the market offers. Therefore, a challenge for the rail is to develop more evenly beyond local economic centers, so that bottlenecks are avoided and credibility is restored. And while speed and time are not the primary concern in cargo rail, yet it also lags compared to road due to the need to share the infrastructure with passenger trains. In that way, punctuality and reliability become quite a challenge for the train operators and discourage clients from using this mode of transport. It becomes a challenge for the sector to operate efficiently on a single network, as time slots are definite, i.e capacity. As a result of delays, international freight trains in 2001 moved with an average speed of 18 km/h (Commission of the European Communities 2001, p.28), which is close to the speed of a cyclist. As a consequence, the share of rail in freight services is effectively shrinking not only in the West, but also in the Central and Eastern part of the EU.

Punctuality, reliability, speed, and technical interoperability need improvement for greater share regain. Alternative financing schemes, more optimal pricing for services provided, as well as fostering competition for service improvement are desirable for the rail to improve services.

Most of the new EU members carry their soviet legacy, which include denser railway networks and infrastructure. Traditionally, rail has been dominant in most of these states and even after the change of regime, the rail share in freight services has been above 30%, compared to less than 8% for the Western part (Commission of the European Communities 2001, p.93). Therefore, a challenge for the sector is to gain additional shares in the West and regain its previous levels as a main fright carrier in the East. It all translates into the need of the sector to find ways to increase the efficiency in use and improve speed of the network, while minimizing investment costs and bottlenecks, so that modal share doesn't shrink in the conditions of economic recession. Since financing for projects is a major concern (as even TEN-T projects require funding at a national level), optimization of the current network should occur before investment in new infrastructure, especially in view of the freight sector's decreasing share in both WEU and CEEU.

A challenge for the sector is to gain additional shares in the West and regain its previous levels as a main fright carrier in the East.

Technical interoperability includes not only time slots and software, but also hardware, i.e. infrastructure. A challenge for the sector is to develop into the direction of infrastructures' complementarily – intermodality. Rail operators should further develop the pattern of intermodality to be able to effectively compete, while taking advantage of the denser road network. The intermodal terminals "connect at least two transport modes, which usually are road and rail" (Salucci 2006, p.4). Such stations are not only used for transfer, but in the case of cargo, also for storage. Therefore, the development of such terminals and the use of current ones is among the challenges of the EU railway sector, since at the current levels, such systems are well developed at few places across the Union (rail-water intermodality in Rotterdam for example). In most member states, particularly CEEU ones, intermodality is underdeveloped/underused, decreasing competitive abilities of the rail EU-wide. As a result, flexibility decreases while costs to maintain are rather fixed. Besides, "the incompatibility of the transport equipment for road, rail, short sea and inland waterway traffic raises transfer and handling costs and necessitates cumbersome transshipment techniques" (Salucci 2006, p.6). Having in mind the density of rail network across the Union, a challenge would be to objectively select the best locations for

intermodal terminals, so that road bottlenecks and harmful emissions decrease, while rail infrastructure is used more efficiently and effectively.

2.3.4 Liberalization & effective pricing

Lastly, two important challenges for the sector are the liberalization and effective pricing for services provided, so that rationalization of scarce infrastructure resources is well used and profitability increased via "best practices to price for scarcity and congestion" (Wheat & Nash 2006, p.5). It is necessary, since today many railway sectors function on subsidies and the costs they charge do not reflect the real costs, which is however bound in a vicious circle to the quality of service. Further liberalization is needed in terms of privatization or franchising, with at least the separation of operators and owners of infrastructure, thus improving financial transparency too. The models to restructure vary according to degree of separation and degree of competition, with the two indicators being quite different across the EU – from the most market-like network behavior in Great Britain to the most monopoly-like clique behavior in Ireland and Greece (Wheat & Nash 2006, p.4). As recommended by Directive 2001/14, parallel to the liberalization process, a new robust system for infrastructure charging should develop under the marginal cost concept. It should be able to estimate the marginal cost of running 1 extra km on the railway separately for each state, considering the costs incurred, such as congestion, accidents, scarcity, maintenance and renewal, train planning (Wheat & Nash 2006, p.16), etc. However, innovation for greater competition needs to be introduced for the policy measures to work accordingly, with franchising practices or open access to the infrastructure, developed intermodality potential, improved service, and accurate price estimations for higher financial stability and performance in general. Among all these challenges, one is particularly encompassing - the ability of the sector to restructure in a timely fashion. Estimations point that by 2010 only Spain and the UK (from the EU-25) would have managed to fully implement the goals of the 12 White Paper policies (Zecca et al 2005, p.20) in time.

2.3.5 Summary

The economic halt of most EU member states, mixed with the rising unemployment levels, and risk-averse bank behavior at present may affect the credit opportunities for railway modernization. Revenues may shrink as well due to the lower number of passengers and amount of cargo being transported at (cross)-national level. As a result, both financing and income may suffer accordingly. Bottlenecks are among the main goals of the White paper and the TEN-T priority projects. Yet, monitoring, accountability, and quick adequate control by the EU and national institutions, in particular in CEE, are challenging. Alternative financing schemes, more optimal pricing for services provided, as well as fostering competition for service improvement are needed, so that the sector gain additional shares and effectively restructure. By introducing equal standards for railway operators in terms of software control and navigation systems, interoperability is fostered. Infrastructure needs harmonization too. Lastly, intermodality should be taken as a main goal across borders, so that rail operators take advantage of the well-developed road network, while combining it with the benefits rails carries along.

2.4 EU strategy for railway sector development

2.4.1 The White Paper on transport modes realignment

Until the late 80's there has been no effective integrated policy measures for the long-term development of the railway within the European Union, as the Commission's recommendations under the Treaty of Rome the Council of Ministers could not operationalize

(Commission of the European Communities 2001, p.6). Together with the Treaty of Maastricht, the meeting of the Council in Essen (1994), and the initial White Paper of 1992, a new direction has been given to the common railway sector beyond national borders, including the initial idea for rail priority and the present TEN-T priority projects. However, even after the updates policy during the Gothenburg Summit in 2001 and the revisions of the 2001 White Paper, a trend for the rail to lag back in following the recommendations outlined and effectively using the investment opportunities still exists, as well as opening-up the market by liberalization and adopting modern techniques within the soft skills sector – i.e. the rail management (Commission of the European Communities 2001 p.7). This resistance to timely reform contributes further to the overall delay in restoring reliability and punctuality, the loss of modal share, and the slow progress on infrastructure projects. It all contributes to the sector's inability to combat the problem of major route bottlenecks, while operating at high cabotage levels.

The 2001 White Paper focuses on revitalization of alternative to road modes of transport, with the idea to cease the ongoing trend, so that from 2010 onwards the modal shares (except for road) start to regain positions through not only the priority projects, but also the strategic policy measures spreading beyond the field of transport (Commission of the European Communities 2001, p.12). A main strategy of the Commission is to foster restructuring at national level and even out the importance of freight and passengers, with dedication of time slots and/or separate infrastructure for freight trains exclusively. Due to the previous disregard of freight, road has succeeded in carrying goods across the EU for low prices and high reliability. Therefore, besides modernization of management and infrastructure, a rail strategy on a EU level includes: increase the inner-state rail usage, facilitate interoperability while maintaining high safety standards, dedication of infrastructure to freight carriers, increasing punctuality and speed of freight trains up to 80 km/h and finally, keeping the higher share of rail within the CEEU countries over 35%, while regaining the modal share in the WEU states (Martens & de Jong 2005, p.14).

A main strategy of the Commission is to foster restructuring, modernization of service/inventory, and to increase freight importance of rail by dedication of time slots and/or separate infrastructure to cargo trains.

The EU strategy for railway sector development focuses a lot on international transport of goods and people in the face of the 30 priority projects as a method to combat the existing network bottlenecks. The goal is to create multi-modal corridors with priority given to freight carriers (Commission of the European Communities 2001, p.51). Liberalization of the freight sector has also started in 2003, with the encouragement of competition among companies that should increase the quality of service and bring credibility back to rail (Commission of the European Communities 2001, p.27).

Since the construction of new infrastructure needed requites a lot of resources, the EU bodies foster the use of Public-Private Partnerships (PPPs). A strategy of the Union is to make companies more flexible, open and market-driven, not relying too much on subsidies, but be more efficient. As a result, collaboration with the private sector is welcomed under the different types of PPPs for allocation of capital, risk and ownership between the public and private sector, which is to bring higher rationality in spending, together with better allocation and effective use of scarce resources (similarly to the established practices in the private sector). Such collaboration extends not only to the mere transport utility, but also to the overall level of productivity per capita and efficiency of technology/inventory use per tkm/pkm. Such optimization in productivity is also expected to lower the cabotage levels and thus, it is to improve the energy use by making it common for freight trains to carry cargo not only to the designation, but also on the way back. Passenger trains do not experience the problem of cabotage that much and this is why this problem is discussed exclusively for freight.

2.4.2 Projects

The vision for the transport sector to develop can be seen in the 30 TEN-T projects, with 18 of them being exclusively dedicated to rail. The revised strategy of the Union is to have all of them completed by 2020, when a real reverse in modal share trend should be already ostensible. Because of the importance of each corridor, the community is spending immense resources on the projects. To lower the share of each member state in financing these huge infrastructure projects in times of economic recession, the EU is providing funding not only from the TEN-T budget itself, but also contributing further via the Structural and Cohesion funds, as well as with tailored loans from the European Investment Bank, expected to constitute approximately 1/3 of the total investment need. Due to the strategy for bottlenecks alleviation and fostering of cross-border freight projects, the funds have been revised and targeted selectively on such projects (Informal Transport Council 2008, p.5), thus giving priority to freight, a strategy outlined in the 2001 White Paper. To foster interoperability, the 30 projects require to have the ERMTS system installed along the new rail tracks as a condition for financing, so that once completed, the backbone of the rail network would operate under a single system, translating into less costs, easier management, and greater efficiency of the infrastructure. This would eliminate the current situation of more than 10 different systems operating across Europe and further guarantee safety and punctuality (Dr Tilière et al 2003, p.7), ultimately improving competitiveness at international level.

Targeted financing under the 30 TEN-T projects and collaboration with the private sector under different types of PPPs strategically aim at rail revival.

Besides the financial support, for the optimal end results the Commission has introduced new legislation to facilitate opening up of markets, liberalization, and "ensure non-discriminatory access charging and allocation of slots" (Wheat & Nash 2006, p.1). Moreover, numerous studies have been conducted to analyze the variety of railway pitfalls and help operators estimate efficiency prior to construction, so that a more precise system of project prioritization is supported. Such evaluation projects and systems on railway performance and optimization opportunities include the PRORATA set of measures describing the marginal change in efficiency after any innovation is introduced, plus ensuring the changes that follow-up in the organizational and institutional sphere of the rail; on the other hand, IMPROVERAIL builds up onto the managerial and business-related processes within the rail companies in capacity allocation, charging, and infrastructure management (Wheat & Nash 2006, p.10). All of these tools are part of the First, Second, and Third Railway Packages - designed to aid the reform processes within the rail and complement TEN-T. The First package is mostly cargo-oriented, looking at the local and national level of management and transparency, while the Second focuses on the international level for cargo management. The Third package is mostly passenger-oriented and is associated with competition. Blending all these regulatory and harmonization tools should lower operating costs of rail companies, decrease travel time for both freight and passengers, decrease complexity of operating, facilitate management, lower training, maintenance, and environmental costs while increasing efficiency.

2.4.3 Other long-term strategies

Lowering costs within the sector is a goal of the Union, with lots of hopes put into the projected electrification levels of the network, which by 2030 should account for 90% of the total energy consumption in the sector (Prof. Capros et al 2008, p.55). Because of the growing apprehension from the global warming and CO_2 emissions, the strategy of the Union is to make the rail as environmental as possible, envisioning the more stringent requirements on vehicles

pollution level that are continuously introduced (such as the new Euro 6 standard on emissions). To further improve reliability and punctuality, the Commission has even taken advantage of space technologies and in collaboration with the European Space Agency is constructing the Galileo navigation satellite system, which is priority project №15 under TEN-T. The 30 satellites are scheduled to launch in space by 2013 to perform similar to the GPS system function in city transport – monitoring and tracking vehicles for easier coordination and more efficient use of scarce resources (network). Similar is the strategy of the Marco Polo I and II initiatives for support of intermodality development for greater balance in freight modal share, while maintaining high flexibility of service.

Evaluation projects and The First, Second, and Third Railway Packages, as well as the Marco Polo I and II initiatives, join efforts with TEN-T to bring rail viability back.

The initial programme has been set into action for the period 2003-2006 and its goal has been to balance freight modal splits by regulating the environmental impact of freight carriers regardless of mode, enhance intermodality wherever possible, so that the transportation system becomes sustainable, yet more environmentally friendly (De Ceuster et al 2008, p.38). Similarly to the White Paper of 2001 objectives, Marco Polo I complements the goal by fostering rail in the sense of balancing freight modal shares within WEU member states to their level of 1998. The 2007-2013 Marco Polo II initiative builds up onto the strategic goals set by the White Paper into a more economic sense – by financially assisting (similarly to TEN-T) entrepreneurs who start up "intermodal projects by providing funds until they reach the break-even point, and reduce" (De Ceuster et al 2008, p.39) the variety of financial, construction and operation risks for the private party, thus acting as a business partner, a PPP-like arrangement where the EU bears the financial risks until the intermodal unit becomes stable and self-sufficient.

2.4.4 Summary

Besides modernization of management and infrastructure, the rail strategy at EU level focuses on the increase of inner-state rail usage, facilitate interoperability while maintaining high safety standards, dedication of infrastructure to freight carriers, increasing punctuality and speed of freight trains up to 80 km/h and finally, keeping the higher share of rail. To reach the goals, the Commission has launched a variety of projects and policy guidelines as methods to combat the existing network bottleneck and foster the establishment of PPPs for allocation of capital, risk, and ownership between the state and private companies, aiming at higher rationality in spending, together with better allocation and effective use of scarce resources. The First, Second, and Third Railway Packages are designed to aid the reform processes within the rail and to complement TEN-T. The first two packages are mostly cargo-oriented, while the last package is mostly passenger-oriented. The Marco Polo I and II initiatives exist to support intermodality development - for greater balance in freight modal share, while maintaining high flexibility of service.

2.5 Place of the railway in the EU

The railway is at present the second most popular modal share after road in almost all member states for both passenger and freight. It faces bottleneck problems and issues on punctuality, which together with the slow liberalization hinder its growth. The new economic conditions are likely to make modernization even more difficult, though the EU strategically invests substantial financial and policy resources to revitalize the sector. Yet, the rail has been inefficient enough to regain substantial importance. To reverse the trend, operators should speed

up the liberalization and effective pricing strategies, besides guaranteeing punctuality and quality of service, while national policies should be less protective of competition. The railway in the West is restructuring itself faster, while the better-developed networks to the East are lagging behind. Yet, the latter are more favored to modernize and are at odds to combat road.

In the long run, the railway strives to regain its importance. As of now, it is gaining back shares within the passenger sector and barely holding its current share within the freight sector, which is likely to increase if advantage of intermodality and road/water networks is taken into consideration. The sector is behind the current market trends and this pushes it further behind road mode and importance within the Union. Overall, it is a player of huge potential who is currently under-performing and ineffective in competition to road, ineffective within too. As a result of that, it is playing a role in transport, but not the role it deserves in the social and economic development of the EU also with regards to its recent enlargement further to the East.

Chapter 3

Situation in the Bulgarian railway sector

So far, the position of the rail within the European Union has been discussed, its strengths and weaknesses, as well as the long-term strategies for rail revitalization, so that it regains modal share. Liberalization of the markets, higher speed, and slots dedication to freight trains via various policies, tools, and projects have been a focus of attention. It all should lead to increase in reliability and punctuality of the service, so that it is more competitive and adjustable to the ongoing economic trends. In the following pages, emphases is to shift away from supra-national to national level of the railway sector, so that the structure of the Bulgarian railways is understood, opportunities and benefits for stakeholders perceived.

The following chapter is important for the reader to familiarize him/her with the specific time-trends of the sector and their imprint into the present; guide one through the costs, the main current and future apprehensions, until reaching the potential benefits for the sector, community, and economy. **First**, I am to focus onto the general structure of the Bulgarian railway sector and some important peculiarities, relative to the EU policies and internal efficiency, just to name a few. **Second**, the changes that occurred with the chance from socialist to market economy are useful to grasp what and when happened, also why, for the sector to reach its current state and face its problems, visible via the indicators. **Third**, the main revenues and expenses are to be discussed, for the reader to see and understand what and why should (not) change. **Fourth**, a main cause for lost of competitiveness is discussed and its resolving is the goal of many EU policies. **Last**, one is to become familiar with the community and sector benefits.

The topics are designed to capture the sector's main drivers. A good sense of the structure and driving forces, as well as considerations that stem from the topics chosen should aid in understanding the peculiarities of the sector, its bottlenecks' causes and benefits for electrification and intermodality, which are currently neglected. It is important for the reader to understand both the logic of the state, and that of the EU in terms of resources and know-how that may improve and raise competitive levels sector-wide. This is why the logic of the chapter flows from the general structure to the main revenues, expenses, and issues, which influence the investment needs and risk, to the financially, socially, and environmentally viable long-term development prospects, aligned with the EU policy strategies. Chapter 3 gives insight to the weak and strong sides of the Bulgarian railway sector and how this current mixture may develop for it to regain modal share. As limitations of the chapter in the effort to keep the focus and volume of information under control I see the selective focus on macroeconomic models, discussing other existing sector costs and revenues, focusing mostly on strategic benefits in the long-run for the sector and local communities. Besides, I am mostly analyzing state-owned operators.

3.1 Structure of the Bulgarian railway sector

As a satellite country in the Eastern Bloc, Bulgaria has established a particular structure of its railway sector in both infrastructure and management, which since the fall of the regime has been slowly changing towards more open and western-style of operation and management.

3.1.1 Physical structure and EU benchmarks

The historical development, geographical peculiarities, and the industry pattern of ex-socialist countries have resulted in denser rail network than in the West in terms of path/area (Bialas-Motyl & Vakalopoulou 2008, p.123). The high level of network electrification of almost 70% puts Bulgaria next to much more advanced members, such as the Netherlands (Bialas-Motyl 28/2008, p.5). Following the EU recommendations and long-terms strategies for the railways restructuring, Bulgaria has made some progress in implementation of the First and Second Railway Packages (CPPD - Coordination of Programmes and Projects Directorate 2005, p.23), despite the predominant old technology and outdated business practices. The Bulgarian gauge size of track is standard: 1435mm, with parameters at most lines for speeding up to 100km/h. According to official state data, the total length of regular and narrow gauge railway network at the end of 2005 has been 7326km, with approximately 2100km (CPPD – Appendix 2005, p.2) located at train stations. When excluding railway lines at train stations and counting intercity 2-track lines as a path, the net length of the network comes to 4316 km. Correlating the original data with the total population of Bulgaria in 2005 ranks the country 12th in terms of kilometers of rail per 100,000 inhabitants, with the ratio

Figure 2: Bulgarian railway network - structure and distribution
Source: CPPD – Annex 2005, p.2

close to the EU-27 average of 57 km/100,000inhab (Bialas-Motyl 28/2008, p.5). Considering the socialist legacy in terms of road and rail and the following juxtaposition of another indicator (for network density), the rail sector in Bulgaria is at a much more advantageous position to road, if compared to most of the other member states.

Indicators / Area	Bulgaria	EU average
Road density indicator	171 km/1000km^2	1075 km/1000km^2
Rail density indicator	37 km/1000km^2	57 km/1000km^2

Source: Bialas-Motyl 28/2008, p.2 & p.5

In view of the rail density indicator for Bulgaria, we see that the difference in favor of road is less than 5 times, which is among the lowest differences EU-wide and therefore, under proper timely policies and management to develop, the Bulgarian railway has much better chances to regain modal share, compared to chances of most other member states, despite the rail density being less than EU-average.

The technical qualities of the existing national network are quite unsatisfactory, considering the current EU goals for speed of either freight, or passenger trains (80-160km, respectively). Parts of the network have been into operation without substantial overhaul since the 1960's. For safety considerations, speed has been limited to 100km/h. There are less than 1000km of double-track network and only 6 cross-border terminals (CPPD 2005, p.24). The structure of the sector includes also 348 train stations, 189 tunnels, 1018 bridges, and 843 cross-levels around Bulgaria (CPPD Annex 2005, p.2). Network density by regions varies too, hindering the delivery of high-quality service in the environment of increasing globalization and requirements for punctuality and reliability.

Moderately dense network with a total length of 7326km. The road-rail network density indicator is at present among the most favorable to rail revival across the Union.

The social and economic turmoil of the 90's affected financing plans and rehabilitation schemes plans, which further contributed to the network's general deterioration.

3.1.2 Operators and performance

Following EU directives on deregulation and opening up of the railways market to competition, together with the requirements by the First and Second Railway Packages, the Ministry has introduced changes and made it possible for private cargo railway companies to enter the market as of 2005, while the passenger sector is still closed. We see a clear tendency and potential for the freight sector to develop, as well as indicators that there is unused potential that the private sector goes after.

Carrier	License date	Type of license	Ownership
BDZ Bulgarian State Railways EAD	01.04.2004	passengers and cargo	state
Bulgarian Railway Company Inc	15.04.2005	cargo	private
Bulmarket-DM Plc	24.10.2005	cargo	private
BDZ Cargo EOOD	31.01.2008	cargo	state
BDZ Passengers EOOD	31.01.2008	passengers	state
BDZ Locomotives EOOD	31.01.2008	passengers and cargo	state
Gastrade Pls	01.10.2008	cargo	private
Unitranscom Pls	01.10.2008	cargo	private

Source: Bulgarian Ministry of Transport 2009

Four 100% private freight carriers out of eight licensed cargo and/or passenger operators in total.

There has been an increase of the (common) tkm indicator of 2,3% in the period 2003-2006 (Noreland 2008, p.3), substantiating the beneficial effect of the Railway Packages and deregulation as a condition to EU accession. Following the EU policy recommendations, the state has gone further in separating the infrastructure management from the service provider by establishing "NKJI – National Company Railway Infrastructure", detached from the national carrier BDZ. Yet, such a big change has not been sufficient to increase levels of punctuality and reliability. According to Petkov, in 2007 the speeds of BDZ trains equal:

- 65,2 km/h for speeding trains
- 54 km/h for fast trains
- 41,5km/h for stop-trains

At present, the market is still largely dominated by the state-owned carrier "BDZ - Bulgarian State Railways" EAD (BDZ for short), in both passenger and freight services (CPPD 2005, p.28). It has an exhaustive system for cargo pricing, risk allocation strategies, tracking and many more, as described by eng. Angelov, while the passenger service has been less advanced in these terms. More than 50% of people use 30%+ discount. However, despite these strategies for low and/or accurate pricing and recent total renovation of 40% of all train stations (SG 2009), it has been quite a challenge for BDZ to "steal" customers away from the road mode not only because of the sub-optimal quality of infrastructure, but also of inventory. 70% of the wagons and 80% of the locomotives in operation are older than 20 years and with very low hygiene; there is serious shortage of specialized wagons, suitable for intermodal carriage of goods (CPPD 2005, p.28) - mostly water/rail. There has been lack of money to buy enough new vehicles from the two Bulgarian wagon producers or from abroad. Similarly, the sector has not been able to maintain its recreational hotels and their quality has also plummeted.

3.1.3 Summary

Data confirms that the railway network of Bulgaria is quite able to compete with the road mode due to the road network being only 5 times denser. The total length of regular and narrow gauge railway network at the end of 2005 has been 7326 km. At present, there are eight state and private cargo and/or passenger operators, with the dominant in either being the state-owned BDZ. The sector is rather multi-developed with the availability of local wagon producers, Higher School of Transport, and recreational bases for staff. Following the Railway Packages advices, NKJI has been established as a separate company to manage infrastructure. There are not sufficient resources to renew infrastructure and vehicles. Thus, lower pricing strategies are not sufficient to cease the decrease in pkm and boost the increase in tkm indicator further. There is poor integration with foreign networks and under-use of existing intermodal facilities.

3.2 Path of railway sector development since 1989

Starting from the 1950's, the Bulgarian government began to realize great infrastructure projects. For more than 40 years, the railway networks expanded significantly not only in length, but also in supportive infrastructure. The majority of new and/or modernized lines were electrified, with inventory and machinery being updated too. As a result, the sector grew to serve an increasing number of passengers and heavy-industry businesses across the country. The major work on electrification, telecommunication, and safety measures were put into operation in the period 1965-1985 (CPPD 2005, p.23), contributing to Bulgaria's present-day moderate railway network density.

3.2.1 Struggles

The situation changed with the change of regime at the end of 1989 and the Bulgarian railway sector took a different path – of neglect, slow deterioration, and higher corruption. It all affected quality of service and gradually, despite the prices being lower than coach services. The road sector grew and took away great deal of the modal share of rail. The lower appeal of passengers to use the Bulgarian railways, blended with the lower desire and opportunity to travel due to economic issues have also contributed to the rail losing modal share. As a result of the lower passenger volume, in 2005 there have been 40% less stop-trains than in 1990 (CPPD 2005, p.25). In the meantime, aging and neglect of the machinery further pushed away passengers towards the more luxurious and faster coach liners and private cars. Even with the stabilization of economy in the new millennium, this tendency has remained also due to the demand for clean high-speed trains of up to 160 km/h, which the current infrastructure and its auxiliary components do not allow. Some attribute the ongoing trend mostly to the decrease of population, with Bulgarians being among the fastest diminishing nations in the world.

Passenger preferences, fundamental state-level changes, and decrease in quality of service all caused reduction into the number of trains in operation and considerable drop in passenger capacity.

The hyperinflation and bank crisis in Bulgaria in the late 1990s have additionally drained the sector. Coupled with all the factors already mentioned, there has been a staggering drop in passenger capacity from 38,119 mln pkm in 1999 to 2,389 mln pkm in 2005 (CPPD 2005, p.25) - a plummet of 11 times in capacity for six years, with the decrease in actual number of passengers transported being 160% for the same period. It is therefore not the decrease of passengers that mostly affected the passenger sector of the railways, but the outdated inventory that had to go to scrap and the poor management/corruption, as well as poor maintenance of existing inventory. Besides the macroeconomic, social, and technological factors outlined above, the supply-demand discrepancy, if to put it into economic terms, may be considered as a reason for decrease in use of rail by passenger. The railways provide a certain level of cleanness, punctuality, quality, and reliability of service (supply) that doesn't match with the customers' demand for general conditions on mobility. Since price is long ago not the sole driver for decision-making for most people, the railways are losing popularity as a means of transport despite investments. Other reasons include:

- Lack of coordination with other modes of passenger transport
- Large time intervals among trains
- Inconvenient ime gaps when switching among trains (poorly designed connections)
- Low speed of trains due to infrastructure and vehicles' quality and high frequency of stations (CPPD 2005, p.25)
- Frequent changes of arrival/departure times and delays
- Neglected intermodal opportunities

3.2.2 Recent investment and administrative development

Only in the recent years is the sector regaining popularity among Bulgarian citizens with the introduction of (inter)-national trains, comparable in quality and overall service to their Western counterparts along the Sofia-Athens route. The current wagons are able to run on high speed, while remaining comfortable and clean (Petkov 2007, p.1). It has all positively affected the popularity ratio of this route and it has recently surpassed the demand for coach liners. Progress

towards modernization has taken place with the purchase of 100 ex-Deutsche Bahn inter-city wagons for the needs of BDZ in 2006-2007, being into speeding train service at the busiest routes across Bulgaria. Moreover, 25 brand new intercity trains Desiro (produced by Siemens) operate on destinations from Plovdiv and Sofia (Petkov 2007, p.2), with the delivery of 25 more soon. However, financial conditions do not allow the purchase of more new trains, as rehabilitation and infrastructure projects have been a priority since EU accession.

Looking at freights, the tendencies are not quite similar to the ones seen in the passenger division, i.e. constant decline in the volume of cargo and number of services delivered. The decline in cargo has reached its bottom in 2002. Since 2003, a slow, but steady increase has been realized. And while there has been a decrease in pkm of 3,8% from 2003 to 2006, there has been an increase in the tkm indicator of 2,3% (Noreland 2008, p.3), with 2006 realizing the greatest rise, possibly attributable to the implemented EU policies and legal recommendations as part of the accession conditions. Unlike the plummet of 1100% in capacity for passengers from 1999 to 2005, the freight has been little affected - the drop in capacity has only been 2,5%.

Freight sector has realized far less decrease in both capacity, and tonnage carried over than the passenger sector, regardless of less investment in modernization. Increase in railway services demand has been the greatest in the cross-border area.

As did the passenger division realize a significant increase in cross-border travels, so did the freight sector in amount of cargo carried to, from, and through Bulgaria - more than 200%. As a result of that, in 2005 the share of international cargo has reached 26,5% of the whole quantity of freight carried (CPPD 2005, p.26), regardless of the fact that no new wagons have been purchased and the majority of those in operation have been in use since the 1980's. Therefore, freight wagons' comfort and quality matter less than with passengers – they are fit to serve as long as the delivery is intact and on time.

Since 1991, safety is officially considered as a part of quality. Thus, the railway operators had time to adjust and continuously work on significantly improving the safety of train personnel, inventory, cargo, adjoining infrastructure, and so on, which has turned rail into the preferred mode of chemicals' and dangerous goods' movementp for which there is already competition between state and private rail cargo-licensed operators. However, a higher increase in tkm indicator is plausible if more intermodal wagons are introduced.

At the same time, numerous administrative and legal changes have occurred with the goal to update the railway sector to the level of current EU standards and long-term strategies for development for the sector via liberalization and achievement of the goals set in the First and Second Railway Packages. Following the recommendations, two new legal entities were born in 2002 out of the national railway operator: "NKJI – National Company Railway Infrastructure", responsible for the infrastructure and "BDZ - Bulgarian State Railways" EAD, responsible for the service to the community; some improvement in management skills and decrease in losses have been realized (CPPD 2005, p.19).

Since 2006, there has been an agreement between the state and NKJI on infrastructure maintenance and modernization, as well as network expansion (CPPD 2005, p.19), with the financing being planned to come from EU funds and increased national budget allocation. Since 2003, the increase in national budget allocation has been more than three times. Together with the planned income form taxes and sales, as well as from EU funds and bank loans, the sector hopes to speed up rehabilitation of infrastructure and machinery, as well as implement in a timely manner its strategic programs for network development, amidst: a second bridge over the Danube river at Vidin, reconstruction of Plovdiv-Svilengrad railway line for speed up to 200km/h, modernization of Sofia and Plovdiv outgoing railway tracks (CPPD 2005, p.19).

Future financing strategies of the state focus exclusively onto passenger segment of rail.

The medium-term strategy for new investment in wagons at national level is continuing to be exclusively focused onto the passenger segmentc in efforts to reverse the negative pkm trend. The state plans on investing 250 mln euro for acquisition of 130 brand new inter-city wagons and 732 recycled wagons, with the strategy for the freight sector being predominantly based on reorganization (without investment) (CPPD 2005, p.36), which may translate into lost opportunities to timely develop intermodality as the new hope for regaining share, in particular in Bulgaria, where road/rail discrepancy is still relatively small and facilities exist for sea and river water/rail intermodality. Financing opportunities under the intermodality-exclusive Marco Polo I&II initiatives are also available and practicable.

3.2.3 Summary

The Bulgarian railway sector has experienced tremendous growth until the late 80's and since then – a reverse in tendencies, which has affected the passenger transport much heavier than the freight division, where a tendency to improve has been recently observed. Since 2002, there has been sector reorganization for the purpose of transparency, liberalization, control, and conformity to EU policies. Yet, financing on a national level has mostly been dedicated to passenger transport and renovation for rise in quality → rise in revenue → rise in capital to invest further, while freight has mostly been reorganized and optimized, without a long-term strategy towards intermodality investment and development despite favorable infrastructure, tendencies, and EU strategies. Both areas have realized increased business mostly from cross-border carriage.

3.3 Main revenues and expenses for the sector

3.3.1 Operating revenues and other sources of income

Considering the passenger transport, there has been a significant decrease in the number of passengers served since the 90's. The revenue from the service has been further decreased by the large percentage of discount users, which according to 2007 data by Alfa Research is 55% of the total number of passengers (Expert.bg 2008, ¶2). It may be argued that discounts foster the greater use of this mode and this factor compensates the lower revenue per traveler. Yet, the same study confirms that the majority of railway users are neither working people, nor students, who are de-facto the largest groups of people traveling on intercity or international routes in general. Despite lower price, flexibility of service is to be considered too, plus the general condition of vehicles in operation, many of which are below average. This is why by having more social, than economic pricing, BDZ is still struggling for passengers. Quality has proven as a main determinant with the introduction of the Desiro trains. On all routes operated by the new machines, there has been an increase in pkm up to 200%, with some lines previously being ceased from service due to low passenger volume (Expert.bg 2008, ¶4). The percentage may rise further if more convenient cross-country train connections are developed, so that an increase in ticket price is substantiated by higher comfort, convenience, and quality.

Income from services rendered and (inter)-national funds, as well as loans, are the main sources of revenue for the railways.

Looking at freights, the drop in use has been much less dramatic for the last 20 years, with tkm indicator showing a positive trend lately. There has also been stronger intensity in rivalry and lower barriers to entry (see Porter's model in 1.3) in the cargo service, i.e. private

operators. The pricing system has also been more advanced, including flexible pricing and taxation policies, opportunities for freight tracking and multiple points delivery, introduction of decentralized pricing strategies. There is a detailed pricing chart of more than 80 pages, clearly defining shipment charges of goods: from petroleum to silkworm cocoons! A new business IT system: "MM Operating Model for Maneuverability" with integrated economic algorithms has been introduced. It systematically coordinates the allocation processes to reach higher levels of cargo effectiveness (eng. Angelov, ¶23). All of these changes in the sector in terms of policies, decentralization, modern software introduction, have managed to preserve revenue levels. With the advance of the financial crisis, however, the situation is likely to change.

Due to the great need for funds allocation in infrastructure and paying off fixed costs, the sector in not counting solely on revenue from services provided, but amidst others:

- EU funds (including TEN-T, Cohesion funds, ISPA, PHARE)
- National funds (investments and subsidies)
- Private funds (valid for the private operators and future PPPs)
- European Investment Bank loans
- Other (privatization, rents, taxes on infrastructure)

With the accession to the EU, the sector is counting even more on these tools for financing to modernize it passenger trains, rehabilitate and modernize infrastructure, and so on, in view of the policy strategies set in the 2001 White Paper to rebalance modal shares and revitalize the railway sector, though development policies for freight differ at national and supra-national levels.

3.3.2 Fixed and variable costs

Operation and delivery of services by the railway sector incur fixed and variable costs, with the former consisting of the major part of overall actual expenses realized. Major resource share goes to material costs - the purchase and continuous maintenance, rehabilitation, modernization of wagons, locomotives, infrastructure, communication, software, wiring, etc. Most of the costs listed above are fixed, as for infrastructure and vehicles to work properly and safely, constant maintenance is needed, regardless of the passenger and cargo flow fluctuation. Due to the inability to sustain the high expenses after 1989, some of the tracks have been abandoned or decomposed, mostly at smaller (freight-related) stations and those connecting abandoned production sites. However, the poor management, lack of timely strategy, corruption, and lower modal share may lead to a second significant physical reduction of rail network by abandonment and/or dismantle of 910km of mostly intercity routes (Enchev 2008, ¶1), constituting 1/6 of the whole network. Once dismantled, tracks cost too much to revive. Such a drastic move would not only hamper Bulgaria's competitive advantage in the road/rail density indicator already discussed, but also would not solve the sector's instability in the long run, make it even less competitive to the road and in contradiction to EU policy strategies for revitalization.

The fixed costs for network maintenance are twice as low as in the road sector, with the overall expenditure of NKJI on infrastructure maintenance of 13,000 euro/km/year: 10 times less than EU average (Enchev 2008, ¶3). Blended with the lower quality and inability to attract new clients, the sector falls into a vicious circle of decreasing quality, competitiveness, and ability to maintain/improve its legacy. Another major type of fixed costs, i.e. the labor costs - salaries, retirement plans, medical insurance of staff, etc further contribute to the circle by affecting liquidity. Only NKJI's full-time employees are 18,000 people. Unless optimization via education and/or reduction of personnel is done, costs would remain high without bringing enough value to capital increase, needed for investment and further improvement of the sector.

Equipment and inventory-related costs, energy consumed, payroll and similar, taxes and charges, and external costs are the main costs for the sector.

Energy is another major cost for the sector. This generally variable cost includes the energy sources electricity and diesel. It is generally variable, since the larger part of it is consumed upon provision of services – by the movement of trains, stations' equipment (including intermodal terminals), signaling, communication systems, and other hardware/software under the MM, for example. Thanks to the high level of electrification along the network and the start to modernize the vehicles, consumption levels have been more optimized and efficient, yet - a major expense of capital. However, the sector is much more efficient than the automobile one, since there is an increasing share of electricity-driven locomotives. They are far more environmentally friendly than diesel-based engines on service.

Last come the various taxes and financial charges from third parties or state, including legal cases, rent fees, advisory charges, non-equipment renovation, legal expenses, and so on.

3.3.3 Intangibles

There are intangible/external costs. Such do not require direct cash disbursements, but make up the last big part of railways' costs. If we are to express them in monetary terms, the value would be significant They include: air pollution, climate change, noise, accidents, and additional external costs (Commission of the European Communities 2001, p.73), expressed as direct costs in view of environmental/social damage. Except for noise, the EU community is quite successful in reducing time-waste and other costs by introducing new technologies, better planning, improved policies and management skills. Scarcity and congestion costs (Wheat & Nash 2006, p.13) are also to be included in the intangible costs, as they directly hurt the profitability opportunities of operators and inflict opportunity costs in the sense of forcing operators forgo business opportunities and/or function at less-than-optimal levels due to external conditions - network bottlenecks. Both costs refer to the scarcity of rail network capacity. Congestions appear along non-efficiently or overly used network (path), while scarcity envisions the inability of the network to satisfy the different demands of operators in service planning (Wheat & Nash 2006, p.13), time-slot allocation, and timely performance in general.

3.3.4 Summary

To sum up, the main sources of revenue and respectively, income, for the sector in the last years have been the services rendered, plus an increasing reliance on EU funds, with a strategy for increase of national funds to balance out the credit balance of the national companies. Public-private partnerships are soon expected to start playing a major role in the financing of the sector, mostly in its non-moveable assets. Cash from taxation and privatization is also planned to realize. On the expenses side, the main players are the fixed costs related to maintenance and modernization of long-term assets, plus payroll. Energy sources are a main variable cost for the sector, plus various taxes and charges incurred. Lastly, there are external intangible costs that have economic, environmental, and social value-bound importance.

3.4 Factors that cause bottlenecks in the sector and hinder its development

One of the major apprehensions for railways is the issue of bottlenecks. Simply put, this is the "traffic jam" over the rail, its inability to carry over people and goods in an efficient, reliable manner. As of today, around 20% of the EU network realizes bottlenecks and this is why the TEN-T and various other policy goals aim at aiding the sector to eliminate them by allocating lines and or time slots to freight services (Commission of the European Communities 2001, p.32), measures via the network permeability indicator.

3.4.1 Infrastructure

The first cause for bottlenecks in Bulgaria is the policy preference for passengers considering physical entities more important than legal entities and they are to be given infrastructure priority. Prospective investment strategies focus predominantly on passenger-related equipment overhaul, disregarding the modernization needs of state-owned freight operators. Thus, the allocation of time slots for freight is bound to the condition not to interrupt the passenger flow by waiting on stations (in the case of a single track). Paradoxically, people still get dissatisfied – these are the business clients deprived of fast, reliable services for local or long-distance movement of production. Similarly to actual tendencies in other EU member states, while 600km of railways are closed down each year across the EU, 1,200km of motorway are constructed (Commission of the European Communities 2001, p.32).

The national carrier has realized a profit of just €5 mln in 2007, while its state subsidies amount to €44,5 mln, plus €40 mln to compensate for the passenger discounts, and €19,5 euro from the state budget excess (Angelov 2008) for no particular reasons. Bottlenecks are present even after these financial injections. One cause is the geographical specificity of Bulgaria, the fact that there are industrial cities with no rail due to high investment needs or other considerations. The presence of a mountain ridge splitting the country in two also causes bottlenecks along the few cross-mountain paths. The network lacks sufficient number of two-track lines and the need to share a single track makes it more difficult to coordinate carriers, which all brings lower permeability and bottlenecks. The network is also rather unevenly used, with heavy traffic in the south-central and southwestern parts of Bulgaria, with lack of traffic in the north, despite the network being rather evenly spread on both sides of the ridge.

Geographical peculiarities, railway network's construction, density, and distribution, as well as stations' equipment and distance lower network permeability.

Along the Plovdiv-Svilengrad route (between Popvitsa and Parvomay) lies one of the largest distances between stations in Bulgaria. Such distance over a single-line track, blended with outdated safety systems inevitably limits the south-central region's permeability. Besides, the work of the Svilengrad border station is obstructed, as well as speed and time to travel to/from it.

3.4.2 Management tools

Bottlenecks are also partly caused by the outdated traffic management systems and style of management in general. Unlike in the Western part of Europe, where there are traffic management plans and software to assist the rail network even loading, train routes alternatives (Commission of the European Communities 2001, p.54), BDZ specialists use outdated tools with limited applications. It is still often practiced the method for mechanical distribution and diagram drawing for traffic coordination, visualization, etc.

Only recently has there been ideas for development of General Transport Plan and Strategic Business Plan as a result of TEN-T in Bulgaria under the priority corridors (Yordanova 2007, p.2). The lack of explicit strategy to combat bottlenecks is also visible in the 2005 CPPD document, setting the strategic plan for transport development until 2013. The different types of trains have different priority and this fact disregards time slots, hindering the smooth operation of freight trains in particular. Most advantageous are the international trains, then the speeding ones, fast, stop-trains, and only then the international freight trains, followed by national and local ones.

3.4.3 Equipment

What is outdated are the tools, the vehicles, the constructive elements of the network, as well as its safety and signaling control systems. The majority of wagons are not designed for speeding, though higher velocity would bring higher passenger satisfaction and simultaneously free up larger/more time slots for freight trains. Thus, coordination suffers and congestion costs increase, despite NKJI being into existence. Only the two-track line between Sofia and Plovdiv (the two largest cities) is equipped with modern signaling systems, allowing multiple trains to move between two stations. However, all other stations have the ALS (auto-lock system), which locks the track between 2 adjacent stations and allows no more that one train going along the track – a highly ineffective and outdated safety system that prevents higher utilization of infrastructure and effective use of precise time slots to relieve bottlenecks and increase utilization (in contrast to the ERMTS system along each TEN-T project).

Outdated traffic management tools, inefficient signaling and safety systems, malfunctions and maintenance/rehabilitation of railway track, and old vehicles decrease output levels.

Finally, any track renovation (like the Plovdiv-Svilengrad route), a malfunction of the signaling and safety systems, or a malfunction of the locomotive/wagons lowers permeability, resulting in drop of speed and utilization levels.

3.4.4 Policy tools

Designation and auctioning of time slots and innovative charging (Wheat & Nash 2006, p.14) to bring more market-driven and optimal use of infrastructure may be a technique to partly combat bottlenecks. Additionally, potential causes may be the time it takes for calibration of the locomotive and therefore, further wait for the next free slot, which may distort the punctuality of the other running trains in the effort to satisfy the needs of all. And since Bulgaria is on the crossroad with the Near East, trade routes further increase the bottlenecks in the border regions, as there are only six stations, connected with outside networks. They receive the whole freight and passenger volume, which together with the technological and administrative capacity, as well as the frequent delays of international trains, causes bottlenecks. By building the TEN-T under revised, selective criteria according to potential benefits, with higher value added, and better decision-making in terms of technology and soft skills (De Ceuster et al 2005, p.112), the EU aims at creating counter-measures for bottlenecks elimination.

3.4.5 Summary

In the case of Bulgaria, there are several main reasons for bottlenecks and lower permeability level. These vary from infrastructure to control and management peculiarities that may contribute/alleviate the situation. Ridges, railway network construction, density, and rehabilitation work, outdated traffic management tools and signaling/safety systems, priority to passenger trains, lack of lines and slots dedicated to freight carriers exclusively, poor condition of the vehicles, lack of large border stations - it all contributes to the appearance of bottlenecks and the decrease in trust and ability of the railways to be reliable and punctual.

3.5 Considerations to be accounted for, so that investment risk is lower

Investing in railway inventory, infrastructure, and personnel is needed for the sector to become more viable, competitive and able to regain modal share. Yet, such huge investments carry risks that need to be managed in order for guarantees on return on investment – ROI.

3.5.1 Traffic intensity and infrastructure

In the case of Bulgaria, what first may be considered is the traffic intensity of a line and the benefits that are related to the indicator. Financing of non-traffic-intensive routes is more prone to slowdown the return on investment and/or increase of investment risk – fewer guarantees on sufficient and timely return. This is true for both passenger, and freight sector of the Bulgarian railways, since the latest trend indicators have been showing underperformance, if benchmarked against EU-27 data.

Losing modal share to road, inability to effectively compete, and the current economic crisis have all contributed to the appearance of the case from April 2009. This is why investments need to be well thought of and risks evaluated, so that optimal results are achieved. Hence, the economic potential of the region is to be looked at via the latest accessibility approaches that bridge (local) economy potential to railway infrastructure investment by assuming that regions with higher population an economic growth potential are more probable to be economically successful (Martino et al 2005, p.20) and therefore, ROI to be plausibly higher, with overall investment risk decreasing when judged via accessibility and pkm/tkm indicators that give idea on the path's popularity, historic/present rate of usage, etc.

A fact to worry: on April 16, 2009, for the first time in BDZ's 140 years history, not a single freight wagon left to Northern Bulgaria (Tzanev 2009).

In addition to the intensity and popularity of the infrastructure, one may also look at the general condition of the infrastructure, machinery, and staff to estimate how high investment risk is or what circumstances influence it. The state of signaling and communication systems, rail track amortization, age of machinery, speeding opportunities, management skills, and staff qualifications are all to be considered, since they determine the amount of investment needed, the time for improvement of the network (the more outdated and decrepit, the more time and resources it takes to bring to standards) – it all increases investment risk by extending it further into the future and raising its net present value.

3.5.2 Macroeconomics

Besides economic potential and hardware peculiarities, taxes, passenger and freight flow levels, unemployment levels, industry sectors developed, performance levels and other macro-economic variables are to be considered for more precise estimation of investment risk at national or regional level. The EU has developed the dynamic ASTRA macroeconomic model to link up transport, economy, and environment (De Ceuster et al 2005, p.59). It takes into account the demand-supply relationship, public and private investments and their mutual influence, the crowding out of public funds, taxation policies and so on via eight correlated modules. The model bridges foreign trade, population, macroeconomics, fleet & transport, regional economics, environment, and welfare measurement (Martino et al 2005, p.22) factors. The existing medium-term strategy for investment of the Ministry of Transport in the passenger sector and fleet modernization (while conducting only policy changes in the freight sector) is also to be considered by the state, the EU, or any private investor that may engage financially into the sector. The TEN-T and other priority transport corridors, policies and plans are to be taken into

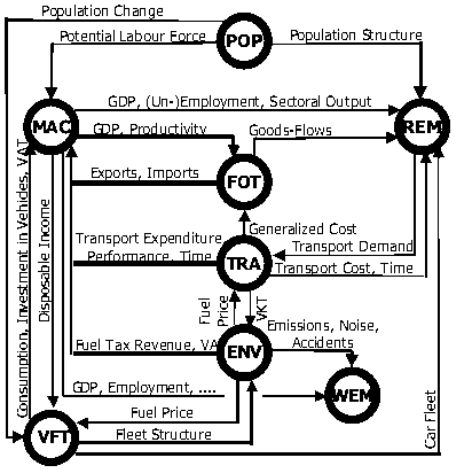


Figure 3: Structure of the ASTRA model
Source: Martino et al 2005, p.23

account too, since financing is more plausible to be obtained when working under routes included in the priority policies, besides one being more sure that the investment is to be timely and properly returned (EU specialists in the financing, economics, transport have had input in determining priority lines).

Traffic intensity levels, tkm and pkm indicators, macroeconomic prognoses, conditions of the network, nation-level development strategies, and barriers to entry/exit affect investment risk.

By investing in projects with European Union support, the public or private sector should foresee the member states' value added to the project and its intrinsic benefits, besides the opportunities for feasibility studies funding, financial aid towards costs to construct and operate (in the case of Marco Polo on intermodality), guidance in pricing strategies, transparency in management, etc.

3.5.3 Strategic policies and opportunities

National barriers for lowering investment risk should be considered, together with their potential impact on project realization and follow-up management. These include: political, legal and regulatory, institutional and organizational, financial and fiscal, social and cultural, and technological (Bak, Pawlowska, Burnewicz & Gerçek 2005, p.46). In the case of Bulgaria, there are barriers to entry and supply power in the face of the state against railways' revitalization via EU policies implementation (Bak et al 2005, p.54) – indicative of the general situation in the Bulgarian sector pertaining to modernization and level of risk for investors.

Opportunities for intermodality, in particular rail/air and water/rail, should be taken into account, so that investment risk in Bulgaria is lower. Railway development should focus towards taking advantage of well-developed road infrastructure, as intermodality ROI increases by using road in rail's favor. Levels of liberalization are also important, as they foster competition. A well-designed investment is to pay off faster by having competitive advantage. In the case of Bulgaria, liberalization is higher in the cargo sector. Last but not least, microeconomic indicators are to be considered, such as potential, partners, staff qualities and quantities, local business climate, demand for cross-border movement of cargo and people (Sofia-Athens for example), so that organizational and other capabilities are better estimated and managed.

3.5.4 Summary

To increase the ROI by lowering investment risk and overall costs is possible if traffic intensity and business demand are considered, plus infrastructure, hardware, and personnel qualities. The ASTRA model is helpful in linking up economic, transport, and environmental macroeconomic indicators. Both national, and EU put attention to railway sector development. Liberalization levels, political, regulatory, institutional, social, and so on influence investment risk.

3.6 Benefits for the sector from electrification, intermodality and interoperability

Looking at the current level of network development, residual/underused resources, and the prospects for regaining shares from road, I consider that among the greater long-term benefits for the sector in revenues, stability, popularity, and popular trust, would come if it timely engages into increasing electrification, intermodality, and interoperability levels.

3.6.1 Electrification

Even though Bulgarian standard of wage is still below average EU standards, its electrification levels of the railway network are above. 70% of the lines are electrified and an

increase in this number to the levels of Belgium and Lithuania (Bialas-Motyl 28/2008, p.5) would deem highly beneficial for the development of the sector and its long-term stability. Higher electrification levels would make the sector independent from oil crises, cuts, or pricing games on raw materials. In the meantime, Bulgaria is substantiated in energy supply with the construction of a second NPP, 51% of which is state-owned. Thus, there would be long-run guarantees for available electricity supply the sector could rely on, levering national self-sufficiency.

Electrification carries environmental benefits. As the EU is continuously raising the compliance standards for fuel emissions, it will be an advantage of the sector to use the cleanest possible energy source, so that it could work towards the Corporate Social Responsibility trend (in the social and environmental pillars in particular) that is recently gaining higher and higher popularity. It also aligns to the Union's strategy for CO_2 increase from energy generation by 2030 to grow only 1/6 comparative to the growth in energy production (Prof. Capros et al 2008, p.18). Moreover, the inner- and inter-city environmental conditions would improve, with fine dust and other gases previously discussed, as in rural regions, where nature is by far the most pristine, diesel and coal-powered engines cause the greatest damage to environment (also due to outdated machinery). The sector could also gain goodwill and environmentally oriented customers by meeting the latest regulatory reforms. In the meantime, there is no danger of energy shortage, since the sector uses less than 1% of the current nation-wide energy consumption. Energy is also more flexible, in the sense that once electrified, the network could use power from NPP, wind, solar generators, while the diesel engines use a fuel, which is more confined in terms of origin.

Further electrifying a network with already high electrification levels is prone to produce higher end results than a lower-electrified network that is starting to be updated just now. Reaching higher electrification levels would be highly beneficial not only in the environmental sense, but also in the chance for rail to regain modal share, compared to that of most EU members. This s due to the fact that the difference in network density in favor of road here is less than 5 times, which is among the lowest across the EU. Thus, higher electrification of the Bulgarian network is comparatively more beneficial not only in terms of investments-benefits ratio, but also in chances to compete with road – a main strategy not only of the EU, but also of the OECD (in terms of projected investments for electrification). What is more, science has proven that the electricity-fueled train "is 25% more energy efficient than the diesel train per unit of transportation activity (Prof. Capros et al 2008, p.54), which inexplicitly lowers the air pollution and slows down climate change - major external/intangible costs of the sector.

Higher levels of electrification would reduce energy dependency and intangible costs, whiles improve cost efficiency per tkm/pkm.

Lastly, higher electrification levels are exceedingly beneficial for the sector, as it would decrease its fixed expenses in the sense of maintenance of different source-powered locomotives. In the same time, it is likely that the income from services increases, since the expenses realized over 1 tkm with an electric-powered machine are three times lower than with the diesel-powered.

3.6.2 Intermodality & Interoperability

There are currently more than 10 intermodal stations all across the country: at the Black Sea coast, at the Danube river coast, in the north and south-central Bulgaria. Yet, most of them are underused, in particular those along the Danube and inside the county, with projects even for their dismantlement. On the contrary, I consider that the sector and the economy would benefit from developing further these freight intermodal stations, since they have the potential to grow into the medium-/long-distance cargo transport, especially as Bulgaria is at the border with Asia and many supplies for the EU are to pass via the railway network, if fast, reliable, and efficient

intermodal services are present, which of course has to be brought about along with policy support for freight at national level, and/or inclusion into the Marco Polo scheme. Moreover, roads around most of the intermodal stations are renewed, so that water/rail/road modality could be easily adopted, if the necessary investment in proper containers is done, as this is currently a major obstacle for freight intermodality development. With the construction of pipelines through Bulgaria and the competitiveness of road, rail should take a strategy to combat these trends by swiftly turning the advantage of other modes into greater advantage of its own: by "bringing" transportation modes together, which refined and substantiated with the ASTRA model would define the optimal mix of variables under the lowest investment risk possible.

As far as passenger intermodality is concerned, for rail it is not existing, but if focused more towards urban areas and airports, it could prove beneficial on a smaller scale in the face of S-bahn and air/rail connections similarly to the WEU practice.

Interoperability and intermodality largely go hand by hand, since the software, hardware, and skills/knowledge should be universal for interoperability to aid intermodality via compatibility. With the advance of CETC corridors and TEN-T priority projects, the Bulgarian railway sector has higher chances to compete on international destinations and that could deem highly beneficial, if the scheme for the Sofia-Athens route is adopted elsewhere - then it is likely its success would repeat. Interoperability would speed up the journey, make it more reliable, while in the mean time less costly for the operators. No additional software should be installed and people trained to maintain and manage it. Accident rate would also further decrease, which is to indicate higher trust into the railways. Planning of the journey would also be less stressful and prone to mistakes from either operator, or passenger, resulting in rise in quality of service and competition capabilities (Wheat & Nash 2006, p.19) of rail as a whole. Interoperability is useful for both freight, and passenger sector, since containers would be faster transported and easily transferred and tracked, while passengers should be able to take advantage of inner-intercity rail compatibility in time, convenience in ticketing, etc. Overall rail competitiveness would rise further with the launch of Galileo navigation system (TEN-T PP 15), for which an alignment of the software and skills of the Bulgarian operators is required.

3.6.3 Summary

Higher electrification of the Bulgarian network requires less capital than most EU members, while it possesses the highest chances for reversing the modal leadership of road under the network density indicator. It is also beneficial, since fixed and variable costs would decrease, while in the same time income increases. Freight intermodality would be beneficial to develop since there are already constructed intermodal terminals around the country that can easily be utilized when modernized and properly linked to the road/water at home and abroad. Passenger intermodality would provide higher convenience and partly resolve traffic and pollution in cities if penetrate metropolitan areas. Interoperability is to lower accident and mistakes rates, while increasing speed of service and reliability on medium-long destinations from Bulgaria to compete with airlines and bus companies. Besides, rail will easily regain common trust and exit the vicious circle of decreasing quality and decreasing revenues, while taking advantage of available EU funds, designed to foster the same beneficial changes.

3.7 Benefits for the local communities and the general mobility of people

Modernization, investments, higher tkm and pkm indicators, faster rail and efficient intermodal stations with less bottlenecks – all benefits pertaining not only to the economic health and progress of the sector, but also the well-being of stakeholder involvement in the sector.

By having the Bulgarian railways operating more effectively and efficiently, local communities would gain by higher employment levels during the timely process of modernization, which is to help the local standard improve. The purchasing power is likely to increase, which automatically translates into higher spending and greater circulation of cash in the local economy. After modernization of the lines, improved (intermodal) facilities may open, especially at border stations, so that the higher employment level would be maintained longer. With a good HR educational policy under EU programs, some constructors may be educated to work on the intermodal station or help in new line operation/maintenance/management, so that the knowledge capital is boosted too. Mobility of the same people and beyond (at national level) is likely to improve, since the refurbished lines are designed to adhere to the latest EU requirements on speed, comfort, etc. Safety and punctuality are also likely to improve, which altogether is probable to foster railway transport usage towards 80's levels (remember the pkm capacity before the drastic degrease of 11 times).

Trust is also to be regained via the railways' reliability indicator on natural disasters like the floods in 2005-6, when rail was highly used to assure the connectivity of some towns and villages. Yet, the dismantlement of extra lines was already present and it proved its flaw – train delays and lower permeability during crises. Lastly, trust is likely to be redeemed under the interoperability criteria, since mobility would be facilitated of not only local, but also nation-wide communities. Interoperability in freight guarantees higher punctuality, reliability, while for passengers it saves time and provides greater comfort and higher average speed, thus all of it contributing to a new, highly competitive extra option on mobility besides road.

Besides mobility and safety, environmental benefits for both operators in terms of external costs, and community as environmental benefits, are likely to occur – lower noise and dust levels, just to name a few. Furthermore, the mere nature is benefiting from the process. Consequently, the sector is also complying with the CSR principles of management and is to further attract CSR-oriented companies or accumulate goodwill via boosted reputation. Besides, lines such as the Plovdiv-Svilengrad route is deemed to integrate into the urban transportation systems and raise the general mobility of people, contributing to the heightened importance of local authorities into the development of high-quality business under safe and modern conditions.

Tourist services are more likely to increase in these regions with cleaner air, lower noise levels, and no bottlenecks – all contributing to the capability to attract tourists, which the locals are also to benefit from (especially in rural regions with higher unemployment and preserved nature). Logistics, banking, security, maintenance are also likely to develop alongside the improved routes, which is to open more workplaces by attracting business to operate locally, away from the congested cities (of course, rail service has to prove itself continuously reliable), or just to foster the local establishment of such facilitating/outsourcing business endeavors.

3.8 Situation in the Bulgarian railway sector

The Bulgarian railway sector has a well-developed infrastructure, but poor maintenance and lack of investment, which together with macroeconomic factors have all contributed to the overall deterioration of the sector in terms of quality, size, income, and trust. There has been modernization of mainly passenger services and stations happening. The sector is lagging behind liberalization, as only recently there have been private freight operators, with the passenger sector being served by the national monopolist. Due to national strategies, there has been some improvement in the quality of passenger sector, while the more liberalized freight sector is renovated mostly in terms of policies. As a result, no actual optimization in financial terms has been noticed. The sector should manage to improve its fixed costs, which is also to assist in lowering the variable and intangible costs in the long run. The sector is extensively relying on EU and national financial help, which should change, for it to be able to compete better with the road and regain share, as the chances for that on EU level are among the most optimal existing,

considering not only the small difference with road on density, but also the present intermodal facilities and location of Bulgaria.

Bottlenecks and low permeability are the main obstacles towards punctuality, reliability, and quality. They are caused not only by the poor control and maintenance of infrastructure and equipment, but also of outdated management and safety practices, which should be brought up-to-date to the three railway packages on liberalization, competition, and price determination. It would be useful for the Bulgarian managers to get available know-how from the West, so that the macroeconomic models and projects for decision-making assistance developed by the EU could be effectively used. Thus, infrastructure, operators, their coordination, cooperation, and management are likely to improve. However, long-term strategic policies should develop, since as of today, only mid-term policy goals exist at national level, disregarding the freight transport and intermodality in terms of investment. Electrification levels of the network and the exiting intermodal terminals should be considered more thoroughly and scrutinized for optimal performance, aligned to EU goals. Investment in intermodality from the state or via PPPs is desirable, so that the waterways and rail may develop hand-in-hand, while taking advantage of the better road infrastructure, following transparent and clear tender procedures.

Improvement of the speed, reliability, safety, punctuality of the sector via the adoption of modern management tools and assistance from the EU under different forms is to help the local communities increase their living standard and the importance of local regions for national trade and higher employment during and after sector's modernization. Yet, these long-term goals have only been hinted in the 2007-2013 strategy plan, without substantial consideration of long-term EU goals for development and the ongoing considerations to further closure lines without first trying to revive them by out-of-the-box thinking. Therefore, the situation in the sector is lagging behind the current international trends. This is likely to affect further sector's profitability and viability, considering the ongoing economic recession. Passenger-skewed financing without enough liberalization and service quality to increase passenger flow and thus, allow for lower increase of prices for the benefiting from volume, not higher prices, is also not strategically considered enough, though it is possible to boost especially in the urban and long haul passenger transport.

As it comes, the sector has a huge potential to modernize and regain share, yet financial performance suffers and investment is not optimally allocated, which adds up to the poor performance via outdated and non-transparent management. The sector is still suffering from its legacy and in particular the passenger division that has not adjusted to the new competitive trends on the market, thus missing opportunities for higher revenues and self-sustainability. Therefore, the sector should start to develop by careful and deliberate analysis and investment, in particular into intermodality and cross-border services. Via more inclusion of PPPs and greater transparency and learning, the sector hold higher chances to combat the negative trends in growth of modal share and focus more on rail freight and passenger carriage in and outside the EU, while preserving network density to its best.

Chapter 4

Mutual benefits for the Bulgarian railway sector and the EU

In the previous chapter I went into details regarding the structure, functioning, main details of the Bulgarian railway sector. It allows the reader to understand the particular socio-economic picture of the sector, recognize its strong and weak sides, as well as opportunities that may deem beneficial if developed in a timely and deliberate manner. The following 4th chapter brings in focus the picture of cooperation between the EU and Bulgaria. Having gone through the first three chapters, one is too see how an alignment of the national and supra-national policy strategies may be constructive for the national rail transport and contribute to the competitiveness of the railway even beyond EU level.

Once familiar with this chapter, the reader would gain specific knowledge on policy, financing tools, and practical information on the potential for sector revitalization. Understanding not only the benefits, but also the limitations towards implementation of tools and practices at national level is to point out to the important mix of development strategies that may lead to overall optimization and improved indicators. Elaboration on ideas and strategies for progress of the Bulgarian sector would be presented, touching on aligned tendencies with the EU, wit relates again back to the main research question.

Chapter 4 is central to the thesis, since its goal is to reveal the real-life benefits that stem from EU-BG partnership for either side. Existing optimization opportunities, aligned with the current EU goals are a main focus here. Financing methods, priority axes, selective know-how, and certain policy alignments are crucial for railway sector optimization, considering in the same time local conditions such as geographical location, infrastructure density, costs to construct, etc.

I intend **FIRST** to focus on TEN-T Priority Projects and their importance for both Bulgaria and the EU, since this is a main railway revitalization strategy beyond national borders that includes financing and management standardization. But to take full advantage of TEN-T, proper financing is necessary. Therefore, my **SECOND** focal point is the methods and forms of financing that may deem highly fruitful and less costly for stakeholders. Part of the financing may come from innovative strategies and non-loan/grant schemes, which is a rather new tendency in the world. This is why I consider important to **NEXT** focus on progressive know-how that can be locally adopted. I have chosen three countries with the criterion of successful pooling of funds and charging schemes under PPPs or other innovative schemes, followed by the **LAST** subsection on "closing the circle" with the important strategies and policies the national sector could adopt, so that it evades modal shrinkage, regain customers, and be more competitive towards road mode.

Due to selectivity and preferences, as well as plausible applicability, I will limit my focus to few financing strategies. I will select a few policies, opportunities, and cases-studies due to their perceived significance towards modal share regain and applicability, with preference being also somewhat subjective. I will neither elaborate on TEN-T information already discussed, nor will I discuss the CETC network, internal sector optimization strategies, structure of financing tools, as well as limitations beyond politics and finance. I have also used a single PPP risk allocation method due to preference. Cases provide are far from supreme or extensive and are probably not the best existing. In the last subsection, some policy aspects are omitted on behalf of those I consider more crucial after analysis to have the potential to really bring greater benefits to the sector and society, without elaborating on legal and administrative capacity.

4.1 The importance of TEN-T

4.1.1 Co-funding

4.1.2 Connectivity

4.1 The importance of TEN-T

TEN-T strives to rebalance the modal shares and boost the development of non-road, with the greatest efforts and financing being diverged towards railways. Cleaner environment, less bottlenecks, and greater competition among modes are also part of the EC goals under these 30 priority projects. Bulgaria benefits from one railway line axis: TEN-T PP22, where financing and know-how is provided to a total of seven EU members. The trans-European transport network (TEN-T) is important not only for Bulgaria, but also for the whole EU in terms of bottlenecks alleviation, transport sector development, quality, and greater competition of services under an environmentally-friendly strategy.

4.1.1 Co-funding

TEN-T has been primarily designed to enhance competitiveness, improve connectivity, and develop higher cohesion. With the EU goal being to revitalize the railways, the focus of the priority projects has been in the direction of support and development of rail. There is a great share of community financing for the 30 priority projects, with a 1993-2013 contribution of €225 billion (Informal Transport Council 2008, p.4) - 1/4 of all funding needed. It mostly comes from:

- TEN-T budget
- Cohesion and ISPA (Structural) Funds
- European Regional Development Fund
- European Investment Bank

What is important is not only the amount of financing, but the opportunity to afford it, especially under the current economic situation. The TEN-T budget does not cover all the costs under a particular priority project, but it establishes a financial network for sharing the resources among national and international banks, institution, and programs. Financing is also important for the fact that it is granted not only for covering construction costs, but also for providing know-how and technical assistance. The fact that a project is being developed under TEN-T is also indicative of its EU viability, since these 30 projects have been selectively prioritized out of the greater Common European Transport Corridors (Ginev 2008, p.2) - CETC network, and have moreover undergone extensive analysis on social, economic, and environmental benefits, similar to the CSR in the private sector. It all facilitates private capital attraction and PPP formation.

Feasibility studies and consulting are financed up to 50%, actual construction phase - with a maximum of 30% in the case of cross-border projects, with a total of 75% of all funding

being allocated to rail (Directorate-General for Energy and Transport 2008, p.4). Corridor №22 is quite beneficial for Bulgaria also because the mobility to the north is more underdeveloped, while some production facilities in the region are still working, with tourism also getting more popular. The total financial contribution towards TEN-T PP22 amounts to €424 mln, with €84 mln being allocated from the state budget (CPPD 2005, p.145), which does not burden the taxpayers if benchmarked against the common financing for rehabilitation of tracks done.

4.1.2 Connectivity

The increased flexibility of the Bulgarian railway sector and its competition abilities are aided by TEN-T being implemented on a local level not only in terms of financial help, but also of connectivity of this less-developed region to the capital and the neighboring countries Romania and Greece. Intermodality can also be set up, since the highway to Thessalonica runs alongside the rail tracks and thus, intermodality in the urban or intercity cargo areas could be established with the goal to escape the ever-present traffic jams around the Bulgarian capital Sofia. This priority project also deems beneficial for the ongoing construction of the bridge over the Danube that is to connect Bulgaria and Romania, so that connectivity is improved via adding up two more modes of transport to the current waterway one. It is to drive competition up, increasing quality, while decreasing travel time and costs along the whole length of the path within Bulgarian border.

The project is also to positively influence to the broader CETC network, as it is an element of Pan-European Corridor №4, which is currently being modernized also in the Plovdiv-Svilengrad part. Thus, there will be a modern railway with speeding ability up to 200km/h that links three Balkan states to Turkey. Having in mind the highly convenient geographical location of Bulgaria, one fast and efficient route with higher permeability levels would inevitably increase the tkm and pkm via guarantees for reliability and quality of service (comparable to road). Intermodality stations along PP22/PEC4 are also to foster connectivity and drive competition up.

4.1.3 Additional benefits

Considering the EU vision for freight development alongside the TEN-T/CETC railway network, it is expected for logistics services (cargo rail) to improve, thanks to both improved rail infrastructure, and intermodal stations along PP22/PEC4, with the terminals being allocated extra funding under TEN-T of up to €22 mln (CPPD Main 2005, p.144). As a result, kinetic (faster reloading, processing, movement of goods) and additional value investments (product marketing, storing, order processing) (Jevtić & Radmanovac, p.521) by private parties are feasible to attract - by offering intermodal services of high quality, express deliveries, punctuality, flexibility, while lowering environmental costs. With a total of five Pan-European Corridors that run through Bulgaria, the intrinsic and second-level benefits of TEN-T PP22 increase.

Not only logistics that satisfy the present JIT production methods and client demands for fast and reliable services stem from modernization, but more benefits like local employment opportunities during and after construction, efficient integration of national network to foreign ones, modernization of the lines connecting major trade centers and intermodal terminals, etc. TEN-T links up different countries and along its network, the ERMTS software is used, which further eases and makes the service faster and more reliable, integrating the different member states and opening up rail. Last, the deployment of ERMTS via TEN-T prepares the personnel and the rest of the infrastructure for further software alignment for less costs and less time. All of that is expected to realize an increase in inter-EU traffic up to 50% along this route (Directorate-General for Energy and Transport 2008, p.54) once it is completely electrified, double-tracked, and properly managed.

The quality in hardware and equality in software open up the medium/long-haul for cargo and people, making it possible to effectively compete against road and air, while using their

competitive advantages via intermodality. As discussed, the local road/rail density indicator is the lowest within the EU, while intermodal stations already exist. Therefore, they need less investment and time to set up – all pointing at the need for timely development of these strengths, while labor and materials cost at present less due to the oversupply and price drops in the conditions of recession.

Intermodality development, local economy boost, hardware and software levels, improved connectivity, and boost in traffic are all benefits stemming from TEN-T's implementation.

Financing and execution of TEN-T is less politically-influenced at national level, being strictly supervised by the EU bodies, and evaluated on future profitability by EIB experts, which all guarantees transparency and signifies greater trust of the private sector to engage participate in financing and timely completion of the project. It is beneficial for the state, the private sector, the local people, the logistic companies and needs of businesses beyond EU level, since connections beyond immediate neighbors improve. Thus, the state is able to shift the construction and revenue risk (Informal Transport Council 2008, p.8) to the private sector, with the private sector assuming it more easily with consideration of the Loan Guarantee Instrument by the EIB, designed exclusively for PPPs under TEN-T. Revenue risk in the first years of operation is mitigated and thus, "risk margins charged by financial institutions" (Informal Transport Council 2008, p.8) decrease, with the EC guaranteeing support on part of the private sector's loan.

4.1.4 Limitations

At national level, there is lack of experience with PPPs. The bureaucratic machine, high levels of corruption, recent change of power, and outdated legal framework also obstruct PPPs. On financing, the TEN-T still mostly relies on private funds, which even with the Loan Guarantee Instrument are not easy to attract in the conditions of economic recession and greater loaning difficulties, especially by the construction companies that have capital grounded into unfinished property across Bulgaria. Cross-financing schemes are also underdeveloped.

Political issues include corruption and power abuse that hinder the transparency and integrity, which lead to blockage of funds for Bulgaria. Project coordination and management at EU and national level needs further improvement, besides the issues on effective legal regulation and guarantee of compliance, including fast and effective control mechanisms, which so far are narrowed down to blockage of funds. Since Bulgaria benefits from one motorway and one waterway PP under TEN-T too, for which intermodality needs fostering, coordination and transparency are a huge problem, envisioning the corrupted practices of politicians and lack of long-term strategy for intermodality. Lastly, there is general inefficiency in transport funds' tendering, absorption, and spending.

4.1.5 Summary

TEN-T provides financial and knowledge resources to the national bodies for faster, cheaper, and high-quality project implementation of superior transparency. It fosters private sector participation by giving higher credibility to ROI opportunities. Connectivity within Bulgaria, among EU member and non-member states is also a benefit of TEN-T, together with its foster of intermodality. Other benefits include software alignment and training of staff, local employment, establishment of logistic centers, and development of intermodality via financial help under TEN-T budged, EIB Loan Guarantee Instrument, and Marco Polo initiatives. Yet, there are constraints, amidst inability to attract/lack of private funding, no PPP experience, poor coordination, regulatory, bureaucratic, political and legal obstacles, and corruption.

4.2 Sources and forms of financing to aid the sector's revival

The White Paper from 2001 sets a common strategy development for the transport sector of the Union, which besides policy tools envisions financial sources and forms of financing that are deemed to bring development of the sector and when managed accordingly - to aid in rebalancing the modal shares. At Community level, supranational funding is designed to join finances together with other sources of funding – national and regional – a logic that is currently adopted for the most rail development projects, including TEN-T (Commission of the European Communities 2001, p.58)(see 4.1.1). These tools are all designed to promote higher competitive levels via technical interoperability (Wheat & Nash 2006, p.5), intermodality, punctuality, so that railways' service quality and reliability rise to meet current customer demands. Being part of the European Union, Bulgaria has the real opportunity to take advantage of 7 billion euro until 2013 (Ministry of Finance 2009, p.5) in the form of EU-funding for areas, including rail.

4.2.1 EU sources

Under the financing policies, there has been PHARE and ISPA available as pre-accession instruments, with the first being designed to help the state efficiently absorb the larger amounts the country is currently eligible from the Regional and Cohesion funds – including TEN-T, which for the period "2007-2013 account for 5667 million euro" (Commission of the European Communities 2008, p.6). The state should work a lot on transparency in spending and tendering, financial management and control. Otherwise, events like the blockage of 115-mln euro in July 2008 from ISPA programme on TEN-T happen (Investor.bg 2009, ¶1). In the case of ISPA-financed Plovdiv-Svilengrad path, there are 340mln euro dedicated to the construction phase and signaling system phase of the project, which is however lagging behind. Such a governmental drawback hurts the modernization of the railway, as deadlines for resources' accounting and spending run even when funds are blocked. It all affects the project's timing, quality, and private companies' performance as sub-contractors.

The Cohesion Fund is another source of funding, with the allocation for TEN-T amounting to 35mln euro for 2007-2013 (Informal Transport Council 2008, p.4). Not only that, but the Bulgarian railway sector could also benefit from other Cohesion Fund allocations that are related to the sector, for example on Accessibility, Business Support, Adaptability of Companies and Workers (especially useful for the personnel of BDZ and NKJI), Energy Efficiency Fund (Inforegio 2008, p.4), etc. EU LL-Learning/qualification programs may also deem constructive.

4.2.2 National and (semi) private financing

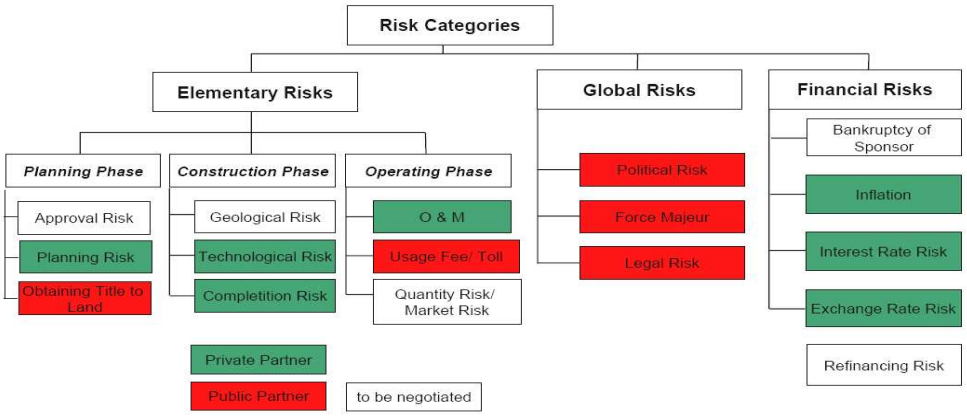
Other financing sources that are particularly suitable for the sector, especially as part of the EU, are the ERDF and EIB already discussed in section 4.1.1. They grant not only financing under the form of cash subsidies, but also interest rate subsidies and loan guarantees (Commission of the European Communities 2001, p.58). However, the major part of financing is to come from other sources - public or private. Only for development of intermodality there are additional stimuli in the form of financial aid under the Marco Polo I&II initiatives to help investors who develop intermodality in terms of cash and consulting until the unit is financially self-sustainable.

The Bulgarian Ministry of Finance is a large fund contributor via its National Fund unit, designed to co-finance any project subsidized by the Structural Fund for up to seven years and a total planned contribution of 1,3 billion euro (Ministry of Finance 2009, p.5), since the advance payments from outside "may not exceed 20% of the total project value. They represent advance financial resource, intended to facilitate project" (Ministry of Finance 2009, p.6).

Policies require the larger final payment to be wired to the beneficiaries only after an audit and ratified documentation and commission estimations are satisfactorily completed. This is why the state should be able to provide proper incentives and back-up during and after

construction to the agents or the PPP venture, so that it does not collapse financially in the interim period construction-reimbursement. Because of their expertise, funding capabilities, quality of control, management practices, and know-how, PPPs are among the main strategies of the EU in the area of infrastructure projects. What the Bulgarian sector may consider it to develop expertise, proper legal framework, administrative capacity, and control tools to effectively participate in such innovative business ventures and financing schemes. Private sector has often proven to be more effective in spending time and money than state-owned companies, with tendering making the final composition of the PPP even more competitive and of high quality. A difference here is the reliance on extra state support and EU funds. A benefit for the state and NKJI in particular would be also not only the private sector expertise, but also the risk sharing between the private and public players, where depending on arrangements, different risks belong to different actors.

Figure 4: Balanced risk allocation within a Public-Private Partnership (PPP)
Source: Nikolić 2006, p.8



The model structures the risk types to be assumed by each party, so that the overall risk is optimally balanced according to fields of expertise and influence. The eventual Refinancing Risk here may plausibly be assumed by the state in the face of the Ministry of Finance and its National Fund unit - to help financially the PPP if needed. It is to guarantee cash flow in case of EU funds are blocked again, or if capital flow/repayment of loans is delayed due to economic circumstances. With the current recession, such guarantees on liquidity guarantee project quality and timely implementation with lower apprehension for lack of funds. Especially for PPPs, there is the Loan Guarantee Instrument (see section 4.1.3). In the same time, the private sector bears the major financial and elementary risks.

4.2.3 Summary

Various (supra) national subsidy, fund, loan, and loan guarantee instruments may additionally boost the process of Bulgarian railway modernization. A success could be the adoption of PPPs to assist financing and risk bearing, while state help is also provided, under the conditions of more transparency on tendering and financing. EU-derived optimization/evaluation projects are also sources of financing, though indirect, they provide valuable qualitative/quantitative expertise.

4.3 Know-how from European states

4.3.1 The Netherlands

The Netherlands is quite similar to Bulgaria in terms of level of electrification and tkm/pkm indicators within the rail sector, but quite different in rail usage and popularity.

However, there is an increase in indicators' value according to recent data: more than 10% difference in the million tkm and pkm indicator for the period 2003-2006 in favor of the Netherlands (Noreland 2008, p.3), where the increase in % in either indicator is being positive, unlike the case of Bulgaria. There are numerous variables that influence this trend, too many to be look at in that piece of work. Yet, among the main ones are the advanced pricing system, use of modern software, intermodality (water-rail), and liberalization/competition.

Regarding the passenger transport, the regular use of Information and Communication Technology (ICT) devices - the "rail pocket" mobile application (Ackerman, Pipek & Wulf 2003, p.37), has increased the responsiveness, reliability, and service of the Dutch railways. It grants to all staff members access to a mobile database on and off the trains to acquire the latest situation in mobility and ongoing operations across the network. Moreover, this application eliminated the need to carry around travel books and schedules (Ackerman et al 2003, p.37), which is more environmental and saves money in the long run. The rail pocket has lower variable costs, compared to the periodic design, update, printing and distribution of schedules and books (like the practice in Bulgaria). Timetables may vary, so even new books are not always accurate and therefore, not reliable – all affecting customer trust and satisfaction. Finally, this device allows employees to access organizational knowledge and also contribute individually by inputting one's own impressions and experiences regarding administrative, operational, functional issues (Ackerman et al 2003, p.37). Thus, knowledge sharing is fostered and learning is promoted, while more freedom and responsiveness are given to the lower-level employees, enhancing their skills and boosting their self-respect and preciseness, while allowing for reliability and trust of passengers to be maintained. What costs the most are: the initial purchase of software and installation of the devices, as well as staff training on ICT. Even considering the present financial stability of the railway sector in Bulgaria, gradual introduction of that service first in the stations in large cities and border/intermodal stations is rather applicable and plausible.

Mobile applications foster learning, while promoting reliability and preciseness of information. ATM ticketing boosts quality by proliferating the service in terms of choice, security, speed, etc.

A know-how that may deem highly beneficial in the long run is the Dutch passenger ticketing method, which is rather convenient, safe, reliable, and accessible. Currently, the Bulgarian railways sell tickets only at counters and no integrated train-switch-tickets exist. Speed of service is limited by the human factor, payment options are limited only to cash, while stress levels and overall quality of service in terms of (language) accessibility, payment options, ticketing, etc is low. Considering the low capital investment opportunities of the sector and BDZ in particular, plus the greater priority for inventory modernization, such a service may better be outsourced to a bank via an open tender (or PPP), so that the genuine railway sector needn't develop in banking (and invest in related HR, IT security, and so on), but to straightly benefit from. Services and risks could be allocated to the bank-partner that has the ATM and other know-how. Payment with cards and language menus would be adopted, useful for foreign travelers and card users. Design and maintenance of the ticketing machines is also to be shifted to their operator, with the state granting places at stations to locate these machines, while making desk purchase obsolete or intentionally more expensive, which would realize savings on labor costs. Lastly, financial security and human error mistakes are minimized, brining higher service satisfaction.

Regarding freight rail, know-how on intermodality, and water-rail stations development, management, and maintenance may be useful when following national long-term strategies focus more on freight and are not exclusively allocating all financial resources to the passenger sector. However, further liberalization and improved legal/regulatory framework may be needed, so that competition and easier entry to market are fostered, in particular for the passenger sector, since

there is only one company serving this niche at present, with the passenger operators in the Netherlands amounting to seven, with some rural non-electrified paths or such of low profitability being allocated to private operators like Arriva, Connexxion, Synthus (European Railway Server 2008). By delegation of routes to private sector, 900km of railway paths may be saved from closure by NKJI due to low profitability. Dedication of these paths to private operators or PPPs with financial risk allocated accordingly may increase the chance of paths/routes being saved by boosting quality and infiltrating private-sector best practices.

4.3.2 Switzerland

The Swiss have always been renowned for their banking and financial management system. Not surprisingly, they have been the first to successfully implement a financial funding programme for rail, where the major source of financing comes from road (Commission of the European Communities 2001, p.61). Such an innovative method is what Bulgaria may easily take as a best practice and implement at national level, once having created the legal and administrative framework that would make such charging manageable and transparent. It is a timely strategy also if considering the national strategy for long-term lease of highways. The state may use its share of toll income from highways to fund railway and/or intermodal stations, overhaul of inventory, personnel training, improvement of fixed assets. Another option is for the railway companies to form partnerships and bid for the concession rights as a separate business entity, though under that model the infrastructure is unlikely to benefit.

The Swiss case sets the main focus on the freight sector, in contrast to the Dutch case. The main investment flow from the innovative source of funds is designated towards infrastructure modernization, with three main sources of funding. Most of cash resources are to come from lorries using Swiss roads. They are charged on the vignette principle, with the revenues diverted towards rail infrastructure improvement and/or expansion. Non-EU haulers pay a transit fee if to use Swiss roads (Commission of the European Communities 2001, p.61). The latter is rather applicable for Bulgaria due to the country's trade crossroad position, with many lorries coming from Middle East and passing via Bulgaria on their way to other EU states. Vice versa – charging EU lorries exiting the Union is also plausible. And while the "Trakia" highway running from the border to the west can be more optimally used, constructing modern intermodal stations at the Turkish border (and not only) is more easily funded, so that there could later be a choice for businesses to use road or rail, with the latter being able to compete better, in line with EU policy strategies, while taxpayers are not burdened or resources are invested elsewhere.

The Swiss government allocates income from road charges, VAT, and loans to rail infrastructure, to improve the latter and increase tkm & decrease CO_2 without burdening taxpayers or economy.

The rest of financing under this novel Swiss approach comes from taxation and 0,1% VAT increase, as well as from bank loans railway operators are to later repay (Commission of the European Communities 2001, p.61). With the global risk being borne by the state and its charge fund lowering financial risk (see 4.2.2), it is more probable for banks and companies to engage in the co-financing, construction, and maintenance of rail infrastructure by loaning, PPPs, etc, despite the current economic turmoil and the generally lower ROI from such large projects.

4.3.3 United Kingdom

Last comes the United Kingdom case-study, which I have chosen due to the immense success of PPPs observed in the last 20 years, with a 57.7% of value of signed projects across the EU, surpassing the next best state more than 4 times (Kierzenkowski 2008, p.25). Such business

arrangements are quite complicated and require excellent communication and well-defined risk allocation among partners, just to name a few. What the UK has set as a determinant is the paramount driving logic of customers: better value for money (Kierzenkowski 2008, p.30) – an unbiased principle lying in the heart of decision-making for PPPs creation and management. Such modern thinking within the public administration follows the post 80's development of New Public Management, adopting ideas from the business administration and the private business goals, has proven to work in the UK. What has made UK PPPs that successful are the:

- Quality and financial control exercised by a central governmental unit over the costs and benefits of any PPP project and its following implementation stage via centralization of knowledge and control
- Experience of learning by doing and accumulating knowledge within the unit, rather than spreading it out across ministries
- Less corruption by bridging the public and private sector's administrative cognition
- Financial transparency and future commitment of public spending
- Development of best practices (Kierzenkowski 2008, p.30)

If Bulgarian government would like to stimulate the participation of private parties in PPPs and the increase of PPPs in general, this may be the key. Such a unit would concentrate the expertise of the state and centrally manage its financial commitment in the scheme. A main issue though would be the guarantee of objective financial transparency and control not only of the partnership, but also of this special unit. It is vital for trust recognition, due to the high levels of current high-level power corruption. This is why such a unit may involve CFAs, independent CBA experts and so on, with a focus on corruption elimination at all levels of the PPP. Therefore, for the trust of public and all interested parties, transparency, and fairness would be the main obstacles, besides a change of culture that would avoid a "groupthink syndrome" paradigm.

4.3.4 Summary

The Dutch case points out best practices for passenger service improvement, effective ticketing, and possible PPP arrangements to guarantee high level of financial security, while granting high quality and reliability of service. Mobile applications foster learning, while promoting reliability and preciseness of information. ATM ticketing boosts quality by proliferating the service in terms of choice, security, and speed, while lowering human costs on the benefit of higher efficiency. In Switzerland, innovative fund allocation approach shifts the financing burden on rail infrastructure construction away from taxpayers to the road mode and its users, with the ultimate benefits of lower emissions levels and bank loan levels, efficient use of roads, without burdening either taxpayers, or economy. The last case goes into best practices for PPP management by a centralized state unit to guarantee transparency, learning opportunities, fairness, less corruption, higher expertise in forecasting future state risks and cash flows under the concept of improved public administration and New Public Management style.

4.4 EU strategies that require the most attention for BG sector development

The policy strategies and measures of the EU may be considered of greater importance, under the effects on optimization indicators used so far. Local peculiarities should be considered, such as the road/rail network density and economic situation, as well as intermodality and national strategies at present.

One important EU strategy for the Bulgarian sector, to my way of thinking, is the mere process of liberalization with consideration of interoperability options and local legal and institutional frameworks (Wheat & Nash 2006), with particular focus on passenger sector in its

lagging behind in opening up infrastructure and ability to more operators to compete for the delivery of services to passengers in terms of quality, punctuality, and reliability. Fostering competition and less protectionism for the state operators is likely to boost quality and regain passengers and cease the trend of falling passenger share. This would also allow for the higher ROI on new machines, since quality is a key variable in a liberalized market. Besides, investment would be better challenged by the expressed customer demands and competitive advantages that are needed within the sector, so that it is optimally balanced. Liberalization aids railway integration by fostering interoperability for the safer and more efficient use of infrastructure and equipment. Financial transparency and individual responsibility are likely to improve too.

Another important strategy would be the better management and increase of capacity (network permeability). This is an important aspect with respect to the important location of Bulgaria along international trade routes. Moreover, it would stimulate the investment and usage of Cross-European Transport Corridors and TEN-T, all being a priority strategy of the EU, benefiting in financing, consulting, and advisory for its development. Such a strategic development is likely to clear bottlenecks, improve speed and reliability of service, ultimately making it more competitive to road in both freight and passenger aspects, which together with the traffic control harmonization and modernization under ERMTS would result in further increase in network permeability and integration, as well as flexibility of operators.

If one considers the 12 White Paper policy strategies, the two that I think have the highest chances to realize tangible optimization within the railway sector under the consideration of improved performance indicators, are the ones for overall railway revitalization and development of intermodality. The last is of particular importance to Bulgaria, as intermodal stations already exist in big cities and ports, but are currently underused or abandoned. With the stress on the five CETC paths within national borders, there are 8 cross-points for freight and passenger intermodality (CDDP 2005, p.65), with the stations at the borders being cargo-oriented and those inside the country – semi-cargo focused. Furthermore, benefits from Marco Polo I&II stem in financial, managerial, operational support until the intermodal stations become self-sustainable. The two common transport strategies are also of high importance due to the member states' tendency to lag behind in implementation, which also affect effective assimilation of financial support and timely alignment and adoption of best management practices. By 2010, no more than 3 member states (Zecca et al 2005, p.20) are expected to timely fulfill these two goals satisfactorily. Bulgaria is moreover already starting later in time to advance towards these goals set in the White Paper. Lagging behind is undesirable.

Similar is the importance and benefits from TEN-T, where lagging behind should not occur and priority to be shifted away from road (Kierzenkowski 2008, p. 20). TEN-T provide financial and knowledge resources to the national bodies for faster, cheaper, and high-quality project implementation of higher transparency. Thus, it fosters the participation of the private sector by giving higher credibility to ROI. Connectivity is also facilitated. Other benefits include software alignment and training of staff, local employment, establishment of logistic centers, and development of intermodality. However, for the effective and timely completion of TEN-T and not only, PPPs should be stimulated by proper administrative framework, plus control and risk allocation schemes, and guarantees by either party. Know-how may be taken from the United Kingdom, as described in section 4.3.3. PPPs are a main source for knowledge and resources that the national sector could take advantage of and modernize for the ultimate benefit for people (mobility without tax increases, employment) and businesses (new niches and less risk).

4.4.1 Summary

The implementation of the aforementioned strategies is very likely to take the sector out of the current vicious circle of decreasing quality – decreasing revenues – decreasing investment by modernizing the network in technical terms for allowing high-speed train services, increasing

permeability and reliability levels (CPPD 2005, p.80), as well as guaranteeing more stable cash flow for maintenance and investment purposes. It is also a good way to adjust to the economic halt at present, open up new workplaces, and stimulate economy. Development in this direction would also bring extrinsic benefits to society, private and public companies, as well as to environment by operating electricity-driven, more efficient machines in a more efficient manner.

4.5 Mutual benefits and opportunities for the Bulgarian railway sector and the EU

Bulgaria may benefit along several lines from its cooperation with the EU and implementation of strategies, while taking advantage of location, know-how, and other opportunities. In financial aspects, the modernization process may be supported by various funding sources and schemes, with the ultimate beneficiary the citizen - not having to pay more taxes to receive improved service. The pkm and tkm indicators are likely to rise, which translates into higher income. Combined with innovations in financing, partnerships, and service-delivery and higher efficiency, it is likely to increase and stabilize inflow for investment purposes. The vicious circle of dropping quality and decreasing investment opportunities is to be broken also thanks to technological benefits for the sector in terms of interoperability, intermodality, higher permeability levels, fewer bottlenecks, software modernization, and technological alignment beyond borders. Inventory and efficiency are also prone to improvement.

Socially speaking, there are employment benefits for the local population, greater mobility, higher comfort, reliability, and punctuality of service, all of it regaining trust into the railways. Other benefits include the adjustment of legal and administrative framework for higher competitiveness, liberalization, and transparency. Administrative capacity is to become more responsive and efficient, innovations are to be implemented at various levels (management, technological, financial), with the ultimate higher levels of flexibility, punctuality, and overall modal competitiveness.

From the European Union side, there are numerous benefits stemming from the development of Bulgarian railways sector. Practically speaking, EU-wide software and management tools would align. Equal technological aspects for higher safety and speed levels within member state would improve. By having Bulgarian railway network well integrated and functioning accordingly to international standards, effectively integrating rail into CETC and boosting its competitiveness EU-wide is highly plausible in the medium and long run. More high-quality lines that are uniform in technology and administrative practices grant higher freedom to private and state operators to go beyond WEU. Intermodality is to be developed according to policy strategies set in the 2001 White Paper, with the opportunity to have intermodal stations (and improved access) at the Black Sea and along the Danube. Intermodality would also facilitate the movement of EU citizens to/from Bulgaria, providing equal comfort and opportunities like in WEU, with the same being true for cargo – boosting pkm and tkm, increasing profitability and efficiency in terms of usage. More players would be able to share and compete on the railway network, intensifying rivalry and improving service along the service path. Ultimately, rail would be modern, trustful, and able to complement with other modes for the sake of its further growth. Therefore, the path for optimization of the Bulgarian railways is interlinked with that of the EU railways and by adopting know-how, goals, and benefits from the latter, the state sector could develop further and strengthen in the long run.

Chapter 5

Long-term development opportunities for the Bulgarian railway sector

In Chapter 4 I have exclusively focused on TEN-T in benefits for Bulgaria and the whole EU and financing sources for its implementation, as well as limitations. Sources and forms of financing to aid the sector's revival were also discussed, followed by know-how from other member states on financing and managing railway projects, with the closing point on strategies that hold the potential of pulling the sector out of its current state. In this last chapter I will be exploring the needs/opportunities for changes solely within the Bulgarian railway sector (BDZ and NKJI mostly) via personnel, technological, and operational changes. By linking to previous chapters, the reader would be able to see how these changes in the sector complement with the EU strategies, benefits, best practices, and current economic situation with the long-term modal stability in mind.

The topics outlined benefit the readers with specific knowledge on possible technological improvements to help indicators grow, complemented with a proper decrease in one of the main expenses for the sector (including HRM), without hurting on performance. Thus, the know-how and new technologies lead towards overall increase in quality and drop in expenses, while there is a boost in service and competitiveness comparative to road.

This chapter looks at technological modernization and HR reorganization of the rail, producing long-lasting benefits for interested parties, with view on indicators' performance during and after the recession. The reader is to understand how the recession affects the sector and what should be planned now with regards to network quality and revenues later. With operational and HR changes, the array of potential local, national, international needs and sources for revitalization is complete, realizing favorable deviations from the current situation within the railways revenue-wise, management-wise, quality-wise, and efficiency-wise.

In this last chapter, I will **FIRST** look at the current economic halt's significance for the Bulgarian railway sector, since the lack of business affects transportation demand and need/ability to pay for transportation services by either legal, or physical entities. This first topic would lay the foundations for the latter ones, which are designed to help the sector resist the economic recession and grow in the long run. In order to do that, the sector needs adequate infrastructure, inventory, and management tools, which are going to be the **NEXT** subsections' focus. It is important to read, since they interrelate existing knowledge with practical future implications and tangible productivity results. **LAST**, I will outline some HR measures I consider useful for cost reduction within the sector that will free financial resources for modernization and relieve the existing financial burdens of the structures.

I focus mostly on the national operators, with far from extensive view on selective technology and HR-related strategies I consider effective. I am looking mostly at the market and technology sides, not extending myself to the political, legal, social, cultural barriers needed for actual policy implementation. The legal and administrative frameworks are ignored. Topics on financing are not to be discussed again. I only suggest HR tools for optimization that I personally view as useful. I offer solutions that I consider have the potential to deem profitable, yet further research would be necessary before definite conclusions are reached. There is greater alignment to current EU policy strategies and recommendations than to those of the Transport Ministry.

5.1 Effects of the current economic situation

5.1.1 Financial
5.1.2 Socio-cultural
5.1.3 Political

5.1 Effects of the current economic situation

During socialist times, Bulgaria has been among the most industrialized communist countries, with well-organized and abundant agricultural, light, and heavy industry production. After the change of regime in 1989, the economy has been suffering. Due to 1994 bank crisis and 1998 hyperinflation, many heavy industry players went bankrupt or shrank their production. Consequently, their transportation needs suffered and so did the railways, which were service providers to most of these industry producers. The 2009 crisis is further affecting the economy, with further shrinkage of transport demand already present.

5.1.1 Financial

The economic recession, together with the trends observed since the late 80's, has lead to the recent shutdown of gas supply to the largest metallurgical facility on the Balkans – Kremikovtzi. The poor management of the plant and inability to optimize it even after privatization has lead to its ultimate shut down, which is to dramatically affect the freight transport demand over rail. More than 30% of the total railway freight has been to/from this particular location (GSHL 2007, ¶6). As of May 2009, the plant is not operating. This is why the freight sector is now to face even greater modal competition for clients, with the railways suffering the most. Apprehensions are even greater with the case of April 2009, when for the first time in BDZ's 140 years history, not a single freight wagon left to Northern Bulgaria (Tzanev 2009, ¶1). In the case of inability to adjust and find alternative clients, the trend of rising freight volume observed 2003 onwards would shift downwards. The lack of investment in the rail freight sector by the state (as per the 2007-2013 national transport strategy) may lead to a stable decrease in tkm and greater financial instability of operators, affecting quality of service and ability to compete.

Intermodal terminals at the Black Sea and Danube are to suffer financially too, since Kremikotzi makes up the majority of business for the ports, in particular in Burgas and Lom (GSHL 2007, ¶8). Thus, decreased demand from Kremikovtzi is to affect the overall stability of the railways freight division and intermodal terminals nationwide. The current construction of Black Sea pipelines may further decrease the market share of the railways for petrol – the other major commodity carried over rail in Bulgaria. The current economic halt has also lowered the demand for transportation services of other major railway clients, such as Liebherr, KCM 2000, Stomana Steel Industry, LUK Oil. This is the reason why a timely strategy for financial stability is needed in view of future demand prospects and revenue stability/amount.

5.1.2 Socio-cultural

The slowdown of production and decrease of purchase demand have all lead to social turbulence, spurred by effective two-digit unemployment levels and decrease of net salaries

nationwide. It affects the pkm performance, since people's demand for mobility decreases in times of crisis (as also observed during the crises of the 90's). As a result, less people use the service of the railways and modal competition for passengers' increases, with the coach liners being preferred due to their flexibility, cleanness, punctuality. The ongoing global economic turmoil affects the Bulgarian railways indirectly also by increasing the popular apprehensions and stress levels, which hinders the effective and pleasant provision of service to clients at the desks, in the trains, at the stations. Attention to customer drops, direct client service deteriorates - it all indirectly becomes a weakness of the railways, compared to the private bus companies.

Higher stress and poverty level often lead to abuse of the common infrastructure in terms of appearance, cleanness, and condition. Low hygiene and unattractive appearance of the railway equipment, mixed with ignorance from employees and customers, affect long-term preference levels. The lack of private passenger operator and urban-level competition against the auto further affects the attractiveness of the sector as a potential transportation service provider. The lack of intrinsic motivation system (empowerment, recognition, appreciation) and recent failure of extrinsic motivation of workers' (pay, stability, work atmosphere) contribute to the effective decrease in service quality within the state railways and indirectly obstructs the sector's ability to regain passengers.

5.1.3 Political

The economic crisis has also caused social turbulence that has further affected the political life of the state. Blended with this year's parliamentary elections, political forces currently destabilize the ministries and top-level managers and so the priorities of the railway, its medium and long-term development strategies stand still. This is how the crisis affects not only the financial, but also operational stability of the railways, as decisions for top-level changes come along politics, not rationality and personal qualities. Politicians use the crisis in their games for power and interests, affecting the drafting and implementation of effective crisis-management framework for the railway sector. Thus, though the current economic stagnation does not directly influence the political life, it contributes to the management inefficiency and divergence of effective top-level strategy modeling and follow-up, as well as cleared financial transparency when political agitation has a paramount importance.

5.1.4 Technological

Lastly, the economic changes have affected the technical side of the railways, as the closure of Kremikovtzi and the decreased service demand by other main industry players has left numerous wagons obsolete, lying around depots and in the open, thus being damaged by hooligans or soon to be scrapped due to lack of purpose. Also, parts of the network become obsolete and therefore, NKJI either doesn't maintain them, or irreversibly closes them down. The expected decrease in revenues from now on would definitely affect the investment scheme of the state and it is highly probable that no adequate enough maintenance across the whole network would be possible, needless to consider upgrade of safety systems along the rail for higher permeability and therefore, competitiveness to road. The abovementioned intermodal stations are likely to be abandoned or not taken proper care of during the crisis (unless privatized or leased), which would affect the later investment needs, current equipment, staff and so on.

5.1.5 Counter-measures

Definite signs of near-future shrinkage in demand for transport and increase in competition among modes for clients become evident, with flexibility and service quality as main players. This is why I consider that the sector may at least partially try to adjust to the new

situation by channeling its management, financial, and other resources into medium-term service improvement, withholding of planned substantial investments in the passenger sector, unless there is planned co-financing subsidized by the Structural Funds of the EU or from sources under TEN-T/Marco Polo. Even then, investment should be cautious, since the larger subsidy comes as a reimbursement some time after the project is complete (refer to section 4.2.2) and short-term liquidity may become an issue to cover fixed costs (refer to section 3.3.2). Also, investment may be diverted from the passenger to the freight sector – a change of the national investment priorities until 2013 to occur (CPPD 2005, p.19).

The freight sector is likely to suffer quite a lot from the economic turmoil. This is why I think that substantial resources should be channeled towards tkm stabilization, so that its long-term viability and ability to deliver adequate services is preserved. The tkm decrease could be partially covered by adequate policy and politics of the state. An innovative medium-term solution is to assign the railways as Sofia's garbage carrier. Since 2007, Sofia is not anymore operating a depot, but transports its thrash to depots in other cities in and out of Bulgaria. The same is expected to happen with Shoumen's waste (Northern Bulgaria) by year-end. By transporting garbage, the railways would be able to utilize their Northern lines, optimize the use of the Southern ones, put onto operation obsolete equipment, and foster competition among the four cargo operators for improved quality at lower prices, while NKJI would be able to avoid dismantlement of paths. In addition, new tracks may be constructed to connect the future factory for recycling of Sofia and the one in Plovdiv to the existing network, so that connectivity is improved for faster and more convenient service. Thus, in summer 2009 this strategy is already viable, requiring little investment in new tracks or the intermodal station in Plovdiv. And since Sofia is to ship trash at least until 2012, it is a good revenue source until the crisis is over, with already expressed mutual agreement of Sofia to use Plovdiv's garbage-factory capacity (Plovdiv24.bg 2009, ¶5). As a result of that, the tkm indicator may stabilize, with long-lasting prospects for this niche to develop beyond the two largest Bulgarian cities and bring additional employment, income, and other local benefits.

5.1.6 Summary

The current economic turbulence is affecting the demand for transportation service and increasing the inter-modal competitiveness. The railway sector bears financial, social, technological and other negative effects from political games. Yet, stabilization is possible under proper state politics and channeling of resources not exclusively towards passenger sector, since freight is to be more severely affected by the crisis. The closure of the 2% GDP contributor Kremikovtzi could be partly balanced by the sector fostering long-haul EU/non-EU carriage of goods and inter-state demand boost by Sofia's and Shoumen's garbage allocation to Plovdiv's eco-factory and abroad that requires little investment, but boosts competition and revenue levels.

5.2 Infrastructure opportunities for the freight and passenger net flow increase

Learning from WEU experience and studies, intermodality may be a key player in net flow increase of passenger and freight carried over rail. Besides, as seen from above, new strategies for increasing occupation levels of the rail could prove highly valuable in view of the economic situation at present.

5.2.1 Freight

To boost attractiveness and competitiveness of the intermodal stations and rail as a whole, the state may consider allocating priority to intermodality by developing a common strategy for its development, foster the establishment of logistic centers close to the intermodal stations (private or semi-private), and aid financing and management (CPPD 2005, p.82). The

availability of containers for intermodal freight and the non-standardization on dimensions and software among different member states further obstructs the development of this opportunity in Bulgaria, besides bottlenecks. With intermodality, bottlenecks exist primarily due to lack of enough space and tracks, limited working hours, lack of standardization in software and intermodal wagons, and capacity (Salucci 2006, p.10). In the case of Bulgaria, all of these are present. Yet, the technical condition, tracks availability, and connectivity with water are generally well developed. This is the reason why I consider that regarding freight, attention should be diverted first to these stations along the CETC network that are best developed and offer the quickest and cheapest establishment of functioning multi-modal stations. Most of these stations lie close to major roads and rail paths. It facilitates the cross-border shipment of goods – a strategy to compete on long haulage with the road by offering quick intermodal service and allocation of time slots for faster cargo haulage. With the modernization of main lines across Bulgaria, the hardware opportunity is already present.

Currently, only few intermodal stations for freight are fully operating - in Sofia, Plovdiv and Stara Zagora (CDDP 2005, p.64), all located in the South, which means that half of the existing terminals stay most of the time obsolete, including those at the ports and the North, where less bottlenecks are present. This is why an opportunity would be to stimulate the transfer of shipped containers to train by the introduction of suitable containers and guarantees for quality service from the river and seaports. Due to limited storage and maneuvering room of stations, logistic centers should be created or on/off-site capacity be increased, focusing at ports. However, this should not mean to discard intermodal stations inside the country, since those that lie along the TEN-T PP22 would be able to take advantage of the installed ERMTS software and new tracks allowing high-speed cargo service from the Middle East to the WEU. To avoid bottlenecks, there should be a balanced load of the network and some goods to be carried over road and loaded on rail inside the country. This is why fully equipped logistic centers with lots of storage space are needed next to freight terminals, so that the latter are solely occupied with transfers among modes, not within modes. Thus, intermodal stations would be more evenly distributed around the country, offering safety and flexibility to its clients, ability to adjust to unexpected overloads or malfunctions without causing delays.

Intermodal stations and logistic centers offer speed, flexibility, and quality of service during transfers, taking advantage of the improved paths and unified software along TEN-T & CETC.

A main thing is to improve speed of transfer at stations and reduce bottlenecks along the paths by channeled investment in wagons and logistic centers with marshalling yards (Commission of the European Communities 2001, p.51), while granting priority paths to such cargo carriers along the rail network and developing efficient freight integration and wagon allocation.

5.2.2 Passenger

By taking advantage of infrastructure peculiarities and considering ongoing tendencies, the possibilities for passenger net flow increase seem rather plausible in the urban and long haul segments. The urban opportunities include carriage of passengers along existing lines within larger cities/conglomerates, with the routes being currently serviced by coachers. The railway sector may take advantage of its extra passenger wagons and introduce them for short-distance routes (S-bahn). For example, in Sofia there are existing lines that are rarely used by freight trains. Instead, they may be assigned to such passenger trains that would function similar to on-ground metro. Passenger along such lines would benefit further from the existing cross-points of metro and the non-overlap with other transport modes and routes. Such a line goes around in circle around Sofia, making it convenient for people to move from one end to the other for ¼ of

the time it otherwise would take them. Investment in stops, cleanness, and safety is more important than in new vehicles. When reliable transport to and from these stops is available, the chance of them being used increases further. Higher use of electric-driven vehicles would imminently decrease pollution levels and environmental costs.

Infrastructure opportunities lie in the intermodality niche too, especially considering the road-rail and rail-air connectivity. Both focus highly at the city and intercity role of rail. The road-rail one is a potential one under conditions; considering the advanced inter-city coach services in terms of punctuality, availability, and cleanness, it may be rather difficult for rail to compete in terms of speed and what has already been mentioned. Rather, competition on international/nocturnal routes would be possible, where the presence of sleep-wagons and bistros has already proven as desired by people: Sofia-Athens route and Sofia-Varna/Burgas night trains. Long-distance bus travels lack comfort to sleep and this is where the rail may take over. Train stations need improvement in terms of appearance and cleanness to add appeal to railways.

Lately, the international coach service have been losing share to low-cost airline companies operating from Bulgaria. But while rail cannot compete on extra-long international routes, it may still benefit by the demand for air travel by taking people to/from the airports. In Bulgaria, the public accessibility of airports is a main issue, as no public transport is available or it is rather inefficient, while parking and taxis are expensive. In the case of Sofia and Plovdiv, rail tracks run close to the new terminals, with the construction of fully operational ground-level air-rail point (Schiphol Airport for example) is quite realistic. Such connectivity would save people time and money, but allowing them to directly get on the train after luggage pick-up and reach in no time the city center, where the S-bahn or any other mode of transport comes handy. The expected completion of an international bus station in the outskirts of Plovdiv and its waling proximity to a new train station links well with the ongoing expansion of Plovdiv airport, allowing for the development of a greater intermodality between international bus services, local and national day/night rail destinations, and international flights, with the rail being the connecting mode for such unprecedented passenger mobility and convenience. Even higher competition could be provided under the customer service benefits of intermodality in integrated ticketing and automated baggage handling – to be looked at in the forthcoming section.

5.2.3 Summary

Infrastructure opportunities that have the real potential to boost rail tkm lie in the effective and efficient usage of water-rail and road-rail intermodality, with the railways taking advantage of the high-speed CETC lines under construction, ERMTS common traffic management software, and already functioning intermodal stations across the country. Major bottlenecks should be removed by allocating paths to freight carriers and fostering the establishment of logistic centers and marshalling yards alongside the intermodal stations, so that handling capacity increases without hurting speed and efficiency of service. Regarding passenger boost of net flow, it is possible via urban/metropolitan service provision in the larger cities and international/long-distance night service provision along tested routes on profitability, as well as intermodal air-rail-road services.

5.3 Role of modern hardware and software for the sector's long-term development

The introduction of modern software for management and control of trains, for transfer of cargo data, etc. is beneficial for the sector in terms of interoperability with other member states, which on its hand is to boost competition and facilitate the process of liberalization. Moreover, data transfer for either passengers or cargo, or any data related to the smooth and safe operation of the train, is to happen easier and faster, contributing to the increased overall quality of service and hence, competitive strengths. The ideas on establishment of a common railway network brings along unified software standards and the application of ERMTS system of control, with its

main task to harmonize signaling and control of trains internationally, simultaneously allowing for more efficient use of existing paths. Thus, by applying this software, the Bulgarian railways would be financially supported by the EU, while the former also receive a modern traffic control system, much more advance that the one used at present. The process towards greater liberalization, also a goal of the three railway packages, would be assisted.

The ERMTS is not only helpful at national level, but at EU-level too, since it allows for the faster and more reliable, as well as safer long haul of freight and passengers – the opportunities already identified. But besides speed and non-punctuality, which are main drawbacks of the national sector, intermodality would be also assisted, as there has been developed an option to connect intermodal freight terminals at EU-level. It is allocating best practices and management techniques across the intermodal stations, as well as allowing for easier tracking of goods and detection of bottlenecks (Salucci 2006, p.7). A Terminal Simulation System TRAPIST has also been developed to deal with on-terminal safety tracking and allocation/control of wagons, plus station layout to increase efficiency in land use while decrease accident rates; brought in action along with ERMTS, new logistics database could prove helpful in developing the Danube intermodal stations via the virtual data model that links logics operator in real-time (Salucci 2006, p.9). As a result, interoperability and intermodality are fostered, with the ultimate increase in tkm by higher speed and greater reliability of service and safety under increased permeability levels without investment in additional infrastructure.

Looking at hardware, improved management and speed via software are complemented by the new equipment that is more versatile in type of wagons to handle, allowing for greater diversity of types of wagons to be managed. Besides, as areas along the coast are already quite expensive, new ways to expand intermodal stations exist - via automated in-land shuttles. In the case of Bulgaria, this would save money on land and grant employment in smaller villages surrounding the automated terminal. Besides software tools for improved efficiency in operations, hardware tools fight against the two major on-station bottlenecks – cost and time to change modes by new wagons and transfer mechanisms, guided by software for shipment allocation that have proven to lower these two costs by 30% (Salucci 2006, p.9). Thus, charging for service use would then be largely substantiated by the improved qualities of service.

The same statement could be valid for the passenger sector, where pkm could increase too by offering integrated ticketing to facilitate the transfer of passengers, or introducing Internet ticket purchase to make front desk personnel not the sole point of purchase. Thus transparency of fare is also guaranteed, while comfort for changing modes is improved (Commission of the European Communities 2001, p.80). Stimulating the use of rail-air is possible by introducing integrated tickets, so that transfers from the plane to the train and vice versa happen via one ticket and the availability of service is guaranteed, while service costs decrease.

Baggage handling is also a current issue and the situation could be altered by introducing flight checking desks at main railways stations, so that people needn't bother with luggage, while in the same time are stimulated to use rail, as they needn't carry the luggage with them or wait at airport queues. With exiting options to reach the airport by the train, the chance for rail, rather than road transport, being used increases. Modern hardware has the potential to attract passengers by it being clean and more passenger-friendly in terms of safety, ease to access, comfort, temperature, atmosphere – all options that are not bound to investment in new wagons, but rather than optimization of old ones. Considering the potential of rail to compete with road at night routes and longer routes, the sector may invest in specific hardware in that direction, so that it adds value to the service. On the other hand, urban sector penetration would be facilitated by offering convenient transfer of passengers to rail via design of stations (hardware) and integrated metro-rail-air-bus tickets (software), as well as integrated city-intercity e-charging to boost the usage levels and popularity on rail as inner-city carrier. Internet technologies on routes, ticketing, and booking would further shape a modern and reliable image of BDZ (still the sole passenger carrier) and facilitate its urban sector penetration.

Lastly, other tools that indirectly increase the success chances of the rail include the ASTRA model for macroeconomic analysis and the various projects run by the EC – PRORATA on internal efficiency, SORT-IN on interoperability (Wheat & Nash 2006, p.10), as well as the upcoming launch of Galileo satellite navigation system under TEN-T.

5.4 HR measures to boost competitiveness, flexibility, and viability

The human resources of the sector are the lifeblood of the companies. Yet, certain measures need to be taken in view of the current economic halt and foreseen decrease in freight demand, mixed with the continuous trend since the 90's of falling passenger share. To make the sector more competitive, HR changes at front-line service are needed, where people interact with the company and decide to use its service. With the advance of IT, many of these posts are to become redundant and therefore, pre-qualification would be a good tool for personnel improvement and decrease of staff at both service desks, and general administration.

The administration within state companies is renowned for being inflated and this fact is even more discernible in times of shrinkage of revenues, while the staff costs for the sector remain overly high, without bringing any additional benefit. Thus, BDZ and NKJI may benefit by reducing the number of employees in the administration by compacting positions and pre-qualifications, limit external hiring (whenever possible - internal shifts of positions), or allocation of staff to other rail operators on the liberal market once it becomes a reality, since private passenger and freight operators need qualified staff and qualified redundant personnel may be easily relocated to the private sector. Nearly 10% of the people employed at NKJI are soon to retire, which would alleviate the sector's financial stability and make it more flexible, allowing it to invest more into the remaining staff. Regarding BDZ, a certain improvement in work output efficiency is needed, as despite new technologies, people stay at redundant posts for different reasons. At the end, due to overstaffing, training cannot be efficiently and effectively provided to all employees, so that overall quality of service and performance suffers, while motivation to work remains low due to salary levels and so on. According to Maslow's hierarchy of needs, if the basic necessities of human are not met, physiological factors preclude intrinsic motivation. Overall, people are disallowed from reaching the level of self-esteem and actualization, where the best job performance and long-lasting motivation to contribute come from. Moreover, scholars like Dr. Miree argue that general work environment affects internal motivation (more than money) and the vicious circle appears again, as too large fixed costs drain the financial resources of the companies and they are unable to improve the work environment or remuneration packages, which hurts on motivation to perform, ultimately decreasing competitive abilities of the railways without saving on costs for the drop in demand.

Laying people off is a difficult task and should happen only after greater period is given to employees to adjust and to HR specialists to ort staff out via continuously followed universal objective performance evaluation matrixes. If the sector wants to use its human capital effectively, it may consider investing in it under life-long learning programs. Internships to other railway companies are beneficial, plus employment under predetermined selection process, where competition is higher and only the best candidates may enter the sector as employees. However, competitive salaries and motivation tools are needed to promote desired outcomes. This is why I consider that a gradual, two-digit decrease in administration is possible without hurting on performance, with pre-qualification options in terms of free riders' control, for example. Thus, money in the short-run would be saved, while in the long-term, more resources would be available by reducing the number of staff, but making it more efficient. Regular appraisals and evaluations, and clear performance criteria in the long run would benefit the sector in discarding of non-effective staff. However, in the short-run, great reduction of staff may lead to inability for smooth functioning - abrupt transitions destabilize performance. This is why shorter-term

measures are first needed. Such include working from full-time to part-time and letting staff in (un)paid leaves to save on fixed costs.

Besides limiting external hiring and promoting internal one and laying off retired people, the sector may improve its costs structure (in view of the financial crisis too) by granting choice to elder employees to retire earlier, for which they are to receive compensations. Pre-qualification and joining of positions is also an option, besides flattening out the organization and making it more IT-driven. Technologically speaking, the sector could also benefit in flexibility and viability by computerizing the small train stations to reduce on-site staff. Introducing on-line ticketing is also to improve service quality and transparency, while lowering fixed costs. Outsourcing of administrative capacity is also an option to save on HR costs and/or lower them.

5.4.1 Summary

Under adequate and transparent management, the sector would be able to gradually optimize its personnel by lying off excessive workers and raising the qualifications and motivation levels of the rest. Focusing on the younger population would also benefit in the long run by employing proactive people with up-to-date skills in technology and management, as well as languages. Adopting IT to complement the human in service (see section 4.3.1) of clients would regain trust of clients, as well as brining in people with more market-oriented behavior. In the short run, decreasing working hours of administration, lying off staff, and letting people in (un)paid leaves would alleviate the financial distress caused by the economic turmoil and decrease in transportation demand by curtailing fixed costs. In the medium term, HR measures to boost flexibility and competitiveness include revising/joining positions, lying off elderly/retired population, advance IT penetration, plus increased free-riders' control in trains to restore railway's credibility and make it function more effectively. Lastly, privatization of stations, recreational bases, and depots offers expenditures' transfers to the private sector.

5.5 Long-term development opportunities for the Bulgarian railway sector

In order to develop, the sector should first combat the economic trends and in particular, the decrease in tkm and demand by investment in IT, specific equipment, and human resources. Existing freight intermodality could develop as part of the EU intermodal network, so that it benefits on international scale in software and best practices, competing on long-haul routes via intermodal stations at ports and along PP22. Speed and effectiveness, as well as storage of freight may develop for extra capacity, efficient transfer of data, and management, so that trust and flexibility of rail increases. Such trends are also aligned to the general trend of the EU for intermodality and interoperability and as such, financial and other support is provided to the entrepreneurs/PPPs, which is further benefiting the sector in costs management and growth. The adoption of ERMTS would alleviate bottlenecks. Higher usage may stem if paths and slots are dedicated to freight carriers, plus establishing of logistic centers alongside the intermodal stations.

Regarding passenger development and pkm increase, it is possible if resources are channeled towards long haul and night trains that offer the sleeping wagon option, as well as bistros. Considering the dense urban car traffic, rail may penetrate the metropolitan areas by running on underused freight paths in bigger cities and with little investment to become a city rail. Intermodality would also be useful, in particular to connect rail with major airports. Modern software may assist the railways become more reliable, service-oriented, and trustworthy, while boosting quality. In the same time, the human capital need downsizing and skills upgrade, so that the sector saves on fixed costs and increase work output and efficiency per employee.

Chapter 6

Conclusions, future research, recommendations

So far I elaborate on different aspects of the Bulgarian railway and its place, importance to the EU and EU-wide development of a competitive railway network. I started with an analysis of the current situation of the railway in the EU in terms of demand, tkm, pkm, permeability, followed by a narrowing down of the focus in Chapter 3 on Bulgaria exclusively, and the peculiarity of the sector locally - its main strength, weaknesses, causes for the current situation, and prospective benefits in technological, financial, managerial terms.

In the following chapters I have focused on potential benefits that would facilitate the sector in its struggle t compete and be more flexible and prosperous. In this final part of the thesis, I am therefore going to answer, on the basis of the research and analysis made, the main research question on optimization opportunities for the Bulgarian railway sector, so that it strengthens and develops in the long-run, considering the current socio-economic conditions and transport development strategies of the European Union, followed by recommendations.

6.1 Conclusions & SWOT analysis

The Bulgarian railways sector is the second most popular modal share after road for both passenger and freight. Yet, at present it faces a variety of investment, obsolescence, management, liberalization, punctuality, reliability, cleanness and other issues that together with outdated software and present bottleneck problems hinder its growth. The global economic crisis is inadvertently affecting the stability, profitability, and development opportunities of the sector by lowering transportation demand and exacerbating competition among modes. The EU invests substantial financial and policy resources to revitalize the sector. Yet, to effectively reverse the trends, the Bulgarian railways should speed up the liberalization and effective pricing strategies, besides guaranteeing punctuality and quality of service, while financing being more transparent and not solely dedicated to inter-city medium-distance passenger trains.

To optimize itself, the sector should liberalize and lower entry barriers to become more attractive for private operators that are to increase rivalry and drive quality up. Proper management and supervision of this process is crucial to prevent cartel formation. The sector should improve its fixed costs by HR and IT tools, which are also to assist in lowering the variable and intangible costs in the long run. Bottlenecks and low permeability are the main hardware obstacles towards punctuality, reliability, and respect. They are caused not only by the poor control and maintenance of infrastructure and equipment, but also by outdated management and policy practices that should be brought up-to-date to EU standards. This is why technological improvement is not a solution by itself, but the real optimization would be possible when it is a part of the larger restructuring process under industry structure approach: fostering intermodality, interoperability via ERMTS, competing on new niches to road and taking advantage of EU aid in terms of funds, experience, knowledge, estimation tools. Acquiring know-how from the West is an option to optimize, as measures that have proven to work in reality could be adopted locally and with slight adjustment, the chance to work in Bulgarian conditions rises. Thus, infrastructure management and service provision to clients are likely to improve. However, long-run optimization opportunities in terms of intermodality and competition in satisfying service

delivery would be more tangible once the sector is penetrated by private companies (in particular the passenger sector) for carriage of goods and PPPs for intermodal stations, as the latter are fully operational, yet underused due to lack of exclusive strategy and investment schemes, available under EU policy development strategies. Highly potential new niches to counter-balance the economic recession are the urban and night passenger transport. Water-rail, rail-air, and rail-auto intermodality could all develop at either city, or inter-city level, with rail benefiting in terms of pkm/tkm, while taking advantage of road infrastructure, increased demand for flights, and time-saving priorities.

Consideration of long-term EU development goals is needed and for the sector to grow, its network should be preserved – hasty closure of lines should cease and alternative ways to boost desirability to use the mode via PPPs, concessions, discounts, improvement of existing services, etc should be sought after, as closure would hurt the long-run prospects for competing to road outside metropolitan areas for passengers and speed to carry freight. The sector should start to develop by channeled investment into few strong points, in particular to intermodality and cross-border services. Via more inclusion of PPPs, greater transparency, and foreign know-how to combat the negative trends in modal share and focus more on long-haul freight and passenger carriage, while preserving network density as much as possible.

Financially speaking, the long-run optimization of the railways could by supported by various EU and private funding sources and schemes that complement the state subsidies and support. Transparency in funds allocation and spending is a crucial issue. Technological optimization includes interoperability, intermodality, higher permeability levels, bottlenecks alleviation, software modernization, and cross-border operational alignment. Higher IT penetration and control are also to regain customers' trust, while tightening control and assuring reliability of services, fewer accidents, and higher speed levels. This is why to compete effectively in the future, the national network should integrate and adopt new standards of member states, but also quickly and effectively integrating software and technology at border stations with non-EU members, so that it is able to attract pools of clients that are currently using the road mode due to its speed and reliability. Speeding lines that are uniform in technology grant higher freedom to private and state operators to access the East of Europe and beyond.

Intermodality is to be developed according to policy strategies set in the 2001 White Paper, with the opportunity to have intermodal stations (and improved access) at Black Sea and Danube ports, as well as along CETC/TEN-T inner-state routes. Intermodality would also facilitate the movement of citizens to/from Bulgaria, providing equal comfort and opportunities similar to WEU operators, with the same being true for cargo – boosting pkm and tkm at EU levels, increasing profitability and efficiency in terms of network utilization, equipment usage, software control, and management skills. More players would be able to share and compete on the railway network, raising competition and improving service along the service path.

Considering the economic halt and the danger of decreasing tkm indicator in the short-run, innovative opportunities for the railways exist in service provision allocating the garbage of Sofia and linking rail to logistic centers for freight, connecting airports by train for passengers, with the latter being offered integrated ticketing and other stimuli to use rail as an intermediary. Privatization of intermodal stations, concessions, or PPP governance is all potentially able to revive intermodality. Since they align to the general trend of the EU for intermodality and interoperability, financial and other support is provided, further benefiting the sector in costs management and growth. In governance terms, optimization without substantial investment is possible under rail paths and time slots priority allocation to freight carriers. On the other hand, railways should optimize in terms of more friendly and pleasant passenger service by focusing on long (night) haul and urban light rail, while adopting modern IT in train control, ticketing, and alternative to cash payment options. Considering the dense urban auto traffic, rail may penetrate the area by offering convenient continuity of journey options for passengers alongside existing tracks. However, optimization is possible after substantial upgrade of skills of staff once proper

downsizing of railway administration takes place. Lastly, national policies to stimulate rail infrastructure modernization and rail usage, aligned with EU long-term strategy goals are vital.

SWOT analysis:

The railway sector has a moderately developed network (CPPD Main 2005, p.79) that connects major cities and ports, with a long presence in the country and substantial amount of fixed assets. The electrification level of the network is quite high, compared to EU average. Intermodal freight stations and local producer of machinery exist. Looking at recent data, the tkm indicator is performing well and increasing, with the freight capacity being close to 1990's levels. Lastly, strength of the sector is its friendliness to environment, compared to road.

Looking at the sector's weaknesses, what has already been stressed throughout the work as such is the unsatisfactory age and general condition of equipment and paths that prevents the speeding of trains (CPPD Main 2005, p.78), safety and management systems, lack of service flexibility and used-friendliness (passenger sector in particular), high fixed costs and unsatisfactory revenue levels. There are still high barriers to entry and no liberalization of the passenger niche for greater rivalry. Besides, the sector is using outdated control, safety and management systems compared to ERMTS that hinder permeability and facilitate bottlenecks.

Looking at the opportunities the sector faces, I may point immediately out the availability of financing and know-how from various EU sources (CPPD Main 2005, p.79) in terms of safety, modernization of paths, construction of new lines, best practices in charging and PPP formation, and intermodality development. More beneficial opportunities lie in the possibility to have increase amount of transit trains and such of night routes to compete to the medium-/long-haul journeys done by now via other modes. Under the financing and EU trail development strategies, ERMTS is to supercede the current outdated systems and effectively integrate software-wise the national network into the common Union one for greater competitiveness and improved quality of service – punctuality, reliability, etc, which together with greater liberalization is likely to boost competition by foreign operators' entry and ease of access. As it has been stressed throughout the thesis, great opportunity for intermodality development exist along borders for cargo and around larger cities for passenger. Lastly, new technologies and further modernization of equipment (CPPD Main 2005, p.79), soft skills and indicators (permeability, network density, tkm, pkm, reliability) may improve under proper mix of economic, political, skill, and legal reforms.

When looking at the sector's threats at national level, among the biggest appears the great chance for lag of projects' realization (CPPD Main 2005, p.80), plus transparent, timely, and efficient assimilation of capital. Another threat is the additional cease of funds by the EC and lost of pre-accession funds. A further closure of paths by NKJI, a delay in network/machinery and software modernization at managerial and client-service levels are also undermining the competitiveness of the rail and may further give grounds to even greater usage of road (CPPD Main 2005, p.80) instead of rail. Finally, even in timely modernization within national borders, Bulgarian rail competitiveness (as projected to greatly lie in long-haul/international sphere) may be hindered by non-timely respective modernization/alignment in technical and/or service aspects within sectors of neighboring state, as well as by international traffic allocation outside national borders (CPPD Main 2005, p.80) (but Greek). The sector may not deem flexible enough to adjust to the closure of Kremikovtzi and this is to affect the freight sector's viability and feasibility.

6.2 Future research

Further research on the national legal framework for PPPs and social role of railways, as well as protective clauses and policies for the sector would be beneficial. Besides, an analysis of the administrative capacity for sector's management and efficient operation would be useful in order to precisely see what kind of staff reforming would deems most favorable in the long run.

As already mentioned, some obstacles like political influence towards sector revitalization and influence of external and national investment opportunities are a subject for further research, so that real-life obstacles that are indirect to the sector, yet crucial, could be identified, having in mind that such influence the financial stability, goodwill, and the railway's ability to modernize. Another research may be done on methods to further liberalize the sector according to the Three Railway Packages and in particular, in the passenger transport, as it is lagging behind in modernization, yet financing is exclusively allocated to that niche.

Intermodality has been a point throughout the work as important and potentially viable. Therefore, I consider that future research in that direction would be highly beneficial to build onto what has been said so far in terms of economic potential and viability of the intermodal stations and their successful privatization or management under PPP. With the extra funds being available for such kind of activity, it would be useful to go into the specific tools and requirements for funding and operating via integrated software and virtual modeling the intermodal stations. Similarly, research may be done towards the EU funding schemes and legal requirements under specific directives that the Bulgarian state should conform to in order to timely benefit from funding, which mixed with the strategy for opening up the passenger sector would bring private know-how and potential to develop sustainable competitiveness via innovative financing and management tools from the private sector.

NKJI is the sole infrastructure management and the organization greatly responsible for permeability and bottlenecks. Therefore, more technical research on strategies for alleviation via modern software (MM and ERMTS) and time slot allocation strategies would deem highly advantageous for the efficient operation of the sector and optimal usage of existing infrastructure via modern management tools. Similar is the issue with modern non-cash payment options, since such sill do not exist in the passenger sector and purchases are only possible at desks in stations. Research on IT penetration, debit cards and internet payment usage, as well as more flexible ticketing options is needed for exploring the opportunities to make the sector more used-friendly, reliable, and transparent.

As I consider highly beneficial the case-studies looked at, I think that deeper research into the way these three case-studies could practically be implemented should be done, in particular to needs to adjust the existing legal, financial, administrative, and IT frameworks to be able to adopt the best practices from the Netherlands and so on. As other studies exist, research may broaden the scope and look at more cases throughout the EU that are viable to adopt locally.

6.3 Recommendations

- Providing new transport services via rail-air connections with major civil airports
- Penetration of the urban sector in Sofia and Plovdiv (existing paths) and higher attention to the long haul and night trains in terms of advertising, comfort, convenience
- Introducing radio, Internet in trains along existing in-train infrastructure, plus speech
- Metropolitan rail penetration with emphasis on convenience and inner-city intermodality with rail being the linkage
- Technological and management improvements to relieve bottlenecks
- Penetration of modern IT tools regarding payment options and management to boost effectiveness, trust, and reliability
- Fostering intermodality use via co-financing under Marco Polo and new logistic centers

- Optimization in use of existing intermodal stations via different tools to stimulate their expansion and efficiency
- Fostering the establishment of logistic centers in proximity to intermodal stations at ports, border stations, and along priority corridors
- Investment in intermodality wagons to boost efficiency of stations and local employment

- Selective major investment in the short-run only along night and/or international paths
- Lease or outsource current unprofitable paths alongside other strategies for boost in popularity, usage, and profitability before deciding to inevitably dismantle a particular track
- Consulting with other EU operators on adoption know-how locally (DBahn, NS, etc.)
- Taking advantage of macroeconomic tools (ASTRA) on efficiency and profitability estimation, plus programs to support management (PRORATA, etc), amidst others

- Investment in management to precede investment in new trains, so that time slots along existing infrastructure are well allocated between the passenger and freight sector
- Reforms to improve the speed and transparency of EU funds allocation and usage under TEN-T and relevant EU programmes
- Steps towards further liberalization in the passenger and intermodal stations sectors for greater competition, participation, and quality of service

- Popularization of rail usage and benefits via campaigns and marketing tools
- Fight tkm decrease by assigning rail with the allocation of garbage to alternative depots around the country and to the ecological factory in Plovdiv
- ERMTS and electrification strategy to match the long-term EU goals
- Adopting a transparent and stimulating framework for PPP development
- Develop alternatives to cash payment and ticketing options to improve customer service

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