Investigation of Public Passenger Transport Service and Market
from a Marketing and Sustainability Perspective

Thesis

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1. THE BACKGROUND AND SCOPE OF THE RESEARCH

My research focuses on current issues in the transport industry, specifically the public passenger transport service, which fundamentally influences the present situation of the industry, the direction of its future development, and the conditions of its competitiveness. In addition, the key issues of the present dissertation also essentially affect the relevant economic actors’ relationship to the macro and micro environment, the actors’ latitude, opportunities and modes of adaptation. My research follows the principles of marketing analysis and employs an interdisciplinary approach.

The general, conceptual basis of the study and reference of the research framework and problem areas is the transport market and services; more specifically an exploration of its main characteristics in relation to sustainability, the EU-level, and domestic conditions through applying a marketing approach. A differentiating aspect is provided by the road and railway subsectors, local and long-distance transport, and their intersections, common ranges and distinct characteristics. From the field of passenger transport and freight transport, the research centers on public passenger transport, which is part of the public utility sector where problems are more severe. In connection with railway market liberalization, it discusses freight transport operating in open frameworks from the perspective of a sustainability analysis, evaluation of the effects of deregulation, and objectives relevant to passenger transport, taking into account that social and economic considerations differ significantly. The infrastructure and the technology determine the opportunities of the sector; the approach requires the provision and development of background conditions, during which the role of management is highly significant.

The dissertation takes a marketing approach. Its main source and core of deeper analysis and exploration is the transport market and the service provider-customer relationship. I approach the marketing of public transport services from two different perspectives. On the one hand, based on the traditional approach I view it as a subsystem of non-business services; on the other hand, according to the service-dominant logic (SDL), a further development of theoretical models. It takes service as a fundamental basis of the economy into account. The heterogeneity of public services is considered regarding the particularity of the industry, notwithstanding that their common intersections are characterized by cross-sectoral activities with mutual dependence between them (Illés, 2000, Mozsár, 2002, Dinya, 2004, Hetesi, 2013). I consider the SDL theory in marketing as an adaptation and limitation of the integration of the service approach for the sector, outlining the conditions for development, the definitions of tasks, and the examination of related goals and necessary assets. SDL assumes the interactive construction of the service offering in the process of value co-creation, which, as the essential prerequisite of public transport

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1 My position, first as a marketing specialist and then as a manager, at MÁV-START Ltd. between 2002 and 2005 has significantly influenced the research topic selection process.
competitiveness, can lead to the optimal integration of competencies of passengers, operators and other customers that are involved in the service offering (Vargo, Lusch, 2004a, 2007, Grönroos, 2011, Veres, 2012).

The sustainability requirements for the analysis of the transport sector serve as a guideline. On the one hand, I approach the topic according to the interpretations of sustainable mobility development principles, corporate strategy and marketing, more specifically, the railway services and their competitiveness; on the other hand, I discuss it from the viewpoint of public transport’s passengers, potential customer competences and the opportunities for stimulating demand (Nijkamp, Geenhuizen, 1997, Erdősi, 2000, Vágási et al. 2003, Fleischer, 2004, Jászberényi, 2008, Michelberger, 2008, Moriarty, Honnery, 2008, Kormányos, 2009, Ransburg, Vágási, 2011). Regarding the conditions, it should be emphasized that the European Union, in its endeavours towards the creation of the single market, aimed to shift freight and passenger transport to rail transport, declaring the establishment of the conditions for competition and multi-stage market liberalization as an important asset in the process. As the final stage of this process, international railway companies are allowed to provide domestic passenger services outside the country that has issued an operating license by December 2019, which may lead to significant changes, especially after the termination of the run-out periods of previous public service contracts in 2023 (EC, 2013). The complete adaptation of previous acts has not yet been accomplished and the member states differ in the extent to which they have achieved liberalization (Kirchner, IBM 2007, 2011, Monami, 2000, Nash, 2008, Kelemenné, 2006c, 2006d, 2007, 2011a). However, mobility is unsustainable in the absence of additional measures (EC, 2011).

The benefits of market liberalization, primarily due to the existence of competition, for the supply (operator) side can be identified as private equity investment, innovation, and increasing technological and organizational modernization and efficiency, while on the demand (passenger) side the main benefits are the opportunity to choose from more than one operator, the expected improvements in service quality, and the favourable relationship between quality and fare (Chang, Kao, 1992, Nash, Preston, 1993, Bokor, 1998, Tánczos, 2000, Ivaldi, Vibes, 2005, Eisenkopf et al., 2006, Heidrich, 2006, Kelemenné, 2006e, Wetzel, 2008, Ludvigsen, Osland, 2009, Lang et al., 2010). Considering the strategic and operative development of public transport services, the latter issues demand more conscious planning of the marketing function’s tasks as well. Besides the recent market players, new market entrants are ready to enter the market. In addition, for these non-incumbents to make decisions, an evaluation of the factors that influence the opportunities, performance and competitiveness of the subsector, besides an analysis of the country’s endowments and the regional market, are all essential when assessing market attractiveness and future activities (Craig, Douglas, 2005, Mühlbacher et al., 2006, Hollensen, 2007, Tóth, 2009, McDonald et al. 2011, Kelemenné, 2011a).
Considering market liberalization, in the case of passenger transport a different approach is needed, which is directed at non-business services (Table 1). On the strength of the previous statement, the marketing of public transport concentrates on ensuring sustainable mobility, stimulating the typically collective demand for public transport, and on maximizing social, economic and ecological value. This comprehensive field represents the market, and in particular the evaluation of public transport development opportunities, marketing strategy, design and development of services, innovation and consumer behaviour, especially travel habits, and finally, quality, brand and price policy.

**Table 1:** The framework and particularity of public services in relation to profit-oriented services

<table>
<thead>
<tr>
<th>Study Characteristics/Criteria under analysis</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social policy, public interest, the aim regards to maximize the social value</td>
<td>Vámos (1996), Mozsár (2002), Pavluska (2003), Laing (2003), Kormányos, Tánczos (2007)</td>
</tr>
<tr>
<td>Different conditions of services provision, differences in market operation, typically monopoly, regulated market, determining role of policy in aims and means</td>
<td>Walsh (1991), Kúrtösi et al. (2004), Aba (2009), Lancaster, Massingham (2011), Kelemenné (2012),</td>
</tr>
<tr>
<td>Public money, funding by the government, subsidies, public attention</td>
<td>Kelemenné (2004a, 2006a), Aba (2009), Hetesi (2009)</td>
</tr>
<tr>
<td>Limited resources</td>
<td>Lovelock et al. (1987)</td>
</tr>
<tr>
<td>Assume losses in the long term for sustainability objective</td>
<td>Kiss (2009), Kelemenné (2012)</td>
</tr>
<tr>
<td>Public services nature, scope, unlike to the profit-orientation</td>
<td>Walsh (1991), Kiss (2009)</td>
</tr>
<tr>
<td>Ethical considerations</td>
<td>Walsh (1991)</td>
</tr>
<tr>
<td>Supply obligation, free access to the service, equal opportunity (not always the case)</td>
<td>Németh, Papp (1995), Kiss (2009), Kelemenné (2012)</td>
</tr>
<tr>
<td>Non-traditional market demand: input orientation is characterized rather than output orientation, as in the case of market conditions</td>
<td>Kúrtösi et al. (2004)</td>
</tr>
<tr>
<td>The intermediary role of price does not prevail</td>
<td>Kúrtösi et al. (2004)</td>
</tr>
<tr>
<td>Different characteristics of organizations</td>
<td>Lancaster, Massingham (2011), Kelemenné (2012)</td>
</tr>
</tbody>
</table>

Note: Often a causal relationship exists between the factors.

Source: According to the above-cited publications, author’s own construction

Transport service providers need to satisfy multiple customers such as the consumer needs of various markets and target groups with different interests and roles at the same time (Durrande-Moreau, Frochot, 2008). Their clients include passengers, governmental organizations, the state and its representative ministries and municipalities, as well as co-operators and other customers who are involved (e.g.: railway infrastructure management, cleaning and catering businesses).

According to the SDL model, value should be generated from every participant involved. The operators’ service offerings and competency harmonization can be most effectively fostered through the interactive cooperation of the operators, particularly between the customers of services and companies. I therefore apply the concept of Vargo and Lusch (2004a, 2007). This recent theory introduces a new model in the context of corporate management. Founded on novel discoveries, the theory proposes a new approach regarding
development, competitiveness, and their quality features for service innovation and marketing management (Hámori, Szabó, 2012, Veres, 2012), as well as for the various applications of that (e.g.: project management (Veres, 2012)).

The concept of SDL can be considered a paradigm shift in terms of differentiating between products and services (Gummesson, Grönroos, 2012, Fojtik, Veres, 2012). Although the market ensures the role of service, its practical application is not widespread (Gummesson et al., 2010, Lusch, Vargo, 2012a, Veres, 2012, Fojtik, Veres, 2012), which can be traced back to a number of reasons. While several theoretical publications have been published on the topic, there are hardly any that marketing managers could refer to for guidance. Since SDL does not cover all types of marketing problems (Veres, 2012), the topic can be recommended for further research (Kunz, Hogreve, 2011).

According to secondary studies and the premises of the SDL approach, during the provision, development and design of transport service the integration of passengers’ resources should be taken as the main reference point. Value co-creation relies on the resources of passengers and other customers involved in the process – in particular, on the technical and technological skills of operators and the economic and sociological knowledge of the state representing organizations (Figure 1).²

![Diagram of value co-creation](image)

**Figure 1:** Value co-creation, competence and knowledge in passenger public transport

*Source: Author’s own construction according to Johnson et al. (2010) and Gebauer et al. (2010)*

Employing the previously-described set of conditions as a reference framework, and the objectives, tool-kit, principles, considerations, and mentality of marketing as a starting point, the research described here examines the factors that influence the competitiveness of sustainable public transport in a complex way.

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² In the context of the marketing approach, the thesis treats the role of the infrastructure manager and co-operators as given; this could be a topic for further research.
2. RESEARCH HYPOTHESES

The study of market liberalization and its underlying issue, the competitiveness of rail transport and sustainable transport development and the opportunity for international expansion by operators, raises the question of their familiarity with the different attractiveness features of foreign markets. The evaluation of attractiveness features should be in alignment with European Union endeavours and the conditions of the single market. In connection with the fact that industry competition and an exploration of its traits will contribute to understanding sectoral problems and opportunities, I formulate the first hypothesis.

**Hypothesis 1:** Due to the increasing level of liberalization of the rail transport market in the European Union, the groundwork for international expansion can be fostered by the creation of an indicator that is based on the attraction factors of the member state markets in transition.

Applying the framework of transport development, my comparative market analysis can shed light on the peculiarities that facilitate better understanding of the transport sector’s competitiveness among EU member state markets, together with improvements in the domestic transport market’s position in an EU dimension. My comparative analysis evaluates the opportunities considering the potential market attractiveness.

In addition, on the basis of macro-economic and sectoral peculiarities, the factors that influence a given country’s railway performance can be determined. Identifying these characteristics is especially important for the development of sustainable transport and for the competitiveness of rail transport.

**Hypothesis 2:** A comparative analysis of the European Union member states’ railway sub-sector and macro-economic indicators can highlight the correlations between factors that determine rail performance.

However, target market selection is influenced by fixed tracks and the creation of connections between the base market and the destination. Therefore, in the case of the Visegrád Four (V4)\(^3\), which is a region with similar conditions and opportunities, a separate investigation is required. On the strength of secondary sources, particularly on legal regulations and the database of ERADIS (2013), it can be presumed that while in the Visegrád Four competition is increasing for the freight transport market, the proportion of passenger market liberalization is significantly lower. On the grounds of the aforementioned, I define the following hypothesis.

**Hypothesis 3:** Through a comparative analysis of macroeconomic and sectoral specifics, it is possible to identify the different attractiveness levels of the Visegrád Four member states’ railway passenger and freight transport markets.

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\(^3\) The organisation of the Visegrád Group (V4) was founded by the Czech Republic, the Slovak Republic, the Polish Republic and Hungary in 1991.
The SDL approach, with the integration of passenger preferences, makes possible the analysis of the sustainability of domestic public transport. Therefore, I examine the impact of the recent measures on transport mode preferences of passengers. Considering the aforesaid situation and the possible trends and prospects in relation to the EU framework, my next hypothesis can be summarized as follows:

**Hypothesis 4:** The share of domestic public transport in the medium and long term, taking into account socio-economic conditions, is converging to the EU average, but still remains at a somewhat higher level than that.

Consisting of secondary research, I started conducting expert interviews in 2005 (Kelemenny, 2006a, 2006b). My survey focused on modeling the strategy creation processes of operators.

In connection with the changes in the market and the marketing environment, there emerged the need to understand the underlying motivations, set of goals and strategy tools, for increasingly integrating a consumer and a value-oriented approach, and carrying out further inquiries with industry experts. Identification of the sectoral problems and opportunities accounted for the formulation of the following research questions:

**Q1:** What major problems can be identified in relation to public transport? What are their underlying factors?

**Q2:** Which areas of the subsectors are experiencing developments?

**Q3:** How can the competitiveness and efficiency of public transport be increased?

**Q4:** What are the features that influence passengers’ choice of transport modes the most? What tools could be applied to motivate people to resort to using public transport?

**Q5:** What type of competencies can be identified? How are these competencies related to multiple customers?

The research questions contribute to identifying the factors that determine the competitiveness and efficiency of public transport, as opposed to individual motorized transport. Furthermore, they make it possible to adopt a competence and value based (SDL) empirical approach to the topic.
3. SCIENTIFIC OBJECTIVES

The main aim of this research, on the basis of the results of my secondary and primary investigations, is to contribute to the field by laying down the scientific foundations of domestic public transport policy development directives, strategic targets and applicable marketing tools with regard to the requirements of sustainable development.

While examining the marketing aspects of public transport, my research has a primary focus on analyzing the differentiating characteristics of the afore-mentioned non-business services. The approach described is distinct from the ones taken by previous studies, and serves my aim of contributing to the field of marketing theory. With respect to the service-dominant logic, my goal is to outline sectoral adaptation and constraints, as well as conditions for development, and to define the associated objectives and tools. I accentuate that, compared to the traditional approach, through its value orientation the global framework of SDL supports the definition of innovation goals that are connected to sustainable development, and the recognition of related problems at an early stage. Beside the previously-mentioned purposes, it can also serve to enhance consumer-orientation and the development of public transport offerings.

The additional objective of my comparative market analysis is to highlight potential market attractiveness factors that facilitate better understanding of the competitiveness of the transport sector among EU member state markets, together with the improvement of the market position of domestic transport within EU and Visegrád Four dimensions.

The quantitative and qualitative empirical analysis of practical public transport development opportunities constitutes a priority issue within my research activity. My investigations operate with various viewpoints and highlight public transport trends, industry issues, problems and their proposed solutions for strategic opportunities from a new perspective.

The overall goal of my perspective is to contribute to the analysis of features that influence the competitiveness of sustainable public transport. In the context of the research results, my examinations lay emphasis on the possible directives, corporate and marketing strategies for the sustainable development of public passenger transport services.

The framework conditions and tools which are suitable for developing a consumer- and value-oriented approach in the public transport sector may ensure sustainable mobility and thus stimulate demand. Among other reasons, this focus serves my aim to define or strengthen the conditions and tools that foster the competitiveness of the sector. My recommendations also supply criteria for developing the sector, and for use in operational, corporate and marketing strategy implementation tasks.
4. RESEARCH METHODS

In exploring the research questions I rely on a broad array of international and domestic secondary sources and on the results of my primary research. The timeframe of my research is the period 2005–2013. Throughout the previously-defined period the changing macro-economic conditions, as well as the analysis of the applicability of new marketing models played a significant role in the research. The structure and logical construction of the dissertation can be seen in Figure 2, which not only represents a multilateral approach to the interdisciplinary field of transport marketing, but also takes into account the viewpoints of sustainability, as well as inter- and intra-modal competition elements.

![Diagram](source)

**Figure 2:** The concept and the structure of the thesis

Source: Author’s own construction

4.1. Comparative market analysis

My comparative model for exploring the European Union market is based on secondary literary sources and statistics. In the framework of international research I conducted an essentially ex-post observation in order to support target market selection process. My research involved studying the potential markets and the effects of liberalization through examining drivers from the perspective of operators.

In order to identify international market opportunities and select the target market, market attractiveness should first be defined and evaluated by various generic models, procedures, indexes, and other methods (Craig, Douglas, 2005, McDonald et al., 2011, Tóth, 2009, Vágási, 1998, Veres et al., 2009). In addition, defining an indicator that compares the attractiveness of given markets is crucial for the transport sector, particularly in the European Union. I created the Railway Market Attractiveness rate or RAMATE rate for potential new
entrants to facilitate adequate analysis of railway markets in general. The creation of a descriptive market index serves the purpose of identifying the characteristics of member states and international rail markets, and determining the motivation of railway companies to expand in the European Union, and in the Visegrád Four in particular.

On the one hand, this indicator is structured following a deductive process which also relies on a review of the relevant literature and existing models. On the other hand, I also adopt some inductive elements, for example, in the frame of statistical data assay. The investigation of the components of the rate allows the determinants of competitiveness to be defined.

4.2. Applying Markov analysis to forecast market changes

Besides general and statistical forecasts about the expected development of the domestic public transport market (e.g.: KTI, 2000, Thomas, 2006, EC, 2011), a forecast based on primary research into changes in passenger preferences is conducive to establishing development goals and identifying the means to achieve them. Therefore, I decided to execute a representative survey on inter-modal competition. The bottom line for the domestic transport forecast is the fact that the public transport market share is the highest in the European Union in Hungary. Furthermore, the situation in Hungary is unlike other member states where this proportion used to be outstanding but has since experienced a significant decline and these days is stagnating and converging to the European Union average (e.g.: Bulgaria, Greece and Slovakia) (Eurostat, 2013b).

On the grounds of quantitative research and secondary statistical data, I forecast the expected share of public transport that meets sustainability criteria employing the Markov chain method and the SDL methodological approach. The previously-described allow the inclusion of passenger competencies in the analysis, which are conditional to value creation and permit strategic planning to incorporate a customer and value-oriented perspective. In addition, these also highlight trends in industry competitiveness and sustainability.

4.3. Expert interviews

An additional part of my research focused on identifying the practical development opportunities of transport through empirical research. The investigation has a bearing on problem identification and problem-solving process and on the SDL concept which identifies specificities and provides guidance for the implementation to foster value co-creation, particularly with regards to customer competencies regarding strategic issues both at the sectoral and at the company level.
The in-depth interviews with sectoral experts purported to discover and reinterpret recent phenomena, identify tools that support sustainable mobility and competitiveness and follow the empirical approach of SDL perspective. For the sake of interpreting the explorative results, I applied grounded theory methodology, which is a method for theory creation operating with systematic data analysis (Corbin, Strauss, 1990, Glaser, 1992). According to this theory, I synthesized the actual problems and development objectives from a scientific perspective. However, it is a prerequisite of the theory that the researcher should not have preconceptions about the topic prior to the research. Thornberg’s (2012) theory helps to overcome this situation. He developed the concept of grounded theory further and created informed grounded theory which allows the integration of prior knowledge. In this framework, I had the opportunity to apply the theory of SDL in practice.
5. NOVEL SCIENTIFIC FINDINGS

5.1. The attractiveness of European Union railway markets

Thesis 1: The Railway Market Attractiveness Rate provides input for the strategic decisions of potential market entrants and supports the process of market selection. From the perspective of new entrants, higher values of the indicator characterize rail transport markets where the process of liberalization is at a more advanced level. Lower values of the rate indicate that the given markets are less attractive, there is a shortfall in the market opening and the conditions for competition are lacking.

European Union directives, in alignment with sustainability objectives, targeted the liberalization of the rail market and enhancing competitiveness. However, despite the directives, railway companies encounter different conditions and have diverse endowments during the process of external market opening. I studied the issue of market attractiveness in these different cases.

To enable a comparative analysis of the macro-economic and sub-sectoral characteristics of European Union railway markets, I created the Railway Market Attractiveness rate. The RAMATE rate reveals the attractiveness level and endowments of individual markets for potential new entrants (Table 2 and 3). I defined ex-post, separately the attributes of passenger and freight rail market attractiveness. The two main groups of factors pertain to accessibility and availability. Accessibility refers to the infrastructure and the access charges; that is, to the accessibility of the market. Availability represents the relevant market and the market share and performance of railway companies. The parameters are compared to the EU averages, and then the rate of attractiveness is calculated as the average of accessibility and availability.

Based on the rate, the most competitive and most attractive markets have the highest values. However, during the screening process for potential external markets, the market saturation level and the fact that most of the domestic passenger markets are still not liberalized need to be taken into account. In the case of non-liberalized markets, entering external markets is possible via cabotage\(^4\). The lowest values of the index indicate that the member state’s macro-economic and/or sub-sectoral features are inadequate for expansion purposes, and that such a country has not liberalized its market yet.

The rate unifies the multi-step procedure of screening. It assists with choosing between potential markets according to macro-economic and industry-specific characteristics, applying a one-phase process.

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\(^4\) Cabotage allows rail companies to transport domestic passengers in those countries where these operate international passenger transport services.
| Attributes of the passenger railway market | UK | DK | DE | SE | AT | PL | LU | NL | BE | FR | FI | ES | CZ | HU | EL | SK | IT | IE | SI | PT | BG | RO | LV | EE | LT |
|-------------------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Rail lines relative to population         | 48.1 | 70.8 | 75.2 | 196.6 | 126.7 | 94.8 | 102.0 | 32.0 | 60.9 | 99.0 | 203.4 | 60.1 | 166.8 | 142.2 | 41.5 | 122.5 | 51.7 | 78.9 | 110.6 | 48.9 | 99.8 | 91.7 | 152.5 | 126.8 | 96.5 |
| Network density                           | 118.4 | 87.9 | 167.8 | 40.1 | 122.6 | 112.4 | 188.1 | 137.2 | 208.6 | 108.9 | 31.1 | 52.9 | 215.0 | 149.0 | 34.4 | 131.5 | 100.1 | 48.5 | 107.6 | 54.9 | 66.5 | 80.4 | 51.9 | 36.5 | 48.1 |
| Share of electrified lines                | 70.6 | 62.6 | 125.8 | 170.1 | 131.7 | 129.5 | 205.1 | 163.7 | 180.8 | 106.4 | 111.5 | 125.5 | 63.9 | 77.0 | 22.3 | 93.7 | 153.2 | 5.8 | 88.2 | 110.6 | 146.9 | 79.9 | 29.5 | 30.6 | 14.9 |
| Share of double or more track lines       | 211.2 | 124.5 | 153.3 | 52.0 | 102.0 | 124.7 | 145.7 | 196.6 | 222.5 | 160.4 | 27.6 | 92.2 | 56.8 | 43.3 | 58.1 | 80.2 | 128.1 | 74.1 | 76.9 | 61.0 | 67.0 | 77.3 | 47.7 | 54.8 | 61.9 |
| Share of TEN-T railway lines              | 111.0 | 79.6 | 77.4 | 87.8 | 87.5 | 48.3 | 143.7 | 120.8 | 111.5 | 76.5 | 110.4 | 126.1 | 46.6 | 66.7 | 163.5 | 71.5 | 104.2 | 125.6 | 87.2 | 119.9 | 104.2 | 56.5 | 129.9 | 135.9 | 107.2 |
| Average access charge for Intercity passenger trains | 95.0 | 853.9 | 50.9 | 290.5 | 88.8 | 233.7 | 99.8 | 139.0 | 49.7 | 76.8 | 295.1 | 213.9 | 168.0 | 120.2 | 345.5 | 122.5 | 77.4 | 59.9 | 118.5 | 156.8 | 67.0 | 89.0 | 57.8 | 132.3 | 48.8 |
| Accessibility of the passenger railway market | 109.0 | 213.2 | 108.4 | 139.5 | 109.9 | 123.9 | 147.4 | 131.6 | 139.0 | 104.7 | 129.8 | 111.8 | 119.5 | 99.7 | 110.9 | 103.6 | 102.4 | 65.5 | 98.2 | 92.0 | 91.9 | 79.1 | 78.2 | 86.2 | 62.9 |
| GDP per capita in PPS                      | 112.0 | 121.0 | 116.0 | 119.0 | 124.0 | 61.0 | 271.0 | 131.0 | 116.0 | 108.0 | 113.0 | 103.0 | 82.0 | 65.0 | 94.0 | 73.0 | 104.0 | 127.0 | 88.0 | 80.0 | 44.0 | 46.0 | 52.0 | 64.0 | 55.0 |
| Modal split of passenger rail transport    | 108.3 | 149.7 | 136.9 | 148.1 | 176.8 | 98.7 | 68.5 | 154.5 | 114.6 | 160.8 | 86.0 | 87.6 | 113.1 | 195.9 | 20.7 | 103.5 | 90.8 | 54.1 | 46.2 | 65.3 | 65.3 | 121.0 | 84.4 | 33.4 | 15.9 |
| The change of passenger rail modal split from 1995-2008 | 181.0 | 136.1 | 128.9 | 162.6 | 145.4 | 46.9 | 133.7 | 108.4 | 42.1 | 63.5 | 117.1 | 121.6 | 135.9 | 113.2 | 157.8 | 121.3 | 15.6 | 77.6 | 60.4 | 67.6 | 77.0 | 33.6 | 96.9 | 34.6 | 121.1 |
| Passenger rail performance per capita      | 131.4 | 171.4 | 151.0 | 182.5 | 186.9 | 72.9 | 107.2 | 151.8 | 149.6 | 217.5 | 116.7 | 77.1 | 94.8 | 122.3 | 22.6 | 64.1 | 126.5 | 58.0 | 58.3 | 60.8 | 43.1 | 43.7 | 50.7 | 28.5 | 10.6 |
| Market volume of non-incumbent passenger operators | 1078.9 | 1177.7 | 745.4 | 128.7 | 35.3 | 351.9 | 0.0 | 5.4 | 0.0 | 0.0 | 0.0 | 0.1 | 1.8 | 0.0 | 4.6 | 2.9 | 0.0 | 0.0 | 0.5 | 1.3 | 11.3 | 14.1 | 0.0 |
| Inland 55 km, full price, one way, second class, single ticket in euro | 186.0 | 192.6 | 179.8 | 145.9 | 166.2 | 117.8 | 22.7 | 134.4 | 111.8 | 139.0 | 77.0 | 144.3 | 44.9 | 51.2 | 81.6 | 38.1 | 59.7 | 234.2 | 72.5 | 68.0 | 33.1 | 93.7 | 28.7 | 32.8 | 44.3 |
| Availability of the passenger railway market | 299.6 | 148.1 | 243.0 | 147.8 | 139.1 | 124.9 | 100.5 | 114.3 | 89.0 | 114.8 | 85.0 | 88.9 | 78.5 | 91.6 | 62.8 | 67.4 | 66.6 | 91.8 | 54.2 | 57.0 | 43.8 | 56.6 | 54.0 | 34.6 | 41.1 |
| Attractiveness of the passenger railway market | 204.3 | 180.6 | 175.7 | 143.7 | 124.5 | 124.4 | 123.9 | 122.9 | 114.0 | 109.7 | 107.4 | 100.4 | 99.0 | 95.6 | 86.8 | 85.5 | 84.5 | 78.7 | 76.2 | 74.5 | 67.9 | 67.8 | 66.1 | 60.4 | 52.0 |

Note: Data refer to 2009; exceptions are the number of licensed operators which concerns 2011, and the modal split of railway passenger transport, which refers to 2008. The change of passenger modal split is measured only among 2002-2008 in Latvia. The research was completed in 2012, so Croatia, which joined the EU after this date, is not a part of the comparison; further data are not fully available for that country.


Source: Author’s own calculations
Table 3: Freight Railway Market Attractiveness Rate

<table>
<thead>
<tr>
<th>Attributes of the freight railway market</th>
<th>DE</th>
<th>SE</th>
<th>UK</th>
<th>BE</th>
<th>LV</th>
<th>LU</th>
<th>PL</th>
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<th>BG</th>
<th>FI</th>
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</thead>
<tbody>
<tr>
<td>Network density</td>
<td>167.8</td>
<td>40.1</td>
<td>118.4</td>
<td>208.6</td>
<td>51.9</td>
<td>188.1</td>
<td>112.4</td>
<td>122.6</td>
<td>36.5</td>
<td>137.2</td>
<td>34.4</td>
<td>87.9</td>
<td>108.9</td>
<td>149.0</td>
<td>48.1</td>
<td>215.0</td>
<td>100.1</td>
<td>107.6</td>
<td>54.9</td>
<td>80.4</td>
<td>52.9</td>
<td>131.5</td>
<td>66.5</td>
<td>31.1</td>
<td>48.5</td>
</tr>
<tr>
<td>Share of electrified lines</td>
<td>125.8</td>
<td>170.1</td>
<td>70.6</td>
<td>180.8</td>
<td>29.5</td>
<td>205.1</td>
<td>129.5</td>
<td>131.7</td>
<td>30.6</td>
<td>163.7</td>
<td>22.3</td>
<td>62.6</td>
<td>106.4</td>
<td>77.0</td>
<td>14.9</td>
<td>63.9</td>
<td>153.2</td>
<td>88.2</td>
<td>110.6</td>
<td>79.9</td>
<td>125.5</td>
<td>93.7</td>
<td>146.9</td>
<td>111.5</td>
<td>5.8</td>
</tr>
<tr>
<td>Share of double or more track lines</td>
<td>153.3</td>
<td>52.0</td>
<td>211.2</td>
<td>222.5</td>
<td>47.7</td>
<td>145.7</td>
<td>124.7</td>
<td>102.0</td>
<td>54.8</td>
<td>196.6</td>
<td>58.1</td>
<td>124.5</td>
<td>160.4</td>
<td>43.3</td>
<td>61.9</td>
<td>56.8</td>
<td>128.1</td>
<td>76.9</td>
<td>61.0</td>
<td>77.3</td>
<td>92.2</td>
<td>80.2</td>
<td>67.0</td>
<td>27.6</td>
<td>74.1</td>
</tr>
<tr>
<td>Share of TEN-T railway lines</td>
<td>77.4</td>
<td>87.8</td>
<td>111.0</td>
<td>111.5</td>
<td>129.9</td>
<td>143.7</td>
<td>48.3</td>
<td>87.5</td>
<td>135.9</td>
<td>120.8</td>
<td>163.5</td>
<td>79.6</td>
<td>76.5</td>
<td>66.7</td>
<td>107.2</td>
<td>46.6</td>
<td>104.2</td>
<td>87.2</td>
<td>119.9</td>
<td>56.5</td>
<td>126.1</td>
<td>71.5</td>
<td>104.2</td>
<td>110.4</td>
<td>125.6</td>
</tr>
<tr>
<td>Average access charge for 960-3000 ton freight trains</td>
<td>158.0</td>
<td>586.0</td>
<td>67.5</td>
<td>253.2</td>
<td>63.6</td>
<td>167.2</td>
<td>62.0</td>
<td>107.2</td>
<td>44.0</td>
<td>106.7</td>
<td>643.1</td>
<td>426.5</td>
<td>213.8</td>
<td>274.9</td>
<td>36.9</td>
<td>64.1</td>
<td>173.6</td>
<td>220.5</td>
<td>276.8</td>
<td>106.5</td>
<td>200.0</td>
<td>45.3</td>
<td>52.2</td>
<td>94.5</td>
<td>111.5</td>
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<td>Accessibility of the freight railway market</td>
<td>136.5</td>
<td>187.2</td>
<td>115.8</td>
<td>195.3</td>
<td>64.5</td>
<td>170.0</td>
<td>95.4</td>
<td>110.2</td>
<td>60.4</td>
<td>145.0</td>
<td>184.3</td>
<td>156.2</td>
<td>133.2</td>
<td>122.2</td>
<td>53.8</td>
<td>89.3</td>
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<td>124.6</td>
<td>80.1</td>
<td>119.4</td>
<td>84.4</td>
<td>87.4</td>
<td>75.0</td>
<td>73.1</td>
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<tr>
<td>Modal split of freight rail transport</td>
<td>106.2</td>
<td>190.5</td>
<td>67.1</td>
<td>76.7</td>
<td>354.7</td>
<td>11.7</td>
<td>98.6</td>
<td>185.0</td>
<td>267.8</td>
<td>24.9</td>
<td>11.2</td>
<td>46.7</td>
<td>80.8</td>
<td>104.7</td>
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<td>81.3</td>
<td>29.0</td>
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<td>99.6</td>
<td>60.5</td>
<td>122.5</td>
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<tr>
<td>The change of freight rail modal split from 1994-2009</td>
<td>54.5</td>
<td>123.4</td>
<td>233.6</td>
<td>35.9</td>
<td>22.5</td>
<td>247.3</td>
<td>45.3</td>
<td>149.1</td>
<td>100.2</td>
<td>115.6</td>
<td>101.7</td>
<td>138.9</td>
<td>157.8</td>
<td>95.8</td>
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<td>86.1</td>
<td>54.6</td>
<td>95.9</td>
<td>50.6</td>
<td>118.1</td>
<td>67.3</td>
<td>61.8</td>
<td>8.3</td>
<td>109.1</td>
</tr>
<tr>
<td>Intensity of network use</td>
<td>132.9</td>
<td>108.6</td>
<td>61.2</td>
<td>83.3</td>
<td>464.3</td>
<td>34.0</td>
<td>102.7</td>
<td>143.6</td>
<td>299.2</td>
<td>90.3</td>
<td>14.4</td>
<td>37.3</td>
<td>44.5</td>
<td>46.0</td>
<td>314.4</td>
<td>62.7</td>
<td>49.0</td>
<td>107.2</td>
<td>35.8</td>
<td>48.1</td>
<td>23.4</td>
<td>89.8</td>
<td>35.4</td>
<td>70.1</td>
<td>1.9</td>
</tr>
<tr>
<td>Market volume of non-incumbent freight operators</td>
<td>1047.0</td>
<td>121.4</td>
<td>333.4</td>
<td>7.6</td>
<td>8.8</td>
<td>0.0</td>
<td>363.9</td>
<td>25.6</td>
<td>91.2</td>
<td>69.1</td>
<td>0.0</td>
<td>11.3</td>
<td>12.0</td>
<td>68.4</td>
<td>0.0</td>
<td>74.4</td>
<td>17.7</td>
<td>1.9</td>
<td>0.7</td>
<td>0.0</td>
<td>204.1</td>
<td>8.0</td>
<td>3.5</td>
<td>29.9</td>
<td>0.0</td>
</tr>
<tr>
<td>International freight tariffs for 200 km, 25 ton</td>
<td>130.4</td>
<td>83.3</td>
<td>125.0</td>
<td>119.1</td>
<td>91.7</td>
<td>119.1</td>
<td>82.4</td>
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<td>127.5</td>
<td>100.4</td>
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<td>85.8</td>
<td>76.6</td>
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<td>106.6</td>
<td>86.1</td>
<td>85.8</td>
<td>87.5</td>
<td>108.3</td>
</tr>
<tr>
<td>Availability of the freight railway market</td>
<td>294.2</td>
<td>125.4</td>
<td>164.1</td>
<td>64.5</td>
<td>188.4</td>
<td>82.4</td>
<td>138.6</td>
<td>123.0</td>
<td>170.0</td>
<td>83.8</td>
<td>41.8</td>
<td>63.9</td>
<td>84.5</td>
<td>83.1</td>
<td>137.7</td>
<td>101.2</td>
<td>56.9</td>
<td>64.3</td>
<td>53.6</td>
<td>97.9</td>
<td>54.7</td>
<td>69.3</td>
<td>54.7</td>
<td>57.7</td>
<td>44.5</td>
</tr>
<tr>
<td>Attractiveness of the freight railway market</td>
<td>215.3</td>
<td>156.3</td>
<td>139.9</td>
<td>129.9</td>
<td>126.5</td>
<td>126.2</td>
<td>117.0</td>
<td>116.6</td>
<td>115.2</td>
<td>113.0</td>
<td>110.0</td>
<td>108.9</td>
<td>102.6</td>
<td>95.8</td>
<td>95.2</td>
<td>94.3</td>
<td>90.2</td>
<td>89.1</td>
<td>89.0</td>
<td>87.0</td>
<td>76.9</td>
<td>71.0</td>
<td>66.3</td>
<td>58.8</td>
<td></td>
</tr>
</tbody>
</table>

Note: Valid licenses and freight transport charges refer to 2011. In the case of Finland, Ireland, Spain, Portugal and the United Kingdom those charges are based on expert estimates. The freight rail modal split of France and Hungary refers to 2008. The research was completed in 2012, so Croatia, which joined the EU after this date, is not a part of the comparison; further data are not fully available for that country. Sources of data: Thomson (2008), EC (2009), EU (2010), ERADIS (2010), Jost (2010), Deutsche Bahn (2011), ITF (2011), KSH (2011), Rail Cargo (2011a, b), UTK (2011), Eurostat (2013e, f, k) Source: Author’s own calculations
My method can be used to assess market potential, estimate expected demand, and identify risks associated with the elements of the rate. Therefore, the indicator supports marketing decisions in connection with entering the international market and subserving the target market selection process. Thus, my first Hypothesis should not be rejected. 

*Related publications: P1, P8, P12*

The correlation analysis of macro-economic and sectoral factors of European Union member states indicates the components for enhancing railway competitiveness which are necessary for determining the priorities that influence sub-sectoral policy. Applying Pearson's correlation coefficient to the data for 25 member states, I identified the features related to Hypothesis 2 with a significance level of 95% and 99%. Tables that present the cumulative results can be found in Appendix 1.

**Thesis 2A:** Passenger transport performance per capita exhibits a positive stochastic correlation with the Purchasing Parity Standard in GDP of member states (welfare in general), the density of the railway network, the share of electrified and double or more track lines and tariffs.

From the correlation analysis it can be concluded that those member states where the share of double or more track lines compared to the total length of the railway network is higher probably have higher transport fares as well. In member states where the railway companies’ market volume is greater, the price level of fares is presumably higher and the infrastructural conditions more favourable, with a larger share of networks with double or more track lines.

In nations with dense railway networks, the share of electrified and double or more track lines and the share of Trans-European Transport Network (TEN-T) lines is generally bigger. In addition, rail transport also has a significant position in the transport modal split in these countries, and thus the performance of passenger transport as well. However, the development level of a given member state’s rail infrastructure (the share of double or more track lines and electrified networks) is not only correlated to the country's level of development, but also to rail transport performance per capita.

The field of transport fare determination is particularly relevant to sustainable mobility. There is a medium-strength positive linear stochastic relationship between tariffs and passenger transport performance per capita. In member states where fares for transport are higher, passenger transport performance is usually better as well. There can be considerable differences between member states. These regional differences can be the result of disparate transport policies and strategy considerations.
Overall, passenger transport performance per capita is probably higher in those member states where the price level (general well-being), the density of the railway network, the share of electrified and double or more track lines, and tariffs are also higher.

**Thesis 2B: There is a positive stochastic relationship between rail freight tariffs and modal shift to rail transport. Accordingly, higher transport fares are expected to increase the market share of rail transport compared to other transport modes.**

The proportion of developed infrastructural facilities, such as the amount of electrified, more track network and TEN-T lines, can be correlated to higher tariffs on the railway freight market. However, a significant correlation between the infrastructure and access charges cannot be identified. Nevertheless, there is a positive stochastic relationship between freight transport charges and the growing market share of freight railway transport.

In some member states this correlation can be the result of the sub-sector’s increasing profitability which may be expanding the freight transport market and increasing intra- and/or inter-modal competition.

*Related publications: P1, P8, P12*

**Thesis 3: Considering the Visegrád Four, the Polish freight and passenger transport market is the most attractive to new entrants.** With freight transport, the Czech and Hungarian markets have almost the same level of attractiveness, while the Slovak market is not liberalized. In light of the macro-economic and sectoral endowments of its passenger transport market, the Czech railway market is also appealing. At the same time, the Hungarian and Slovak markets have average attractiveness rates in comparison with the EU member states.

Taking into consideration the case studies of the Visegrád Four, it can be concluded that the member countries have similar legal environments, and the disparities between railway markets are primarily due to the different sectoral endowments. The analysis of the RAMATE rate (Tables 2 and 3) indicates the main elements of the differences between the member states.

The Czech infrastructure is decentralized; its country networks and its density are the highest in the European Union. The share of main international corridors, the Trans-European Transport Network (TEN-T) is unfavourable, even though it is a transit country, as are the other Central European states. The infrastructure access charges for freight transport are high, and thus offer less incentive.

The endowments of the Polish rail market are rather favourable, thus it has a considerable internal and external market and the country is better equipped with electrical and double or more track lines. In addition, the Polish have created a competitive market
environment and apply low infrastructure access charges. As a result, the Polish railway market is the most competitive and attractive for new entrants in the region.

The most centralized and least liberalized passenger railway market is the Slovakian one. Despite the fact that the railway network of the Slovak Republic is similarly extensive to that of other nations of the Visegrád Four, and tariffs are the lowest in the region, the performance of the nation’s passenger rail transport market is substantially below that of the other V4 countries. Slovak freight transport performance is also low, while access charges are high which is not favorable in terms of profitability and does not encourage the market entry of new operators.

The attractiveness rate of Hungary is most similar to that of the Czech market, despite the fact that its extensive railway network has a radial structure which has a significant impact on sectoral endowments and their quality is not satisfactory; further, the proportion of double or more track lines is also inadequate. The condition of the infrastructure presents problems in terms of competitiveness, and increasingly, in basic operating conditions (e.g. difficulties in canvassing for traffic on single-track lines, increasing delays and customer dissatisfaction). The modal split of the passenger railway market is the highest in Hungary despite the fact that transport fares have almost doubled in the last five years (Eurostat, 2013d). In the freight transport market, however, entry can be encouraged by the relatively low infrastructure access charges.

The findings correspond with Hypothesis 3; the attractiveness levels can be identified for the Visegrád Four markets based on the RAMATE rate. The endowments of the V4 markets are, in comparison with other EU markets (including the Slovak passenger market), attractive to new entrants. Correspondingly, I do not reject Hypothesis 3. According to data about the transport modal split, significant changes or inter-modal competition within the V4 countries cannot be identified, even though that was one of the key aims of EU directives. In the Czech Republic, however, the railway freight modal split has slightly increased in the last decade.

Related publications: P1, P8, P9, P12

5.2. Inter-modal competition in public passenger transport – domestic market forecast about transport mode preferences

Thesis 4: The share of public transport, despite European Union trends, is expected to increase in Hungary. Due to the modal shift in the transport industry, the share of public road transport is anticipated to grow, while rail passenger transport is expected to lose market share.

To forecast market changes, I employed an analysis of passenger preferences which largely relies on the concept of the SDL model, thus the notion of passenger competences. Firstly, I carried out representative, quantitative research on transport mode preferences.
Then, based on these research findings, I determined short and long-term (until the complete liberalization of railway markets in 2022) market forecasts applying the methodology of the Markov analysis.

I studied two states in the state space. A one year interval (April 2012 - April 2013) is denoted by $t$, as it was assumed that for regular travel behaviour to change, a longer period is necessary. In addition, I also surveyed the state prior to $t$, state $t-1$ (April 2011 - April 2012), in order to analyze the change or transition. I defined the transition matrix (Table 4) taking into consideration the preferred transport modes of respondents and changes in their preferences, considering travel distance as well.

**Table 4:** Transition probability matrix of transport mode preferences between 2011/2012 and 2012/2013 considering travel distance

<table>
<thead>
<tr>
<th></th>
<th>Rail</th>
<th>Public busses</th>
<th>Private car</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail</td>
<td>0.81</td>
<td>0.03</td>
<td>0.16</td>
<td>1.00</td>
</tr>
<tr>
<td>Public busses</td>
<td>0.04</td>
<td>0.92</td>
<td>0.04</td>
<td>1.00</td>
</tr>
<tr>
<td>Private car</td>
<td>0.01</td>
<td>0.04</td>
<td>0.95</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Source: Author’s own research based on GfK data

It can be concluded from the research findings that, considering short- and long-term changes, rail and individual transport are both losing market share, while the share of public road transport is expected to grow. In the short run (by 2014) there will only be a slight change in market share: rail transport is likely to decrease to 10.13% (from 11.8%), road transport increase to 28.03% (from 25.1%), while the share of individual transport will diminish to 61.84% (from 63.1%). Finally, according to my long-term forecast (by 2022), the share of rail transport will drop to 9.6%, public road transport increase to 30.9%, while the share of individual transport experiences will undergo an appreciable reduction to 59.5%.

These findings should be treated with caution due to the conditions of the model’s application, its specificities, and the characteristics of the survey. The existence of a stable market environment is a prerequisite for successful use of the method. The Markov chain projects the impact of market changes happening in the two intervals into the future, thus it provides reliable results in the case that there are no significant changes in conditions. These results can therefore only be interpreted for the interval of the survey and the near future.

The reliability of the prediction can be enhanced by taking into account the relative distribution of the attitude indices ($A_v, A_k, A_e$) corresponding to transport modes (1).

\[
S_t = S_0 \begin{bmatrix} p_{vv} & p_{vk} & p_{ve} \\ p_{kv} & p_{kk} & p_{ke} \\ p_{ev} & p_{ek} & p_{ee} \end{bmatrix} \begin{bmatrix} A_v \\ A_k \\ A_e \end{bmatrix}
\]

(1)

The research did not examine all segments; only regular travel was taken into account, and it did not include analysis of weekend trips or ad hoc travel. Presumably, the share of individual motorized transport is higher for these.
The research did not confirm Hypothesis 4 about the clear predomination of European Union trends. In addition, it can be stated that Hungary is expected to develop on its own as the share of public transport continues to increase. Rail passenger transport, however, is expected to experience a slight decline; further growth of the public transport sector is due to improvements in the share of road bus traffic. Consequently, in order to further sustainability, the development of railway transport services should be a priority in the future.

Related publications: P4, P7, P10, P13

5.3. Sustainable development of the public passenger transport service

Thesis 5: The development of a sustainable public transport industry can fostered by increasing market liberalization, reforming the transport apparatus, involving private capital, developing settlements and the parallel application of incentive and restrictive transport policy measures.

By analyzing the qualitative in-depth interviews applying grounded theory methods, I identified sustainable public transport development as the base coding category. The process also resulted in the definition of subsystems in the topic of the research questions Q1, Q2, and Q3. As the result of the emerged and theoretically saturated theory, Thesis 5 could be determined. The summarized thesis indicates potential opportunities for finding solutions to public transport problems which is crucial for the development of sustainable transport. Figure 3 depicts the broad coding categories and their relationships.

**Figure 3:** Problem-solving approach to sustainable public transport development

Source: Author’s own construction based on qualitative research

The problems detected in the public transport industry are due to underfunding, the current condition of the infrastructure, politicization, and organizational rigidity. On the macro level, creating adequate terms for market liberalization, settlement development, reform of transport infrastructure, involvement of private capital, and the enhancement of
public transport competitiveness can be recommended as possible ways to improve the situation. During the development process, the improvement of the supply side should be a priority by applying measures that encourage the use of public transport and restrict motorized individual transport, and by creating conditions that enable the avoidance of parallel methods of transport and interconnectivity between transport modes.

*Related publications: P2, P3, P5, P6, P11, P14*

**Thesis 6:** Public transport planning contributes to value co-creation, and to sustainable consumption of public transport services through the competencies of consumers and other customers involved, in particular the operators and the contractor, by the coordination and control of the process.

Applying the methodology of informed grounded theory, I integrated *a priori* knowledge and the SDL approach into the research, which made possible the examination of additional questions (Q4, Q5). The resulting system of correlations is depicted in Figure 4.

---

**Contractor competencies**
- Ensuring of prevailing passenger competencies (especially availability, accessibility)
- Control
- Liberalization
- Reform of public utilities organizations
- Settlement development
- Multimodal nodes
- Tariff reform
- Education

**Operator competencies**
- Capacity management, fleet order to competencies of passenger and development (e.g., flexible transport system)
- Traffic management, punctuality, interoperability, reduction of transfer risks, creating connections, optimization of stops
- Interoperability of season tickets
- P+R parking area, according to the development needs of passengers
- Real-time passenger information
- Electronic Ticketing System
- Training for front-office
- Development of sales channels
- PR
- CSR

**Passenger competencies**
- Fast and door to door transport (max. frequency, min. waiting time)
- Reliable, predictable service
- Reduction of crowding
- Friendly staff, decline in conflict situations

**Value co-creation**
Sustainable consumption – Sustainable public transport

**Transport authority competencies**
- Based on competence of passengers to optimize output and pricing
- Ordering service and financing
- Supervision of Market
- Coordination of market participants

---

*Figure 4:* The sustainable public transport from an SDL perspective regarding the competences of the market players

*Source: Author’s own construction based on qualitative research*
According to the axioms of SDL, companies are not able to create value on their own, so I included the competences and knowledge of consumers into the theory based on research findings. In addition, my research reveals that in the public transport industry it is not enough to pair up consumer competencies and corporate knowledge and capabilities. In order for value co-creation to happen, the added value of other market players, such as the contractor, is needed as well. The contractor and the transport authority are also crucially important in the process of determining the principles of consumer-competency based service and controlling their effectiveness.

The value, in accordance with the previous research findings, can be defined as the main category of grounded theory, sustainable consumption and sustainable public transport. My expert research, however, revealed more complex relationships (Figure 4) than those discernible from the competency-based approach of my secondary research (Figure 1).

*Related publications: P3, P12*

Understanding and expanding sustainable transport are requirements for influencing involved customers in transport development endeavours, and are essential prerequisites for implementing the formulated theses.
6. APPLICABILITY OF RESEARCH FINDINGS

My approach emphasized sustainable mobility and sustainable public transport in particular, from a new perspective. The results of my research can contribute to the better understanding of current sectoral problems, and to the determination of more effective plans for development. My primary aim is to emphasize the significance of market analysis through examining problems and solutions from a marketing perspective, taking into account the challenges of inter- and intra-modal competition. Sectoral interpretation of the SDL model can assist efforts to strengthen the competitiveness of public transport through the process of highlighting the opportunities for the identification and joint integration of passenger and service provider competencies.

Companies may employ different screening procedures in the decision-making process regarding rail market liberalization and foreign market entry. The RAMATE rate could be one of these screening methods, which incorporates the macro-economic and sub-sectoral features of the EU member states (Thesis 1). Research into the regional characteristics of the Visegrád Four renders perceptible the market attractiveness and competitiveness of Hungary (Thesis 3). My comparative railway market analysis identifies the features of transport policy (Theses 2A and 2B) that need to become a priority in order for sustainable transport development to proceed. Following these findings, it is necessary to focus on modernizing the railway infrastructure, which essentially impacts the competitiveness of the given market.

The forecast about intermodal competition (Thesis 4), which adopted the premises of the SDL approach as a base and my qualitative research resulted in the creation of a “grounded theory” (Thesis 6) that contributes to the competency-based development of transport. Furthermore, the findings also serve as an important information source for defining development plans. Therefore, the previously described theses can enable an increase in the motivation and involvement of multiple customers, enhance pro consumer orientation, and the creation of programs and activities that lay the foundations of public transport development, both on the governmental and the operator level.

The research findings identified and confirmed that fostering the level of liberalization, the reform of transport apparatus and the involvement of private capital and settlement development can act to augment the market share and sustainability of public transport. Furthermore, it would be fostered by additional public policy measures directed at enhancing the public transport supply and developing public transport so that it can measure up to private transport options and by creating and harmonizing connections and encouraging usage, and finally, restricting personal transport (Thesis 5).

The directives and transport development strategies analyzed and confirmed in this dissertation, can be put into practice by political and corporate decision makers and operators for the purpose of sustainable transport policy and developing corporate strategy and marketing.
7. RELATED PUBLICATIONS

Publication listed in Web of Science

Publication listed in Scopus database

Book chapters


Hungarian-language journal paper priorities in Economic and Management Sciences

Hungarian-language journal paper priorities in Transport Sciences

Other peer-reviewed journal article in Hungarian

Published international conference papers


Published Hungarian conference papers


Other publication
8. REFERENCES


Kirchner, C., IBM (2007): Rail Liberalisation Index market opening: Comparison of the rail markets of the Member States of the European Union, Switzerland and Norway, IBM Global Business Services, Brussels.

Kirchner, C., IBM (2011): Rail Liberalisation Index market opening: Comparison of the rail markets of the Member States of the European Union, Switzerland and Norway, IBM Global Business Services, Brussels.


9. APPLIED DATABASES


### M1 Table: Correlation analysis of the main features of the RAMATE rate in the railway passenger market

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**Correlation is significant at the 0.01 level (2-tailed).**

*Correlation is significant at the 0.05 level (2-tailed).**

**M2 Table:** Correlation analysis of the main features of the RAMATE rate in the railway freight market

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</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed).**

*Correlation is significant at the 0.05 level (2-tailed).*