Governance for public values in European railways: A comparative analysis for organizational aspects and performance on public values

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20th of November, 2015

Abstract
It is generally assumed that good governance is crucial for well-performing railways. The focus until now was mainly on the degree of separation within railway sectors and the performance on efficiency, but little attention has been paid to other organizational aspects and performance indicators. Therefore, the objective of this paper is to get a better view on the influence of organizational aspects on the performance of European railways by answering the following research question: How do organizational aspects of public rail transport systems influence the performance? A comparative analysis was done to compare the way three organizational aspects (capacity allocation, competitive tendering and supervision) are applied in European railways and the performance on KPIs, based on relevant public values. Based on the results of the comparative analysis it can be concluded that not all organizational aspects of railway governance do influence the performance of public rail transport systems. Competitive tendering, however, is preferred over direct awarding in order to increase the performance on relevant KPIs for railways.

Keywords: Comparative analysis, governance, organizational aspects, public values, European railways

1. Introduction
Public rail transport plays a vital role in the Dutch society. This is indicated by the fact that over 3% of the Dutch travel by train everyday and 60% at least once a year (NS 2014). Keeping these figures in mind, it seems logical that the government pays a lot of attention to the railways. The Ministry of Infrastructure and the Environment even spends approximately 25% of its total budget on improving the railway sector (Rijksoverheid 2015). The railway sector is not only of great importance to the Netherlands, but for many other countries in Europe as well.

Steering of the European railways has until now mainly been done through governance on organizational structures by separating the task of infrastructure managers and transport operators. In order to improve cost efficiency and encourage innovations reforms took place in 2001, driven by the European Railway Packages (van de Velde and Röntgen

Figure 1: Relation between public values and public rail transport systems (Veeneman 2015)
2. Problem description

It is generally assumed that good governance is crucial for well-performing railways. This is underlined by the fact that research has already been done regarding the influence of governance on the performance of railways in the United Kingdom (Vranye-Billon and Ménard 2005), Germany (Martin 2008) and Sweden (Alexandersson and Hultén 2008).

In addition to that, Wolff (2011) and van de Velde, Nash et al. (2012) focus their research on the relationship between organizational structures and performance for European railways. However, they do not pay attention to organizational aspects other than the degree of separation between the infrastructure manager and the train operators. Also, they evaluate performance based on efficiency, but from a governmental perspective it might seem strange to not take other goals, based on the public values, into account.

A next step is required for a better understanding of the governance mechanisms in the railways. Therefore, the objective of this paper is to get a better view on the influence of organizational aspects on the performance of European railways. Answering the following research question helps in doing this: How do organizational aspects of public rail transport systems influence the performance?

The relevance of this research mainly lies in two aspects. The scientific relevance of this thesis work can be found in adding to existing research by exploring a field of study that has not yet been studied well, in this case the influence of organizational aspects on the performance of railways. There is a social relevance as well. Since governance on public values is important to almost every layer of the society, it is useful to gain more knowledge about this topic. This could lead to improvements in the governance of public rail transport.

3. Research approach

To come to a scientifically sound analysis, several steps have been taken. The first step was to identify important organizational aspects in the governance of railways to be taken along in the analysis. The choices made are based on relevant literature for this specific topic.

The second step was the definition of KPIs (Key Performance Indicators) based on relevant public values for public rail transport, since due to time constraints and a high variety of possible organizational aspects a selection had to be made. This selection is based on existing literature on governance for railways.

After defining KPIs and doing a performance evaluation based on data from several sources (Railisa, Eurostat, European Commission, OECD and ERA), the comparative analysis was done. This analysis provided the information needed to answer the research question and was aimed at figuring out
whether there is a correlation between the selected organizational aspects and the performance of railways on the KPIs based on public values.

4. Literature on organizational aspects and KPIs

As mentioned in the research approach, several steps had to be taken to prepare for the actual comparative analysis. One of these steps is determining the organizational aspects to be taken along in the analysis. Of course it would be valuable to analyze as much aspects as possible, but due to time constraints only three organizational aspects were chosen. The three aspects that are important to railways and have been selected for this research are capacity allocation, competitive tendering and supervision (Yvrande-Billon and Ménard 2005).

Capacity allocation in railways is a complex task as a result of some key characteristics (e.g. interdependency and high transaction costs) (Gibson 2003). Capacity allocation in railways is either done by the Infrastructure Manager or by a Governmental Agency.

The concept of competitive tendering does not work the same for railways as for many other sectors. Competitive tendering in the railway sector is often called ‘competition for the market’ or ‘competition for the track’, because a tendering procedure leads to a temporary monopoly for the winner (Alexandersson 2009). ‘Competition on the track’ is also an option, but in Europe this is mainly used for more deregulated freight services. Despite the fact that competitive tendering is obliged for European railways, not all European countries use it to the same extent. A distinction is made between competitive tendering and direct awarding. The latter means that there is an official tender procedure, but the contract is directly awarded, without a real competition.

In order to ensure that enough supervision in railways takes place, the European Commission obliged Member States do so. Directive 2004/49/EC forces the Member States to set up an authority responsible for the supervision of safety, a so called safety regulator (European Commission 2004). Another directive, Directive 2001/12/EC, contains the legal basis for the establishment of a regulatory body in the railway sector of every Member State. This regulatory body should “ensure a fair and non-discriminatory access to the rail network and services” (European Commission 2001). The European Commission came up with these directives in order to improve the performance of railways, but it is unsure whether they had the desired effect. For the analysis the degree of supervision has been separated into the following three categories:

- Safety Regulator and Regulatory Body
- Safety Regulator, Regulatory Body and Competition Authority
- Safety Regulator, multiple Regulatory Bodies and Competition Authority

After determining the organizational aspects to be taken along in the analysis, the KPIs were defined. These KPIs are based on important public values for public railways in order to be to evaluate performance from a governmental point of view. Important public values that were found in a public values analysis and used to define the KPIs are the following: Competitiveness, Efficiency and Safety. Translating these public values into KPIs and combining them with the KPIs provided by Wolff (2011) led to a selection of five KPIs, presented in Table 1.

<table>
<thead>
<tr>
<th>KPI #</th>
<th>Selected KPI Terminology</th>
<th>Indicator Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Effectiveness of Production</td>
<td>Pkm / Train-km P</td>
</tr>
<tr>
<td>2</td>
<td>Effectiveness of Resources</td>
<td>Pkm / Staff P</td>
</tr>
<tr>
<td>3</td>
<td>Efficiency of Production</td>
<td>Train-km P / Staff P</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Train-km P / Network Length</td>
</tr>
<tr>
<td>4</td>
<td>Competitiveness</td>
<td>%</td>
</tr>
<tr>
<td>5</td>
<td>Safety</td>
<td>Train-km P / Accidents</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Train-km P / Deaths + Injuries</td>
</tr>
</tbody>
</table>
The last step before the comparative analysis is the performance evaluation. In the graduation research of Leussink an extensive overview of the performance evaluation is presented, containing the scores and relative rankings for a selection of twenty European railways on the KPIs. The results of the performance evaluation act as input for the comparative analysis, since they provide a view on the performance of the European railways.

5. Comparative analysis

The comparative analysis enables us to find out whether relations exist between the three organizational aspects, capacity allocation, competitive tendering and supervision, and the performance of European railways. It requires the formulation of several hypotheses in order to do so. Therefore, a hypotheses was formulated for every of the organizational aspects. This has led to the following three hypotheses:

1. Different capacity allocators lead to different performances in railway sectors.

2. Competitive tendering leads to a higher performance in railway sectors.

3. A higher degree of supervision on the railway sector leads to higher performance.

Comparative analysis is a collective term for many tests that do more or less the same, but are used in different situations. For this analysis, two different tests were used: Analysis of Variance (ANOVA) and the Independent Samples Test. ANOVA is suitable for testing the first and third hypothesis, because these organizational aspects are divided into three categories. The Independent Samples Test is used for testing the second hypothesis, since competitive tendering is only divided into two categories (De Vocht 2008).

The ANOVA and Independent Samples Test look for differences in the performances per KPI for the various categories of the organizational aspects. In addition, the significance for these differences is presented. If the significance is below 0.05, it can be said with 95% certainty that one category performs better than the other on that KPI.

Example: The Independent Samples Test for Competitive Tendering results in a 0.002 significance for competitiveness. This means that there is a difference in performance on competitiveness for railways that use Competitive Tendering and Direct Awarding.

In the following paragraph, the results of the comparative analysis are presented and explained further.

6. Results

The results of the comparative analysis are shown in Table 3, Table 2 and Table 4. The ANOVA for Capacity Allocation (Table 3) shows that none of the differences for the three categories have a significant score on any of the KPIs. This means that there are no differences in performances for the various categories of Capacity Allocation.
The ANOVA for Supervision (Table 4) shows that the same can be said for Supervision. There are no significant differences found for the various categories of the organizational aspect Supervision. Table 2 contains the results of the Independent Samples Test for Competitive Tendering. This shows completely different results. With the exception of the KPIs Effectiveness of Production and Customer Satisfaction there is a difference found for the performance of the two categories for the organizational aspect Competitive Tendering. Table 5 presents the significant differences found in performance on the KPIs for Competitive Tendering and Direct Awarding. The values are all positive, which means that the category Competitive Tendering performs significantly higher on the KPIs than the category Direct Awarding.
Based on these results the following can be said about the hypotheses:

1. Different capacity allocators lead to different performances in railway sectors. – **NOT ACCEPTED**
2. Competitive tendering leads to a higher performance in railway sectors. - **ACCEPTED**
3. A higher degree of supervision on the railway sector leads to higher performance. – **NOT ACCEPTED**

The first and third hypotheses are not accepted, since no significant differences in performance were found for the categories of Capacity Allocation and Supervision. The second hypothesis is accepted, since a significant difference is found in the performance of railways that applied Competitive Tendering and those that applied Direct Awarding. The railways that apply competitive tendering tend to have a higher performance than railways that apply direct awarding.

### 7. Conclusions

The objective of this paper was to get a better view on the influence of organizational aspects on the performance of European railways by answering the following research question: *How do organizational aspects of public rail transport systems influence the performance?*

The comparative analysis shows that the first and third hypotheses have to be rejected and that the third hypothesis should be accepted. This means that the way capacity allocation and supervision are organized does not seem to influence the performance of railways. On the other hand, the extent to which competitive tendering is applied, so competitive tendering or direct awarding, does influence the performance.

The results show that there is a significant relationship between whether competitive tendering or direct awarding is used and the performances of European railways. It has to be noticed that this relationship does not count for the performance on Effectiveness of Production and Customer Satisfaction.

So, the main conclusion from this comparative analysis is that changes in the organizational setups of European railways do not necessarily lead to different performance, but for some aspects, such as competitive tendering, this could be the case. This does not mean that the performance on all relevant KPIs increases due to the application of competitive tendering, but overall performance does.

These outcomes indicate that governance of railways might not be as effective as suggested in common theories, but that the efforts of governments are not at all pointless. A possible explanation of the improved performance as a result of competitive tendering could be that it leads to a more competitive urge for the stakeholders in the railways. The concessions for railways that apply competitive tendering instead of direct awarding might contain sharper goals than the concessions that result from direct awarding. This could be the case since the presence of multiple candidates requires a more competitive attitude in order to win the tendering procedure.

Based on the results of the comparative analysis, an answer to the main research question could be the following: *Not all organizational aspects of railway governance do influence the performance of public rail transport systems.*
transport systems. Competitive tendering, however, is preferred over direct awarding in order to increase the performance on relevant KPIs for railways.

Looking back at Figure 1 it can be concluded that organizational structures can influence the performance of railways, but that not all organizational aspects really do so. Competitive tendering is one of the examples of organizational aspects that could lead to higher performance, but the comparative analysis shows that this is not the case for capacity allocation and supervision.

8. Discussion

There are some limitations to this research that require discussion. First, the research only takes three organizational aspects into account. This is a logical result of the time constraints, but given how many organizational aspects could be a part of the governance of public railways this seems to be only a small part of railway governance. Secondly, there is also a limited number of KPIs. These KPIs are based on the public values that are mentioned most often in policy notes, but these public values are not the only ones that play a role in the governance of public railways.

9. Recommendations and future research

Following the discussion points, a couple of recommendations can be done for future research on the topic of public values governance in public railways in order to improve the performance. The analysis shows that organizational aspects can lead to a higher performance of public railways. This is, however, not the case for all aspects (e.g. capacity allocation and supervision). It could be valuable to policymakers to find out which organizational aspects could be used in order to improve performance. Therefore, analyzing more organizational aspects could lead to valuable new insights on how to influence the performance through governance of public railways.

The same counts for the number of KPIs taken along in the analysis. Adding more KPIs, based on the public values defined by governmental authorities, could provide valuable insights for policymakers.

References


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