

# **SOCIALLY NECESSARY RAIL SERVICES**

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## **Abstract**

Rail services across Europe are facing problems due to declining market share, lack of responsiveness to market changes and customers' needs. Policy initiatives are put forward to change this situation and provide viable solutions, e.g. as presented in the EC White Paper from 1996 on Revitalising the Community's Railways. Many rail services are loss-making and will continue to be so such that these services can only be provided through financial support from the State. Given that resources are scarce it is important that this support is allocated according to the social value from these services.

This paper will present the EC funded SONERAIL project, which has concerned an examination of socially necessary rail services. In particular, it has developed an evaluation methodology which allows for the assessment of the costs and benefits associated with providing a given rail service.

The paper is planned as follows. Section 1 will give an overview of the SONERAIL project in terms of background, objectives and project structure. In section 2 the SONERAIL definition of a socially necessary rail service will be described. The evaluation methodology developed during the project will be examined in section 3. Subsequently, section 4 will discuss the potential for applying the methodology in practice. Section 5 considers possible future scenarios while best-practice recommendations regarding the provision and evaluation of socially necessary rail services are given in section 6.

## 1. Introduction

### 1.1 Background

The modal split in passenger movements has changed significantly over the last forty years and basically reflects the increase in car ownership. In the late 1960s car ownership rates began to rise sharply, partly because of increased consumer spending power and partly due to the decline in public transport services in rural areas. This has been accompanied by a continuing downward trend in passenger loadings by bus and rail that has reflected changes in Europe as a whole. While car travel has increased ten times, bus travel has halved. The number of rail journeys has also fallen, but passenger kilometres have increased slightly, primarily due to a concentration by national railways on inter-urban and cross-country business with a decline in rural branch lines as passengers made fewer but longer journeys.

The change in modal split is shown in Table 1 covering all 15 EU countries for the period 1970-94.

**Table 1. EU 15 passenger transport - modal split of passenger kilometres (%)**

	Car	Bus	Railways	Air
1970	75.1	12.5	10.3	2.1
1975	75.8	12.0	9.5	2.7
1980	76.9	11.4	8.5	3.2
1985	77.0	10.5	8.1	4.4
1990	79.0	9.0	6.9	5.1
1994	79.7	8.3	6.2	5.8

Source: European Commission (1996) "A Strategy for Revitalising the Community's Railways"; White Paper, COM(96) 421.

Several studies have identified that railways across Europe face problems due to the declining market share, lack of response to market changes and customers' needs along with and related high subsidy requirements and insufficient managerial independence. The EC White Paper "A Strategy for Revitalising the Community's Railways" concludes that a new kind of railway is needed allowing for more customer oriented services being provided less expensive, more efficient with less subsidy needed. Already a number of policy initiatives at national and European level are being implemented following the recommendations from the White Paper. This includes the framework for provision of public services. Increasingly, these should be provided through contracts between State and operator, rather than obligations imposed by the State. The key elements in these contracts are planned to be better value for money, more efficient services, with explicit and transparent compensation and limited time contracts. This development is supported through the EC Council Regulation 1893/91 although this regulation allows for continued public service obligations with respect to "...undertakings confined to the operation of urban, suburban and regional services..".

SONERAIL should be seen in relation to these changes as a study concerned with providing clarity regarding the definition of socially necessary rail services as well as the evaluation criteria to be used in relation to determine the value generated through the provision of such services. This information is of crucial importance regarding the specification of public service contracts.

## **1.2 Overall aim and objectives**

The overall aim of SONERAIL can be stated as follows:-

“to examine the role of socially necessary rail services in order to improve the decision making basis regarding the provision and funding of such services”

In particular, the project seeks to clarify how socially necessary rail services should be defined and the evaluation criteria to be used in relation to their provision. A number of specific objectives were identified for the SONERAIL project:-

- define concepts of socially necessary rail services
- develop evaluation methodology for socially necessary rail services
- apply evaluation methodology
- identify and examine operations scenarios

The accomplishment of these objectives has enabled SONERAIL to provide recommendations regarding the provision of socially necessary rail services.

Apart from these objectives it has also been of importance to the SONERAIL Consortium to collaborate extensively with external parties including railway operators, funding and regulatory authorities, transport ministries, user groups, universities and research institutes. This collaboration has been undertaken in order to ensure the relevance of the research findings and to obtain access to information and data of importance for the study. Furthermore, it has been an objective to carry out dissemination activities during the life time of the project such that information about research findings will reach a wider audience among interested parties within the transport field in general and rail in particular.

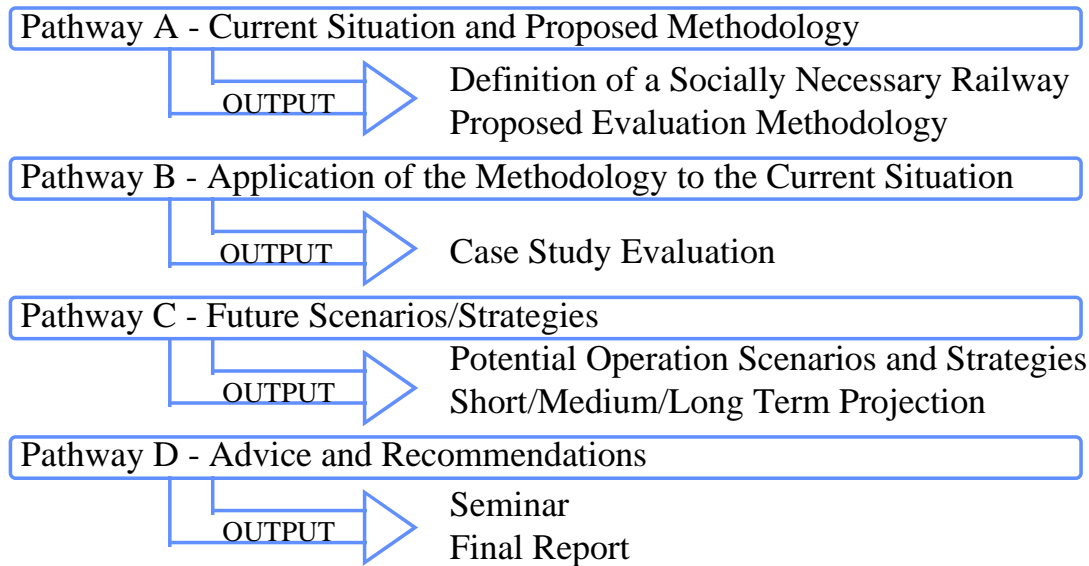
The focus of the research has been identified as:-

- passenger transport not freight
- rail services not infrastructure
- demand side rather than supply side
- heavy rail with other forms seen as alternative public transport provision
- the countries represented in the SONERAIL Consortium

## **1.3 Project structure**

The fulfilment of the SONERAIL objectives have been ensured through a comprehensive work programme addressing the key issues in relation to socially necessary railways. This work programme comprises four pathways. Below, the pathways are presented along with the main outputs from each pathway.

# SONERAIL Project Structure



Pathway A concerned the development of a definition and an evaluation methodology for socially necessary rail services. The evaluation methodology was then applied on specific rail services in Pathway B. Subsequently, future scenarios were identified and examined utilising the SONERAIL Evaluation Methodology as part of Pathway C. Finally, advice and recommendations are provided as part of Pathway D.

This research has been undertaken by six organisations in six European countries:-

- Transport Research and Consultancy (Project Coordinator) United Kingdom
- University of Pardubice Czech Republic
- Technische Universität Dresden Germany
- ZEUS European Economic Interest Group Greece
- Trasporti Mobilita Turismo Pragma Srl Italy
- Netherlands Economic Institute Netherlands

## 2. Defining socially necessary rail services

Reviewing the available literature on rail reveals that the concept of a socially necessary rail service is not clear-cut along with the presence of problematic definitions. Therefore, the first stage of the research concerned the development of definitions that would be valid in different circumstances.

The SONERAIL definition of a socially necessary rail service can be determined as one with a positive net social value calculated with reference to the social benefits and costs identified for users as well as non-users of the service. The basis of the definition is therefore where generalised costs are significantly affected by changes in level of service provision (reduction or increase) and where there are measurable externalities (such as environmental effects).

Thus, the definitions are linked to the evaluation methodology. A rail service will only be identified as socially necessary if the outcome of the evaluation results in a positive net social value. Measurement of the social value is in this way crucial and will be based on the impacts included in the evaluation methodology, see section 3. Ideally, the calculation includes all relevant impacts that are measurable.

In this way the definition phase provides for an objective tool by which socially necessary rail services can be assessed without including political factors in the analysis.

An important aspect regarding this definition is that it avoids the common association between socially necessary rail services and their financial profitability. Usually, loss-making services are defined as socially necessary services. It is possible that profitable rail services are socially necessary; those services are just in a position of being able to generate a positive financial profit apart from the social impacts. On the other hand, it is also possible that a service is loss-making and not socially necessary. In this way, the SONERAIL definition will characterise a service as socially necessary if:-

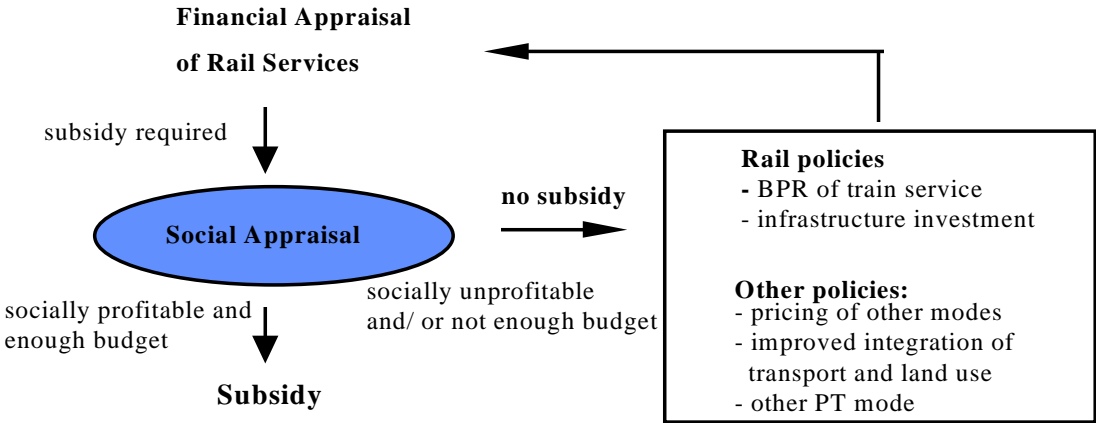
- it is financial profit-making or loss-making, and
- the social benefits are larger than the social costs.

### 3. The SONERAIL Evaluation Methodology

A major element in the study has been the development of an evaluation methodology for social assessment of rail services, the SONERAIL Evaluation Methodology (SEM).

The aim of SEM is to establish an objective approach by which decision makers can justify public funding support to the provision of rail services. The overall principles of the methodology are set out in Figure 1. Public funding support is not relevant for financially profitable services (such services can still be socially profitable). Public support to a rail service is only relevant if it is financially un-profitable. Justification of support for financially un-profitable rail services is based on whether the social benefits from providing the rail service outweigh the social costs.

**Figure 1. Overview of the SONERAIL Evaluation Methodology**



Firstly, it has to be determined whether a rail service is financially profitable or not, i.e. is a subsidy required to secure the provision of the rail service. This financial appraisal is not a core element of SEM. In fact, the financial profitability of a rail service could be determined outside this methodology. The core element of SEM is a social appraisal of those rail services for which a subsidy is required because of the financial position, to assess whether a subsidy can be justified and the possibilities to provide such a subsidy. This appraisal will consist of two stages. In the first stage the social benefits and the social costs are assessed in monetary terms, for a given rail service. If the benefits outweigh the costs, the rail service is characterised as socially profitable in monetary terms, and a subsidy can be justified.

However, the assessment has focused only on the individual rail service without consideration to the available budget. Therefore, a second phase of the social appraisal process is needed. This phase examines the funding required to support all socially monetarily profitable services compared to the available budget. Only if a rail service is characterised as socially profitable in monetary terms and the budget is sufficient a rail service can be certain to get a subsidy. An insufficient budget will imply that the rail services recommended for subsidy will be those with the highest social value.

The social appraisal in SEM can thus result in two outcomes:-

- a rail service is socially profitable in monetary terms and there is a sufficient budget such that subsidy can be given;
- a rail service is not allocated a subsidy.

The second outcome can be caused by the following two reasons:-

- a rail service is socially unprofitable in monetary terms;
- insufficient budget combined with the existence of other rail services with higher social value;

It should be noted that it is possible that the budget is sufficient to support not only the socially monetarily profitable services but also some of those for which the monetary benefits are less than the monetary costs. The extreme case is when the budget is so large as to allow for support to all financially unprofitable services, although this case is unlikely in practice.

In case the social appraisal for a given rail service results in an outcome with no subsidy provided a number of measures/policies can be suggested to improve its financial/social position including business process re-engineering, provision through other public transport mode (e.g. bus service provision), pricing policies for other modes and land use policies.

The main focus of SEM will be the social appraisal procedures for rail services. Also recommendations for integration of financial appraisal/improvement strategies into an overall framework for appraisal of rail services will be included though without being further examined.

The presentation of SEM could be interpreted as if the social appraisal stage could only be applied to those rail services which are financially un-profitable. It should be noticed that SEM could also be used for financially profitable rail services. The social appraisal stage is

designed to provide recommendations for decisions regarding subsidies to financially unprofitable rail services, but the techniques used to determine the social value of a given rail service should be applicable irrespective of the financial position.

The innovative elements in the methodology are:-

- integration of different appraisal techniques (cost-benefit analysis and multicriteria analysis)
- iterative procedure allowing for assessment of improvement strategies
- flexibility regarding the type of rail service option to be assessed (marginal change in frequency as well as complete closure)
- possibility to consider alternative modes as valid options

#### **4. Application of the SONERAIL Evaluation Methodology**

On the basis of the developed evaluation methodology a number of rail services located in the countries represented in the SONERAIL Consortium were examined. This application has been in the form of a case study framework with focus primarily on the cost-benefit part of the methodology. The main purpose of the application was to obtain information about how SEM works in practice with reference to the advantages and problems involved.

In particular, the case study outcomes should be assessed with respect to:-

- data availability;
- calculation principles for impacts;
- appropriateness and reliability of results.

Therefore, if it appears that the data required are available, that a theoretical sound approach is used for the calculation of impacts and the results can be viewed as appropriate/ valid then it can be concluded that SEM has passed an important test towards full-scale application.

The approach applied in the application of the selected rail services concerned the situation of having the rail service compared with not having the rail service. In this sense the impacts are associated with the closure/ retention of a rail service.

Overall, SEM has been applied to 25 rail services in European countries, including:-

- 4 rail services in Great Britain;
- 9 rail services in Netherlands;
- 3 rail services in each of the other countries (Czech Republic, Germany, Greece and Italy).

Among these 25 services a total of 15 services appeared to be socially profitable in monetary terms, i.e. higher monetary benefits than costs. The annual net-benefits ranged from -4 mill. ECU to +5 mill. ECU, although only 4 services had net-benefits less than -0.5 mill. ECU. The results show that the main impacts associated with a rail closure were:-

- avoidable rail costs;
- loss in consumers' surplus for the former rail travellers;
- travel opportunity loss for those travellers who decide not to travel;
- travel time effects;
- accident costs.

On the basis of the results obtained it can be concluded that a socially profitable rail service (in monetary terms) is one with:-

- high patronage;
- low cost of operation;
- relative low journey times;
- lack of alternative modes.

During the application of SEM a number of problems were experienced. Firstly, although the required rail data exist (provided by the rail service operator) confidentiality issues can make it hard to obtain access to the data. Secondly, changes in rail infrastructure costs due to the closure of a rail service have been excluded in the calculations because of the major difficulties involved in estimating these cost components for individual services rather than a group of services. Thirdly, the road data have been roughly estimated on the basis of information from traffic counts. A link to a traffic model will provide a solution to this problem. Finally, it appears that not much information is available regarding the distribution of former rail travellers to other modes (including cancellation of the journey). This information could be provided through surveys. *The problems identified in the case study phase appear to be possible to solve in a full-scale application of SEM.*

## **5. Future operations scenarios**

The research elements described above concerned, in the main, the current position of socially necessary rail services. In addition, research has also been undertaken in relation to possible future changes of importance for the provision of rail services. This research consisted of a combination of general identification of possible scenarios and specific assessment of changes in financial and social profitability for the services already examined as part of the application of the SONERAIL Evaluation Methodology. Subsequently, the case study assessment results were examined with respect to the generality of the findings.

Future scenarios were identified on the basis of an examination of likely key influencing factors. These scenarios were defined with respect to the next ten year period covering the short, medium and long term. The scenarios reflect the range of policy initiatives currently being implemented or considered with the aim to revitalise rail in Europe. If the policies are successful it can lead to reduced cost of providing rail, increased demand and hence improved financial and social profitability. The scenario assessment results indicate though that the improvements might be insufficient for some rail services to show a positive value of the social profitability measured in monetary terms. A key element in any improvement of the position of rail services appears to be the extent to which cost efficiency gains can be achieved. Another critical issue will be the approach adopted in the implementation of infrastructure charges. As such these charges can add substantially to the cost of providing rail



services which could imply that the services become financial non-viable and/ or require increased subsidies.

The research on future scenarios established an interesting interface between the analysis of scenarios, assessment of social profitability and specification of counter measures/ strategies following an iterative procedure. In this way the approach used provides an integrated approach towards scenario specification, assessment and reassessment. On a full-scale basis it would be possible to include the political decision making bodies at various stages in the process as part of an iterative procedure towards the identification and analysis of future policy options with respect to the provision and support to rail services. The development of such procedures would clearly provide a decision supporting tool through structured consideration to input/assumptions and policy requirements. The detailed implementation of such a system requires further research but SONERAIL could provide a relevant baseline for this work.

## **6. Best-practice recommendations**

Best-practice recommendations have been provided at two main levels:-

- case study specific recommendations on the basis of the action plans
- strategic recommendations regarding the provision and evaluation of socially necessary rail services

The action plans were specified on the basis of an analysis of key issues which would influence the selected rail services over the short, medium and long term period. Across the action plans are a variety of issues reflecting the aftermath of rail privatisation, pending privatisation, state ownership and transition from plan economy to market economy for the Eastern European countries. This results in a diversity of action plan proposals which all evolve around the themes of increasing patronage, reducing costs and measures to instigate a reduction in car use through transfer from road to rail. The need to increase patronage (and revenue) and reduce costs are in general related to the risk of subsidy reductions combined with the possibility for increases in access charges. On the other hand there is scope for increasing rail demand due to the possible introduction of road pricing combined with an overall increase in travel demand. It is worth noticing that the action plans include:-

- improvement in rolling stock;
- track and signalling improvement to allow faster service;
- station facilities improvements;
- integration with other modes;
- consideration to provision by other modes, e.g. light rail or bus services.

The strategic recommendations relate to:-

- the evaluation of socially necessary rail services
- the provision of socially necessary rail services

SONERAIL has primarily been concerned with the evaluative aspects of socially necessary rail services. A need for clarification of the definition of socially necessary rail services was identified in the first part of the project. The SONERAIL definition satisfies this requirement. In particular, the definition is linked to the evaluation of socially necessary rail services. As a recommendation this definition can be put forward as a possible basis for characterising rail services as socially necessary or not.

The research also showed the lack of available assessment procedures for rail services including socially necessary rail services. SONERAIL developed an evaluation methodology which is primarily a social appraisal tool, integrating cost-benefit analysis and multicriteria analysis. This methodology has been applied on a number of rail services and although this application was not a full-scale application it did indicate that the methodology represents a promising tool. As a recommendation it will be suggested to develop SEM into a full-scale application tool. Concerning the provision of socially necessary rail services it will be recommended to study the possibility to integrate the developed evaluation methodology within the decision-making process as a tool to enhance the information basis. This holds in particular with the move towards public service contracts and requirements about increased value for money and reduced subsidies. The application results suggest that a mixed approach regarding policies for loss-making services is appropriate. It is possible to demonstrate the existence of a large number of rail services which have larger benefits than costs. However, there are also rail services for which the benefits are smaller than the costs. At this stage it should be noticed that negative social net-benefits would not be a sufficient reason for closure. Following the application of the SONERAIL Evaluation Methodology a series of improvement strategies would be put forward in terms of possibilities to increase revenue and/or reduce costs or provision by alternative modes. The scenario analysis suggests the possibility for some improvement in social and financial profitability. However, given the current pressures on subsidy the positive changes may not be sufficient to ensure continued provision. As a recommendation it will be put forward the need for the actors within the rail industry to consider measures which can increase the demand and reduce the costs to attain best-practice.