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ECONOMIC EVALUATION OF SOCIALLY NECESSARY RAIL SERVICES

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Abstract

This paper will present research undertaken as part of the SONERAIL project (funded by Framework 4 Research Programme, European Commission DGVII) into an evaluation methodology for socially necessary rail services. The paper is planned as follows. Firstly, the role of socially necessary rail services is discussed. Secondly, an overview of the SONERAIL project is given. Subsequently, the SONERAIL Evaluation Methodology is analysed, covering the overall approach as well as the identified impacts. Fourthly, practical issues in relation to the use of the developed evaluation methodology are discussed. Finally, the findings of the paper are summarised.

INTRODUCTION

Rail services are needed for basic mobility especially in rural areas and as a mean of reducing congestion and pollution as part of an integrated transport policy in urban areas. In transport expenditure generally there may be a number of options open but in the case of train or bus passenger services there are essentially three: a) to retain the service in its present form, b) to close the service, c) to rationalise the network (by amending merging routes). The only railway likely to be profitable is one where there is an intensive use with high load factors. This is never going to be so for rural railways or on large commuter rail systems. This places the evaluation of such services into the political context. In order to secure continued provision of rail services which contribute towards the achievement of social objectives such as ensuring basic mobility in rural areas and/or reducing congestion and pollution in urban areas but are non-profitable, financial support is necessary. The main source of such support will in most cases be from public funding. The justification for financial support towards these services will have to reflect the net benefits these generate. Therefore, it is important to identify the impacts generated from rail services and to determine the social value these represent. This information provides an objective basis for decisions on public funding of rail services.

This paper will present research undertaken as part of the SONERAIL project (funded by Framework 4 Research Programme, European Commission DGVII) into an evaluation methodology for socially necessary rail services. A major aim for SONERAIL has been to establish such a methodology containing the following elements: i) specification of relevant variables for the evaluation of socially necessary rail services. This includes supply and demand factors along with possible externalities; ii) measurement guidelines for the specified variables including the extent to which these are measurable; iii) identification of how the specified variables can be aggregated in an appropriate way to form an overall assessment of socially necessary rail services.

SONERAIL OVERVIEW

EC (DG VII) has funded within the 4th Framework Programme on Research and Development a research project on SOcially NEcessary RAIL services - SONERAIL. The project runs for 2 years (from 1st February 1997). Six universities and research institutes are involved in the project. The countries represented in the project are: Czech Republic, Germany, Greece, Italy, Netherlands, United Kingdom.

The overall purpose of SONERAIL is to examine the role of socially necessary rail services, and to develop an evaluation methodology. The methodology should improve the decision making basis, and possibly enhance the position of rail services. The scope of the project is restricted to analyse passenger services and not freight services, mainly focusing on heavy rail. In the first phase the evaluation methodology has been developed. This methodology was then applied in a number of case studies. The third stage involved identification and assessment of future operations scenarios for rail services on the basis of the results from the case studies. The final phase of the project will provide recommendations on best practice for socially necessary rail services. This phase concludes with the preparation of the final report containing the various SONERAIL findings. The final report will be completed in January 1999.

THE SONERAIL EVALUATION METHODOLOGY

Definitions of key concepts

The specification of the SONERAIL Evaluation Methodology (SEM) is based on a number of concepts which will be defined below in order to enable a clear and accessible presentation of the methodology.

Rail service concept

As SEM aims to assess rail services it is an important task to establish appropriate definitions of rail services. The clarification covers the terminology and the aggregation level. A number of terms can be used in relation to rail services including:-

- service;
- line;
- route.

The first term can be interpreted as a reference to a connection between two points on a specific time of day. The second possibility can be interpreted as a reference to the infrastructure aspects of a rail service. Route appears to be the most appropriate term. This term is concerned with a rail service operated between two points taking into account all connections provided between them.

The second dimension required to be clarified concerns aggregation levels. Three options can be suggested:-

- single route from A to B;
- group of routes;
- network of services.

From a practical point it might be easier to use a rail service definition which consists of several routes or even network of routes as the concept corresponds to how railways usually are organised including the role of some routes within a network functioning as feeder services. In addition, the problems represented by joint cost/revenue structure in relation to rail service production can be expected to be on a reduced scale if the rail service concept is based on a group of routes/network of services. However, a concept based on several routes has the disadvantage of being defined at an aggregated level. This implies that it would be possible to conclude from an evaluation of a combination of routes that its social value is zero, with social costs equal to social benefits. Such a result could be obtained, if each route within the combination has social costs equal to social benefits. However, it is likely that socially profitable routes cancel out with socially unprofitable routes.

Therefore, the most appropriate concept is one based on single routes provided that interaction aspects such as the role of feeder services are taken into account in the evaluation of single routes. However, the rail service concept used in empirical applications of SEM might need to be based on a higher aggregation level as the result of a lack of disaggregated data. In this way the available data will determine the applied rail service concept. SEM is applicable to both single routes and groups of routes/networks.

Rail service impacts

SEM concerns the evaluation of a wide range of impacts generated from a rail service. The impacts are related to the actual use of the service. Therefore, impacts are not defined in terms of the effects a rail service has on a set of specified planning objectives. The latter approach to impacts is mainly of relevance in the assessment of infrastructure projects where options are more open, in the sense that different schemes can be selected according to how objectives are influenced.

SEM focuses on rail services which are there already. The main options in this case are retention or closure: Therefore, SEM impacts will be defined according to the situation with the rail service compared to the without situation, i.e. the influence of the use of a rail service for a number of different dimensions. The rail service will impact various parties in society such as the train operator, rail users, users of other modes, and society in general. More details about how specific parties in society are influenced will be given later on. At this stage it should be mentioned that within the set of impacts, some can be measured in monetary terms, while others cannot. Monetary impacts cover both the ones which are defined in monetary terms as well as those which can be assigned imputed money values. In order to achieve a comprehensive evaluation, SEM will take into account both monetary and non-monetary impacts. The details of the evaluation approach for monetary and non-monetary impacts will be given later.

Financially profitable vs. financially unprofitable

All rail services in a region or country can be grouped according to the financial position: if the revenue generated from a rail service is larger than the costs required to provide the rail service, then it is financially profitable. Otherwise, the service is defined as financially unprofitable and requires a subsidy in order to be provided.

Socially profitable vs. socially unprofitable rail services

In principle a rail service can be characterised as socially profitable if the positive impacts engendered from the service are larger than the negative impacts. Otherwise, the service is socially unprofitable. An assessment of the social profitability requires that all relevant impacts across the incidence groups are taken into account. It should be noted that empirical measurement of social profitability in absolute terms is not possible due to the presence of non-monetary impacts and in particular impacts which are measured on a relative scale. Alternatively, rail services can be categorised as: socially monetarily profitable or socially monetarily unprofitable rail services.

Socially monetarily profitable vs. socially monetarily unprofitable rail services

Socially monetarily profitable services are those for which monetarised positive impacts are greater than monetarised negative impacts. Otherwise, a rail service is socially monetarily unprofitable. This concept only concerns the monetarised impacts, whilst the non-monetarised impacts are ignored.

Relative socially profitable vs. relative socially unprofitable rail services

This concept takes into account both monetary and non-monetary impacts. It implies a ranking of the rail services according to their performance for the different criteria. A service obtaining a high ranking has thus an overall positive performance in relation to the identified monetary and non-monetary impacts.

Combination of financial and monetary social profitability

If the two concepts - financial and monetary social profitability - are combined, then it allows the categorisation of a given set of rail services into four groups, as shown in Table 1.

Table 1 - Categorisation of rail services

Financial \ Social Category	Socially monetarily profitable	Socially monetarily unprofitable
Financially profitable	I	II
Financially unprofitable	III	IV

Although SEM is applicable to financially profitable services, the main focus will be the financially unprofitable rail services; those which require subsidy to operate, i.e. categories III and IV.

Overall principles in the SONERAIL Evaluation Methodology

The aim of the SEM is to establish an objective approach by which decision makers can justify public funding support to the provision of rail services. 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.

The overall principles in SEM can be set out as follows. 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. It should be noted that the justification of allocating subsidy to a service does not, and cannot, take into account the non-monetary impacts due to the relative character of those impacts. 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 and monetary 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. 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. One important measure for the considered rail services could be to undertake a business re-engineering process (BRP) of the rail service in order to reduce the costs and/or improve the revenue. Other public transport measures could be to examine the possibility of providing the train service with other public transport modes which could have a better cost or revenue structure. Another consideration is whether infrastructure investments could improve the position of the rail service, e.g. by changing from diesel operated trains to electric operated trains. In addition, other policies outside the public transport policy domain could be seen as potential measures to improve the financial/social profitability of the rail service. Two examples of such policy initiatives could be:-

- pricing of other modes;
- improved integration of transport and land use.

The applied pricing mechanisms of other modes can have an influence on the competitiveness of the rail mode. Obviously, measures which aim to internalise the external costs of car travel could lead to an improved basis for the rail mode. It is also important to recognise that land use policies could be utilised as a way to improve the position/role of railways.

The phase of considering measures which could improve the position of a given rail service should be followed by assessing whether the improvements are at such a scale that the service does not require a subsidy (financially profitable) or the improvements justify the rail service receiving a subsidy due to social profitability. It should be mentioned that SEM will not identify the elements which could lead to an improved position for a given rail service. Thus, SEM will not involve the specification of a Business Re-engineering Process (BRP) Model for rail services. What the methodology will provide is a tool whereby applications produce, as part of the results, indications about possible problems. These could provide the starting point to a BRP. The main focus of SEM will be the social appraisal procedures for rail services.

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. However, 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 un-profitable 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 selected techniques in the SEM appraisal approach

Above, an overview of SEM was given. At this stage the specific techniques included in SEM will be presented. As described above the social appraisal in SEM involves two stages: (i) monetary assessment of social benefits and social costs, (ii) ranking of socially profitable rail services. Cost-benefit Analysis (CBA) and multicriteria analysis (MCA) will have varying degrees of influence in the two stages of the social appraisal. The first stage aims to provide recommendations for whether it is justifiable to provide a given rail service with a subsidy. CBA is the most appropriate approach for this task compared to MCA, as CBA has a clear monetary basis which easily can be linked to the monetary dimension of the task of justifying subsidy to a rail service. Assessment covers not only

whether a subsidy should be granted, but also the magnitude of the subsidy. CBA is designed to provide information on these types of aspects. In contrast, MCA is ill-suited to examine absolute/cardinal aspects. In the specification of the CBA for the SEM model, it will be attempted to incorporate as many of the available impacts as possible. In this way the CBA result will provide a robust basis for the justification of funding support to individual services. This conclusion will be strengthened if the impacts remaining as non-monetary are of relatively small importance compared to the CBA elements. The second stage of the social appraisal in SEM should contain a ranking procedure for the socially monetarily profitable rail services in case of insufficient funding. This ranking should establish the basis for deciding which socially monetarily profitable rail services to be recommended for subsidy support. MCA is designed to enable the ranking of several options when a range of different impacts are involved. The type of impacts likely to remain non-monetarisable calls for an approach which can handle ordinal impacts rather than cardinal impact/weights. Therefore, it seems appropriate to utilise techniques within MCA which can handle ordinal impacts/weights. An example of such a technique is Regime Analysis (RA), see Nijkamp *et al* (1990). The basic approach in RA is to calculate the probability of a given service to dominate the other services. The services are then ranked according to the probability score.

The chosen specification of the MCA approach implies the rail services recommended for subsidy support on the basis of the ranking will be selected among the monetarily socially profitable rail services. In this way the MCA is not allowed to influence the set of rail services from which the ones to be recommended for subsidy will be identified. Socially monetarily unprofitable rail services cannot be recommended for subsidy before all the socially monetarily profitable rail services have been recommended. In this way the MCA procedure is based on a non-compensatory approach with respect to the set of rail services to be considered for subsidy support. However, the MCA procedure is compensatory with respect to impacts such that the ranking of the socially monetarily profitable with inclusion of the non-monetary impacts can be different from the one obtained by only the monetary impacts. A relatively good performance for non-monetary impacts can compensate for bad performance with respect to monetary impacts, and vice-versa. It should be noticed that CBA could also be utilised to provide a ranking of the socially monetarily profitable rail services. For example, the measured net benefits relative to the required subsidy level could be used to rank the rail services. The reason for recommending that MCA methods are used for the ranking is to enable non-monetary impacts to be included in SEM. So far it has not been examined in detail how the public funding budget size influences the evaluation procedures. It should be noticed that the budget size does not influence the CBA procedure. However, the budget size can influence the MCA procedure. The influence concerns which services to consider where the following possibilities apply:-

- budget corresponds exactly to the total required funds for the socially monetarily profitable services;
- budget corresponds exactly to the total required funds for the financially unprofitable services;
- budget is smaller than the total required funds for the socially monetarily profitable services;
- budget is larger than the total required funds for the socially monetarily profitable services but smaller than the total required funds to support all financially unprofitable services.

The first two possibilities are straightforward. If the budget corresponds to the funds required to support all socially monetarily profitable rail services then the MCA provides a ranking, but all the services will be supported, i.e. the ranking will have no consequences. If the budget corresponds exactly to the total required funds for all financially unprofitable services, then neither CBA or MCA will have any consequences. However if the budget is smaller than the total funds required for the socially monetarily profitable services to be supported, then the MCA can influence which of these

services will be supported. If the budget is larger than the total required funds for the socially monetarily profitable, but smaller than the total required to support all financially unprofitable services then two rankings will be undertaken:-

- firstly, the socially monetarily profitable rail services which will all be recommended for subsidy;
- secondly, the financially unprofitable and socially monetarily unprofitable rail services will be ranked.

Required data inputs

An application of the proposed SEM requires availability of data for a large number of variables. Two main types of data for this evaluation approach will be needed:-

- impact data;
- weight data for the included impacts (to allow the relative importance of the various impacts to be taken into account in the assessment).

In order to include an impact in the assessment, its measurement must be feasible. Furthermore, weights for the different impacts need to be identified, if the impacts are included in the assessment of monetary social profitability or the ranking. Inclusion of an impact in the monetary profitability assessment requires monetary weights, while for the ranking procedure a weight must be identified for each of the included impacts. This weight will not necessarily have a monetary basis.

Limitations of SEM

The selected approach excludes a number of issues:-

- business reengineering process model;
- financial appraisal;
- current public transport budget levels.

It has already been mentioned that SEM will not involve a BRP model as such. The development of a BRP model is outside the scope of the project. However, the developed methodology can be viewed as providing the starting point for a BRP model. The results from an application of SEM could provide significant information as to which areas to examine in more detail in order to identify the specific problems and design improvement strategies. Furthermore, the social appraisal methodology could easily be linked to other elements including a BRP model. Financial appraisal is not a core element of SEM and could be placed outside the methodology. Obviously, the financial position of a rail service is important for SEM, as it determines whether a subsidy is required for a rail service and hence whether it is necessary to undertake the social appraisal. However, the information on the financial position can simply be one of the inputs required for the assessment. Current budget levels with respect to the available funds for subsidies to rail services will not be a variable in the assessment of a given rail service. This implies that the budget level will be assumed to be fixed and determined outside SEM. In particular, the available budget for subsidies will be determined prior to the application of SEM. In this way the SONERAIL approach does not aim to determine an optimal subsidy budget. The objective is to measure social profitability and to ensure that the rail services with highest social value are recommended for funding given the available budget. The scope for enhancing optimal social value, is limited to the evaluated rail services. Any improvement in social value, achieved from changing the budget level, is excluded from consideration.

The three considered aspects focused on different segments of the analysis. One additional aspect should be considered here which concerns the entire approach: the chosen approach for assessing rail services implies that the analysis is marginal rather than total. Overall, a marginal analysis is simpler to undertake compared to total analysis. A marginal analysis of rail services, within the SONERAIL context, appears to be more advantageous, as one of the key elements is to determine the social profitability of individual services.

Selected SEM impacts

The provision of a rail service involves a large number of different impacts where different groupings in society are affected: rail service operators, users, non-users, other transport operators, government. Impacts will differ in spatial as well as temporal and sectional terms. In the overview of SEM, a main function of the methodology was specified to be the assessment of social profitability of rail services. The developed methodology will focus on the comparison of a rail service to the situation without the rail service. However, this does not preclude the use of SEM to evaluate other types of options, the only change concerns the specification of the without case. The aim of applying SEM is to assess the impacts generated from a rail service, compared to the situation without the service. This implies that the impacts considered will, in general, be rather significant in terms of scale and range, although less than for major rail infrastructure investments, e.g. construction of new lines. The impacts covers the range of effects of having a given rail service. SEM impacts should include all variables which can be considered to be different according to whether the rail service is there or not. In particular, the SEM impacts are the result of the use of a rail service. For example, rail passengers would, if the rail service was not operating, use the car or not travel at all. In this case the use of the rail service leads to less road based transport and hence congestion, which leads to less pollution from transport. These types of impacts (less congestion, etc.) will be taken into account in SEM. The impacts included in SEM can be grouped into monetary and non-monetary impacts. The first group covers those impacts which are or can be valued meaningfully in monetary terms. This concerns impacts which are measured on the basis of money-changing-hands, and impacts for which imputed monetary values can be identified. The monetary impacts will be included in the CBA. These impacts will be incorporated in the MCA together with the non-monetary impacts. Non-monetary impacts are those which are difficult or impossible to assign a monetary value. In addition, to clarify what type of impacts are generated from a rail service, it is also of importance to clarify which groups are affected by the provision of a rail service. Below, is a list of groups which are affected:-

- rail service users;
- non-users - other transport;
- non-users - general society;
- train operators;
- other transport operators;
- funding organisations.

Tables 2 and 3 provide an overview of the impacts included in SEM. In Table 2 the CBA impacts are identified as costs in relation to closure (benefits of retention) and benefits in relation to closure (costs of retention). The shaded cells represent impacts which are of benefit to one group, yet a cost to another. Non-monetary impacts listed in Table 3 are not categorised with respect to incidence group. In general these are related to the social level. These impacts will be measured through a set of indicators along with an overall assessment. This will enable an evaluation of each of these impacts with respect to an ordinal scale.

Table 2 - CBA Impacts in SEM

	Costs of closure = Benefits of retention	Benefits of closure = Costs of retention
Former train travellers which change mode	- travel time change (commuter, leisure, business) U_1 - change in efficiency business travel U_2 - loss of consumers' surplus U_3 - costs other mode U_4	- saving train costs (the fare) U_5
Existing car travellers	- change in congestion costs C_1 - change in operating costs (fuel) C_2	
Train company	- change in revenues (excl. subsidy) T_1 - change in subsidy T_2	- change in costs (excl. joint costs) T_3
Government	- change in costs of road maintenance G_1	- change in subsidy to train G_2
Former train travellers which do not travel	- loss of welfare L_1 - Loss of consumer surplus L_4	- saving of travel time L_2 - saving of train costs (the fare(L_3
Society	- change in emissions S_1 - change in noise S_2 - change in safety/accidents S_3	
Other		- change in revenues oil companies/ garages O_1 - change in revenues other transport modes O_2

Table 3 - Non-monetary Impacts in SEM

Categories	Impacts	Indicators
Environmental impacts	A. Land/water pollution	Change in key pollutants, type of affected areas
	B. Vibration effects	Seismographic analysis, increased disturbance to buildings causing major/minor structural damage
	C. Ecology/Wildlife	Alterations in species diversity, spatial distribution and population composition.
Spatial impacts	D. Economic development/regeneration	Change in employment, change in production, change in investment, effects on tourism, number of new businesses, productivity changes, unemployment, GDP_{act}/GDP_{pot}, GDP per capita
	E. Landscape/townscape changes including visual intrusion effects	Change in traffic flow, change in number of parked cars in town centres, Change in perception of townscape/landscape
Other impacts	F. Stress caused by congestion	Estimated change in stress level based on expected change in traffic flow with congestion

USE OF THE SONERAIL EVALUATION METHODOLOGY

Potential uses

An important element in the specification of the SONERAIL Evaluation Methodology (SEM) is to specify how and by whom it will be used. In this section the potential users of the methodology, will be examined. From the preceding sections, it is clear the main use will be to aid decision making regarding justification and allocation of subsidies to rail services. It is the aim of SEM to be a useful tool for decision making bodies, responsible for allocating subsidies to rail services. The methodology will also be of use as a source of information regarding the social value derived from different rail services. On the basis of the methodology it is feasible to compare different rail services (at least within a given country), in terms of social value. This comparison could be based on the so-called benefit-cost ratio or a MCA based ranking score. Furthermore, provided the appropriate harmonisation of relevant data between the different European countries, it would be possible to undertake a Pan-European comparison of rail services and social value. This could be based on either the benefit-cost ratio or a MCA derived ranking score. However this latter application is not considered in the above outlined specification of SEM.

It requires harmonisation of data such as the differences in rail cost accounting systems used in the different European countries. The suggested comparisons (national or European level)) can contribute to establish best practice rail services. Obviously, the definition of best practice is easier for a small scale/national level, where the context in which the rail services operate show low variation. On the other hand the large scale comparison allows for a more robust statistical basis along with the possibility that it is possible to define best practice for different categories of rail

services, e.g. rural against urban, alternative modes against no alternative modes, privatised against state provided, deregulated against regulated, etc. This form of analysis can contribute to information regarding the type of rail service which provide the highest level of social benefits compared to the social costs, given the context in which the rail service is placed. It would be possible to extend the analysis to specific types of benefit/cost elements in order to evaluate whether the rail services differ with respect to the relative magnitude of these elements.

Potential users

The main users can be expected to be government departments responsible for the allocation of subsidies to rail services. The precise users at the governmental level will depend on the structure of the public sector in relation to support for rail services. In some countries decision making, in relation to support for rail services, is organised at the central government level. Other countries have adopted a more de-centralised structure where regional and local government agencies are responsible for the allocation of subsidies to rail services. The difference in decision making context creates a specific problem in relation to SEM. Consider a situation where rail subsidies are decided at the regional/local level. As such, the methodology can be applied at this level. However, it creates a problem when some benefits occur outside the region in which the decision regarding support is made. The basic question is whether a given region should provide support to benefits occurring outside this region. This is an example of a collective good, the persons benefitting from a given good/service cannot be limited to the persons providing the funds. If the aim is to achieve a social optimum, the evaluation of a rail service should include all relevant impacts irrespective of where and to whom they occur. In order to solve the apparent dis-incentive for regional/local decision making bodies to fund such services, this problem should be solved through inter-regional transfers. In this way other regions could be called upon to fund part of the costs of providing the rail service.

If the decision making body responsible for allocating subsidies to rail services is placed at central government level then the problem will be on a reduced scale. In this case the impacts concerned will be those occurring outside the national level, i.e. in other countries. It can be expected that the provision of a given rail service supplied in one country will have very limited impacts in other countries. The only case where such impacts could be on a higher scale would be border areas. Again the optimal solution with respect to the application of SEM would be to include all impacts irrespective of where and to whom they occur. Transfers between the countries concerned should then remove the dis-incentive to include impacts in other countries.

Political Economy Issues

It is important to consider the implications of using SEM within a political decision making process. SEM should be seen as a source of information in relation to policy decisions regarding the allocation of subsidy to a sample of rail services. However, although SEM can provide recommendations regarding which services should receive subsidy it cannot make the decisions. The actual decisions will always be political, where other criteria than the ones included in SEM can have importance, e.g. distributional concerns. Therefore, it is possible that subsidies will be allocated differently compared to the recommendations from SEM.

The implementation of SEM in practice will require consideration to the assumption of a fixed rail subsidy budget. This assumption implies that the budget is determined outside SEM. In practice, it is possible that the subsidy budget can be influenced by the outcomes from SEM. This has be considered in the SONERAIL project, where it has been described as a possibility that the decision making process results in a subsidy increase if insufficient resources are available to support all monetarily socially profitable services. Furthermore, it could be of relevance to reconsider the

budget size if resources are available to support not only the socially monetarily profitable services but also the unprofitable ones. However, this assumes that non-monetary impacts are not given a value in the process.

CONCLUSIONS

The SONERAIL Evaluation Methodology (SEM) presented in this paper aims to provide a tool for justifying and allocating subsidy support to rail services. It is based on the identification of monetary social benefits and costs so if these benefits are greater than the monetary social cost, it is justified to provide funding support. If the overall budget for subsidy is sufficient, funding support for a railway can be recommended. Otherwise, the allocation of subsidy will be based on a ranking of the socially monetarily profitable rail services. The services recommended for subsidy will be those with the highest relative social value. The two stages in SEM, monetary social profitability calculation and ranking of socially profitable services in monetary terms, are mainly based on two approaches. Cost-benefit analysis for the former stage and multi-criteria analysis for the latter stage. In this way SEM will allow for the inclusion of monetary and non-monetary impacts. This paper has specified the general structure of SEM, including how it can be linked to other types of analysis which will be useful in relation to a general improvement of the position of railways as a viable mode of transportation. These include financial appraisal and business re-engineering process.

In addition, to the specification of the general structure of SEM, the paper also shows the impacts which should be considered for the social appraisal of rail service. These include monetary and non-monetary elements, which ensures a comprehensive examination of the consequences of rail service provision. The list of impacts have been drawn up with the aim of including all relevant impacts for a rail service while at the same time avoiding double- counting of impacts. Impacts include: rail operator impacts; user impacts; non-user impacts; general society impacts;
government impacts.

All impacts are identified with respect to the situation of a rail service closure. This represents the core situation in SEM as it is concerned with evaluating the consequences of providing the rail services compared to the situation without the rail service. Obviously, it will be possible to use SEM for evaluating other rail service options such as frequency changes.

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