

IBEC Secretariat



Papers at International Workshops on ITS Benefits, Evaluation and Costs at ITS World Congress session:

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Introduction

The International Benefits Evaluation and Costs Working Group (IBEC) organises sessions to exchange information and ideas on ITS benefits, evaluation and costs during the annual ITS World Congress meetings.

The first of these sessions was held in Toronto in 1999, when Dr Richard Mudge, in his capacity as chair of ITS America's Benefits Evaluation and Costs (BEC) Committee, invited experts in this field from around the world to attend a meeting at the 6th ITS World Congress in Toronto. The purpose of this first meeting was to exchange information about current state of practice in ITS evaluation around the world, hear reactions from a panel of experts on state of practice and areas of strength and knowledge gaps, and to exchange ideas on planning a more formal workshop to be held in conjunction with the 7th ITS World Congress, being held in Turin in 2000. Those who attended the meeting also discussed ways in which the exchange of information and networking might be formalised in future.

Since then, sessions on ITS benefits, evaluation and costs have become a feature each year at the ITS World Congress.

This document provides a brief summary of the material covered during the workshops held in 1999. The event was informal, so proceedings were not prepared at the time. Copies of the speakers' presentations were retained and these have been used to prepare this summary.

Proceedings from subsequent IBEC sessions at the ITS World Congress are available in the Library section of the IBEC web site: www.ibec-its.org.

1 Outline of the programme

The 1999 ITS World Congress was the first in this series of meetings at which experts from around the world assembled to share ideas on ITS benefits, evaluation and costs, and was attended by about 20 people. The focus of the presentations was on how different countries conduct ITS evaluations, and to enable participants to compare methods used and results obtained.

The topics covered in the presentations are outlined in the following table.

Presentation title	Speaker	Country	Outline of content
Introduction	Richard Mudge	USA	Introduction and purpose of meeting
Intelligent Transportation Systems Evaluations in the US	Joseph Peters	USA	Scope of ITS technologies tested in the US Methods used to assess impacts Lessons learned Knowledge gaps Use of results Resources available to others
BEC Committee: the Canadian Experience	Richard Zavergiu and William Johnson	Canada	Scope of ITS applications tested in Canada Experience of assessment in Canada Knowledge gaps in benefit-cost framework, national benefit-cost assessment and economic productivity impacts Lessons learned from assessments
ITS Evaluations – Finnish Views	Risto Kulmala	Finland	ITS and its impacts in Europe in 8 application areas European and Finnish guidelines on evaluation of impacts Use of results Knowledge gaps
Evaluation and Assessment in Road Transport Telematics	John Miles and Ken Perrett	UK	The need for evaluation and assessment Frameworks for assessment and evaluation Current issues RTT evaluation and assessment in practice
Evaluation Plan for ITS Model Experiments in Japan	Masaya Sugita	Japan	Coverage of 18 experiments and themes in 5 districts Evaluation framework used Indicators measured Evaluation policy
Investigation of ITS Status in Asian Countries	Yasuhiko Kumagai International Fellow, ITS America	USA	Report of investigation into the status of ITS in Asian countries using questionnaires, data analysis and site visits
Wrap-up, summary and conclusions	John Flora, World Bank		

2 Summary of presentations

2.1 Intelligent Transportation Systems Evaluations in the US: Joe Peters, ITS Joint Program Office, US DoT

Joe Peters started his presentation with an overview of the technologies being tested in the US. Two types of ITS were identified: intelligent vehicles, and intelligent infrastructure. The initiative on Intelligent Vehicles, aimed primarily at improving safety, and involved applications for passenger cars, heavy trucks, buses and special use vehicles (such as construction vehicles). Intelligent infrastructure was being implemented in both metropolitan and rural areas, and in commercial vehicle (fleet) operations.

The applications included arterial and freeway management, transit management, traveller information, emergency management and electronic payment (in urban areas), transit mobility, weather and winter mobility, crash prevention (in rural areas), and in commercial fleets, credentials administration, safety information exchange and electronic screening.

The process for assessing ITS impacts was outlined. The focus was on assessing the programme and ITS deployments, with assessment both of the outputs (number of deployments) and the outcomes, where 'a few good measures' were being used as indicators to assess impacts. Assessment results were fed back in to planning the ITS programme.

Lessons from the Metropolitan Model Deployment Initiative (MMDI) in four areas were discussed. The key points were:

- Information kiosks need to be bundled with other services if they are to succeed
- Integrated freeway/ arterial diversion corridors do work and offer benefits under certain conditions
- Toll tags as a source of traveller information do work and offer great benefits
- Travel signal co-ordination across local authority boundaries does work and offers great benefits
- Web pages providing traveller information do work and offer great benefits.

The following gaps were identified in knowledge on quantifiable impacts of ITS:

- ITS integration
- Intelligent vehicles
- Work zones (road works)
- Intermodal freight management
- Alternative traveller information business models
- Archived information and decision support systems
- Intelligent vehicle and rural market penetration
- Economic indicators: jobs/ productivity

Gaps were also identified in evaluation methods:

- Tools for state and local government to do low-cost project-specific benefit-cost analysis (the 'IDAS' tool was under development at this time)
- Valid methods for estimating the benefits of ITS, especially safety and environmental benefits

Uses of the results of ITS evaluation were outlined and included: affecting the policy direction of the ITS programme, benefits and cost information for planning and evaluation, and outreach materials prepared for specific target audiences.

Sources of information on ITS benefits in the US were listed, and available on the US DoT web site and in paper form:

- ITS benefits brochures
- ITS cross-cutting studies
- ITS case studies
- ITS implementation guides
- ITS technical reports

2.2 BEC Committee: the Canadian Experience: Richard Zavergiu and William Johnson, Transport Canada

The sub-title for this presentation was Benefit-Cost Assessment Knowledge Gaps.

The presentation began with an overview of ITS applications in Canada: traffic management, electronic payment, commercial vehicle operations (fleets), advanced public transit applications and inter-modal (airport and port) applications. Of these, traffic management and signalling systems provided the most reliable impact measurements.

In some cases, ITS benefits in Canada are influenced by policy pursuits. Examples quoted were electronic payment technologies, which have made road privatisation easier to introduce, and automatic compliance enforcement at the roadside, which has benefited both operators and regulators, with time savings, reduced emissions and safety improvements.

The importance of secondary benefits was emphasised, but these are not always adequately measured.

Knowledge gaps were identified in the following areas:

- Improved benefit-cost framework – classifying benefits according to the type of beneficiary (transport users, infrastructure owners/ operators, communities etc) and then case studies using the framework to demonstrate that ITS implementation could be facilitated
- National benefit-cost assessment – a benefit-cost assessment of national deployment was conducted, using assumed travel behaviour responses to ITS, but future studies need empirical evidence on responses.
- Economic productivity impacts – reduced travel costs are adequately measured, but savings in logistics costs for freight are not adequately measured and increased transportation output for firms and individuals are ignored.

Lessons learned were outlined:

- Urban applications offer the greatest potential
- Benefit-cost ratios are strongly affected by the cost of in-vehicle technologies
- Anticipated future cost reductions in ITS technologies will improve benefit-cost ratios
- Significant savings can be achieved through deployment of shared ITS infrastructure
- Benefit-cost ratios are strongly affected by the traffic conditions at individual locations.

The presentation closed with a more detailed look at the question of increasing transportation efficiency, one of the impacts which had been identified as being ignored. The issue here was seen as the need to understand and measure effects on accessibility and concentration of urban development. Improvements achieved in the transport system need to be related to improvements in location advantage (e.g. more industry, more jobs). The presentation concluded by suggesting that long term industrial and economic strategies should be linked to transportation and ITS deployment plans.

2.3 ITS Evaluations – Finnish Views: Risto Kulmala, VTT Finland

This paper began with a review of the ITS applications being implemented in Europe. A total of 34 types of applications were listed, grouped into eight categories:

- Traveller information
- Traffic management
- Vehicle
- Commercial vehicles
- Public transport
- Emergency
- Electronic payment
- Safety

European guidelines for evaluation were described. Guidelines for transport projects, ITS projects and R & D programmes were available at a European level. The European Guidelines for ITS evaluation covered preparation of both validation plans and reports of results and cross-project collaborative studies.

The Finnish guidelines were described as an example of national guidelines and are based on comparability to other transport projects or systems. The approach sets out a structure for both pre-implementation evaluation and post-implementation evaluation covering project description, impact descriptions, socio-economic analysis and a summary. Indicators for impacts in seven areas are set out: network and costs, fleet and costs, accessibility, time and predictability, safety, environment, valuations and comfort.

Uses of evaluation results in Finland were outlined. Within the ITS industry, results contribute to product and system enhancement, marketing, introducing innovations, and for R & D. Results are also used for decisions on deployment by local authorities, road authorities and in businesses, for developing deployment strategies by system providers and local and national transport authorities.

The following knowledge gaps were identified:

- Little impact information on most ITS
- Impacts of all ITS are not known in the long term, on a large scale, or as integrated deployments
- Economic assessment methods
- Impact of infrastructure deployment
- Impacts on specific areas: safety, environment, economy, transport system and society

2.4 Evaluation and Assessment in Road Transport Telematics: John Miles (Ankerbold International) and Ken Perrett (TRL Limited), UK

This presentation began by defining evaluation and assessment, and noted that at the time, there was no comprehensive framework for evaluation and assessment of Road Transport Telematics (RTT) in the UK, despite the need for decision-makers to justify ITS investments.

Various frameworks for evaluation and assessment of RTT used in the UK, the European Commission's R & D programme, and in the USA were discussed, and the methods adopted and results of a TRL study assessing the benefits of 35 applications of RTT around the world were outlined. The EC R & D programme included five categories of assessment: technical assessment, user acceptance assessment, impact assessment, socio-economic evaluation and financial assessment.

Some of the current issues in this area were discussed.

- Market assessment was seen as an additional category of assessment to be added to the five set out in the approach adopted in the EC programme.
- In cases where projects have private finance (as opposed to public funding or self-funding), this affects the coverage and content of the assessment.
- Evaluation of enforcement and regulation was seen as particularly difficult, but crucial to the public acceptance of schemes involving restraints on movement (such as access control, speed control, and lane control).

The presentation then discussed RTT evaluation and assessment in practice, highlighting the importance of demonstrating real benefits before decision-makers will have enough confidence to fund schemes or invest in new products. The European Commission's approach developed in the CONVERGE project and applied consistently to R & D projects in the Fourth Framework Programme was described, and some conclusions from the review of validation plans prepared by those projects were presented.

Other key points covered the need to include intangible costs in assessments (e.g. pollution, comfort, confidence, reliability), and the uncertainties surrounding responses from users, which means that these can only be determined through significant demonstrations on a scale large enough to have real impacts.

2.5 Evaluation Plan for ITS Model Experiments in Japan: Masaya Sugita, VERTIS Planning Department, Japan

This presentation described a series of 18 demonstration projects in five districts in Japan:

- An information highway supporting a range of ITS services in Okayama
- Park and ride, traffic information and electric vehicle sharing in Toyota City
- Public transport priority in Tokyo
- Recycling society using mobile communications in Gifu
- Traveller information services, network management, fleet management and demand responsive public transport in Kochi area

The structure of the evaluation framework was described. The study design phase had included a review of work in Europe and North America, which was evident from the framework used, which focused on:

- User benefits (efficiency, safety and environmental impacts)
- Benefits and costs
- User acceptance (users' realisation of the effects, customer satisfaction and ease of use)
- Technical evaluation
- Market assessment
- Financial assessment
- Legal/ institutional

The presentation then described the indicators used to assess impacts on user benefits and user acceptance, and the policy on a common evaluation approach between the various projects.

2.6 Investigation of ITS Status in Asian Countries: Yasuhiko Kumagai, International Fellow, ITS America

In the project reported in this presentation, the status of ITS implementation in different countries in Asia was investigated with the aim of suggesting implementation approaches to be used in Asian

countries. Information on Benefits, Evaluation and Costs was seen as important in future implementation decisions for these countries.

Using site visits, questionnaires, and an analysis of data on traffic and accidents for Asian countries, the road and traffic conditions in Asian countries were analysed. Heavy traffic was seen as a general problem, particularly in cities, with a large number of two- and three-wheeled vehicles. ITS projects are often postponed or cancelled due to economic crises, but traffic experts are keen to implement ITS schemes. The review identified which countries had an ITS association, a master plan, and the deployment status of key ITS services. Deployment of ITS in Japan was described in more detail.

Lessons learned included that ITS benefits were different in different situations, and that the same systems work differently in different situations.

A 'status clock' of ITS implementation in Asian countries was proposed, taking account of ITS developments, traffic demand and the status of relevant infrastructure.

An approach to ITS implementation was suggested, starting with the necessary infrastructure, proceeding to basic ITS implementation and later, advanced ITS, as the supporting conditions become available (these include organisation of ITS promotion, enhancement and administration, awareness of drivers and pedestrians).



3 Acknowledgements

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