# Creating Traveller Information Services using ITS.

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**ABSTRACT:** Traveller Information Services are a core component in terms of influencing overall personal travel mode selection behaviours via the use of varying channels, to communicate information on current travel issues, choices and options to the wider public as well as the private sector.

Effectively Traveller Information Services are Travel Demand Management social engineering support structures that can be passively or actively leveraged to revitalise the use of public transport, walking and cycling, reduce congestion on roads and significantly impact on the carbon footprint and sustainability of transport systems for the country.

This paper therefore aims to provide an insight into how Intelligent Transport Systems can be effectively used to build Traveller Information Services and some of the opportunities that can be realized by both the public and private sector in this regard. This paper includes an examination of overseas experience in the area and overseas approaches towards engagements around the provision of Traveller Information Services.

## TRAVELLER INFORMATION SERVICES – WHAT ARE THEY AND HOW DO THEY FIT IN CREATING A SUSTAINABLE TRANSPORT ENVIRONMENT?

The recent focus on the use of Traveller Information Services has increased worldwide along with central government agency concerns about sustainability, global warming and the negative impact on productivity caused by excessive congestion.

The New Zealand Ministry for the Environment defines sustainability on its website: "Sustainability integrates …concern for social, cultural, economic and environmental issues, and involves thinking broadly about objectives, considering long-term as well as short-term effects, assessing indirect as well as direct effects, and taking extra care when changes brought about by development might be irreversible".

The function of Traveller Information Services is to provide travellers with timely accurate and meaningful information via a variety of delivery channels to assist them to make informed travel choices and also often to encourage the use of public or alternative transport options other than the use of a private car. Koppelman, et al (1980) outlined this principle by stating: "Providing travellers with relevant information on travel options is generally acknowledged as having the potential to change their behaviour in ways that are beneficial to the efficiency of the use of the transport system."

As a behavioural modification measure it is therefore reasonable to see the use of Traveller Information Services as providing a key role in enabling a sustainable transportation network.

Often Traveller Information Services are described as Advanced Traveller Information Services or ATIS. Please note the terms are interchangeable.

## SO WHAT CONSTITUTES A TRAVELLER INFORMATION SERVICE, (ATIS)?

Traveller Information Services revolve around data collected from a variety of ITS systems which is then processed and repurposed for delivery to the public via channels. A "channel' is any delivery mechanism that allows a potential Traveller to obtain information in advance or during their trip.

These channels can take the form of websites, radio stations, emails, SMS text messages, Television announcements, in car navigation units, Highway Advisory Radio, Radio Data Services, dynamic road side signage (VMS), intelligent illuminated road (smart) studs, syndicated RSS web site feeds, 0800 numbers etc.

In some cases these services will also use a combination of historical information and predictive models to predict likely traffic patterns and issues depending on the time of day, date and upcoming known planned events.

The ITS equipment that provides the information required consists of ATMS infrastructure, inductive loop systems, CCTV and Web Camera footage, Traffic signal controllers, event and incident management systems, asset management systems and weather monitoring systems. Other contributory data supply systems often incorporate information extracted from public transport systems and GPS fleet data obtained from private operators.

## DELIVERY CHANNELS – HOW TO BEST DELIVER RELEVANT, TIMELY INFORMATION

In 2000 University of California at Berkeley and Caltrans researched the relationship between the delivery of Traveller Information Services and successes in delivery methods – whilst this analysis did not specifically divide information supplied into pre-trip and en-route the results were interesting to say the least.

These findings indicated that in order to be effective such services required widespread deployment. Widespread dissemination tools such as dynamic message signs (dissemination using ITS equipment) and static information via the Internet were found to be the most effective in terms of disseminating information to the public. Its worth noting that neither conventional Radio Stations nor Highway Advisory radio both of which have been found to be highly effective traffic information dissemination tools both in the UK and New Zealand were included in this study.

It was clear from this research that the most effective tool / channel in supplying drivers information en-route was namely variable message signs.

From a New Zealand perspective, Transit New Zealand (Transit) has long recognised the effectiveness of using ITS tools such as Variable Message Signs as a highly effective information display method. (Transit currently is in the process of rolling out a large number of these units in rural and urban environments to assist drivers by providing route choices at key decision points on the wider state highway network. Transit has also planned to roll out a similar network of VMS signs advising travellers of Journey Times as part of its commitments to deliver travel time information contained within the Ramp Signalling Projects currently underway on the Auckland Motorway Network).

## CHOOSING THE CORRECT BUSINESS MODEL TO DELIVER TRAVELLER INFORMATION SERVICES

Worldwide significant effort has been spent on trying to understand the best approaches to setting up delivery mechanisms to successfully deliver Traveller Information Services to the wider public. Much of this investment is not only in the delivery mechanisms required for Traveller Information Services but also in the ITS systems that are required to provide data sources. Overseas experience has found that there are a number of business models that can be used to facilitate further ITS investments and the delivery of Traveller Information Services.

These business models can be largely divided into Public/Private Partnerships, Private Entities that procure and resell data and MOU based arrangements where Roading Authorities have transparently engaged market leaders to assist with the dissemination process, (Transit New Zealand Radio Producer Trial 2006-2007).

The Florida Department of Transportation has this to say about private public partnerships to deliver Traveller Information Services & ITS data sources:

"Obtaining, developing, and deploying ITS infrastructure, using only public expertise and funding, can be a difficult and time-consuming process. Forming public-private partnerships is one way to help alleviate these constraints. Public-private partnerships provide agencies the opportunity to draw upon private sector expertise and funding opportunities. However, agencies forming such partnerships must be aware of measures that can be taken to ensure success of both the project and the partnership. These measures include: anticipating unforeseen events, allowing flexibility on part of the contractor, and clearly defining the roles of the public and private sector agencies".

Kan Chen (2002), made some interesting comparisons between American and European Traveller Information Systems business delivery models:

"Private ATIS companies (e.g., Trafficmaster) in Europe are closer than their North American counterparts to being financially independent of public subsidies…
Formal agreements (mostly in the form of Memo of Understanding) are prerequisite for ATIS public-private partnerships but are frequently not necessary in North America…
North American consumers are more reluctant than European consumers to pay for traffic information due to the more deeply-rooted car culture in North America…"

Other models adopted in other countries include letting tenders for companies to act as brokers to provide feedback to the wider media (Australia, US, UK, Germany).
The key to establishing a workable model appears to be understanding who actually owns the base data or the ITS systems that generate that base data and being equally clear about the contractual or defined terms of use around that data. It goes without saying that where there is insufficient investment in road side ITS for data collection the ability to deliver Traveller Information Services is severely constrained.

## ISSUES AND CONSIDERATIONS AROUND INFORMATION OWNERSHIP

Compelling Traveller Information Services exist overseas because of Road Controlling Authorities and private companies who make substantial investments in order to obtain information from ITS systems.

That raw data is usually the property of the Road Controlling Authority, as is the data that is validated by the same Road Controlling Authority.

Steps need to be taken when a Traveller Information Service channel is being considered as part of its procurement to ensure that the interests of the Road Controlling Authority are maintained within arrangements for the repurpose or reuse of information.

Any misuse intentional or unintentional of information leading to a loss of confidence in a Traveller Information Service could have very serious long term ramifications for a Road Controlling Authority and damage its public credibility significantly.

Branding and other considerations around Third Party channel providers must be considered carefully. Where information is being repurposed or re-presented as content by a third party Roading Authorities.

## OBTAINING DATA FROM ITS SYSTEMS TO ENABLE TRAVELLER INFORMATION SERVICES OUTCOMES.

There are a number of core factors that need to be taken into consideration when considering using an ITS system to provide data for a Traveller Information Service as outlined above. The first of these factors is the relationship between the ITS equipment collecting the data and the actual primary purpose for the data being collected.

In the case of inductive loop technology, mainline loops that collect data which feature traffic counts and occupancy but not speed may not be of immediate use for a Traveller Information Service which needs to report on Travel Times but may be of use for a Traveller Information service that reports on relative congestion.

In a similar vein the use of Side Mounted Radar may provide immediate and real time speeds however the results from it for occupancy and volume would render it less than ideal as an ITS data source for congestion monitoring.

However if you were to take outputs from both systems and transform them into a common database the information would not be immediately useful due to differences in operating protocols, languages and data storage structures. This position raises a number of important issues:

The first of these relates to ensuring that all ITS devices used as data sources are able to be connected via the same common communications system. This step creates certainty around the data transport methodology and simplifies the process of merging the data into a third party repository from contributing systems.
The second issue is based around the protocols and languages that ITS devices speak. Roading Authorities around the world have struggled with this for many years however there are standards which can help here. NTCIP is the internationally accepted default ITS protocol and communications standard. It is able to use Simple Network Management Protocol as the basis for inter-device communications and has freely published libraries of data objects and message information blocks – the driver libraries that explain how one system can talk to another.

If Internet Protocols such as TCPIP and SNMP are used as the base communications method via an NTCIP framework then it is possible to build truly interoperable and inter-connectable environments where data from different ITS roadside devices can be more readily used.

Reliability and robustness of ITS data sources and most importantly reliability of channel dissemination methods is a crucial requirement for ITS systems in order to avoid the pit falls of presenting inaccurate and unreliable information. From the point of view of Traveller Information Services ITS data sources must be demonstrably resilient, and be backed up by at least one other system to ensure continuity of information supply.

## THE ROLE AND FUNCTION OF CENTRAL DATA REPOSITORIES

In order to better manage and transform data from often proprietary ITS devices into usable content for re-purposing, data needs to be comprehensively validated and processed. There are two models of data processing approach that can be taken in order to meet these validation requirements.

1) A centralised processing environment where all ITS generated data is collected and automatically processed with validation of data quality performed by database administrators.
2) A distributed pre-processed environment where data is processed near its source, validated by automated business rules and the results of that processing are passed back to a central repository for further analysis or transformation into usable content.

Irrespective of which model is used the field of data warehousing is a complex subject and Roading Authorities need to ensure that they have engaged with suitable Information Technology Specialists whom are able to provide them with the right advice and design process for any such deployments.

## SUMMARY / CONCLUSIONS

At present there is no independently verifiable local evidence that road users in New Zealand have an appetite for real time information on route choice, travel times, driving conditions, smog levels, incidents and other events. However there is ample evidence from overseas experience that providing this information greatly assists with managing network demand and is seen as a must have by most drivers.

In a society where communication has become instant and time pressures on individuals and organizations are more acute, travellers will begin to expect as much information as possible being supplied to them on the state of the transportation system as rapidly as possible.

The ever increasing capabilities of mobile communications systems and increasing availability of in car GPS guidance equipment will create a higher level of road user awareness of the time spent en-route.

## RECOMMENDATIONS

Traveller Information Services will become an increasing focus of demand by road users particularly as network attached in car entertainment and navigation systems combined with more advances in cellular phone technologies proliferate.

It is one of the recommendations of this paper that rather than worrying about what these services might be, steps need to be taken immediately to start actively investing in increased ITS capabilities on the roadside in all NZ metropolitan areas to collect metrics that provide travel time data and the capability of determining levels of relative congestion.

These investments will ultimately pay dividends in the delivery of social engineering outcomes to meet central government demand management policy objectives whilst creating a more informed traveling public who can then make active decisions about transportation modes.

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