The impact of the application of new technology on public transport service provision and the passenger experience: A focus on implementation in Australia

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ABSTRACT

The emergence of Intelligent Transport Systems (ITS) has been recognised with many initiatives during the last 20 years. In Europe, the "ITS Action Plan" identifies a number of applications as key elements contributing to the efficient co-ordination of the overall transport chain. The context and experience surrounding the recent widespread development of technological tools and ICT platforms to support the emergence of ITS are notable for the way in which they permeate the transport and logistics chain. But a key question remains: to what extent is the public transport sector able to exploit the wider benefits of ITS?

This paper provides a comparative analysis of ITS policy between Europe and Australia. With a focus on the applications and methods adopted in the use of ITS in the public transport sector in Australia the paper critiques their effectiveness in enhancing passenger experience, operator effectiveness and the likely effect on patronage. The relatively low incidence of the use of ITS in the public transport system in Australia, as compared to Europe, is discussed in the context of technology trends/pathways and impediments to deployment in the public transport sector.

1. Introduction

The emergence of Intelligent Transport Systems (ITS) has been recognised with many initiatives during the last 20 years and recently in Europe with a specific "Recommendation", the "ITS Action Plan" (EC-ITS, 2007). The recent widespread development of technological tools and ICT platforms to support the emergence of ITS and the way in which they have permeated the transport and logistics chain are well documented. In contrast, the extent to which the public transport sector has been able to exploit the wider benefits of ITS is an unanswered question. This paper provides a critique of methods adopted in the use of ITS and its impact using a case study approach and comparing European and Australian experience. In comparison to Europe, the evidence suggests that Australian cities have a relatively low incidence of the use of ITS in the public transport system and the paper seeks to present an explanation for this lower take up.

The paper begins with an overview of ITS policy in Australia and Europe (Section 2) before moving on to consider experience to date in Australia with a number of ITS applications (bus priority, journey planning and flexible transport services) in Section 3. Section 4 considers factors influencing ITS policy and application and explanations for lower take up of ITS applications in Australia.

2. ITS policy in Australia and Europe

2.1. ITS policy in Australia

The current National Intelligent Transport Systems (ITS) Strategy for Australia (ITS Australia, 2010) encompasses a five year timeframe from 2010 to 2015 and was developed from the first Australian ITS Summit, held in Melbourne in November 2009. The National ITS Strategy provides a framework for delivering priority intelligent transport solutions in recognition of the needs and aspirations of government, industry, transport operators, academia, road users and the wider community.

The Strategy is aligned to three core pillars of *Safety, Mobility* and the *Environment* as shown in Table 1.

These three pillars in turn provide a context within which success can be measured. These have been identified as to the context of zero harm to users of the transport network, zero avoidable congestion, and a significant (50–70%) reduction in transport greenhouse gas emissions based on 2010 levels.

Table 1
ITS focus areas (ITS Australia, 2010).

ITS focus areas	Areas of impact (core pillars)		
	Safety	Mobility	Environment
1. **Advanced Traffic Management Systems**, such as lane control and ramp metering components of controlled motorway solutions	√	√	√
2. **Vehicle detection and enforcement solutions** to support tolling systems, access control and providing a base for road user charging systems		√	√
3. **Driver Assistance Solutions** (e.g. predictive terrain adaptive cruise control)	√		√
4. **Intelligent speed assistance or adaptation**, automatically updating the vehicle with speed-limit information	√		√
5. **Traveller Information Systems** delivering information to drivers and travellers across all modes	√	√	√
6. **Vehicle to vehicle and vehicle to infrastructure communication** solutions, delivering automated safety solutions, information and potentially further pricing options ("Co-operative ITS")	√	√	
7. **Vehicle performance tracking and monitoring**, using in-vehicle logging systems and communication options, with a preference for a single operational platform in freight vehicles	√	√	√
8. **Vehicle Environmental Solutions** to enhance the performance and utility of low emission vehicles, for example managed charging of electric vehicles			√

Within the strategy, eight categories of enabling solutions or ITS focus areas have been identified and mapped to the three pillars of safety, mobility and the environment (as shown in Table 1 above). The strategy provides a framework for the evaluation and development of these ITS focus areas, structured around the components of:

(a) Architecture, Standards and Tools which draw on developed architectures in Europe and/or the USA;
(b) development of a "roadmap" of potential development paths and supporting information on resources, best practice strategies and potential impact on government objectives;
(c) the definition of development opportunities for solutions relating to one or more of the pillars; and
(d) a set of public policy initiatives required to give further shape or clarity to the Strategy.

A further component identifies the need for a "distributed ITS Centre of Excellence" to define groupings of organisations that are contributing to particular streams of ITS development.

The policy outlines a number of activities that are proposed as strategic framework components to make a starting point on (a) to (d) above but these include little explicit reference to public transport. Applications that would make a difference in the public transport sphere include dealing with heavy vehicle driver fatigue and the creation of a "multi-modal transport portal, with ability to opt in or out, incorporating articulation of true performance and cost of all journeys and real-time journey planning" and "management of road and lane access and enforcement, e.g. transit priority, dynamic bus lanes, priority based on passengers, on-board vehicle mass monitoring".

The proposed projects outlined in the document are the outcome of the ITS Summit. Whilst the projects are mapped against the three pillars of safety, mobility and environment there is no measurement of progress against the criteria identified for the measurement of success, as identified in the National ITS Strategy.

The second Australian Intelligent Transport Systems Summit to progress industry input to a strategy for national ITS development was held in September 2011 with the theme 'Strategy into Action'. It brought together all ITS stakeholders − the entrepreneurs, manufacturers and users, including vehicle and component manufacturers, transport businesses and government bodies responsible for transport infrastructure. A key challenge, already identified as a potential impediment to widespread deployment, is to align technology standards among ITS producers and apply identical technical regulations across Australia's state and territory borders. The strategy for national ITS development (revised following the Summit) covers transport operations, vehicle and freight technologies, traveller information, a national ITS architecture, and the roles of academia, industry and government with an overarching objective of enhancing the nation's transport infrastructure in terms of safety, security and productivity benefits.

2.2. ITS policy in Europe

The EC-ITS Roadmap (EC-ITS, 2007) identifies the challenges and obstacles that will need to be overcome for progress to be made in research and development, and for greater commercial adoption of the technology to occur. The roadmap is set within a policy framework that identifies three major challenges in the provision of sustainable transport: reduction in congestion and optimum use of existing capacity ('Efficient'); increase in traffic safety ('Safe'); and addressing the negative impact on the environment with increasing energy efficiency and reducing dependency on fossil fuels ('Clean').

The EC-ITS Roadmap identifies a number of core ITS applications, including:

• Seamless real-time travel and traffic information, including multi-modal journey planning and information systems;