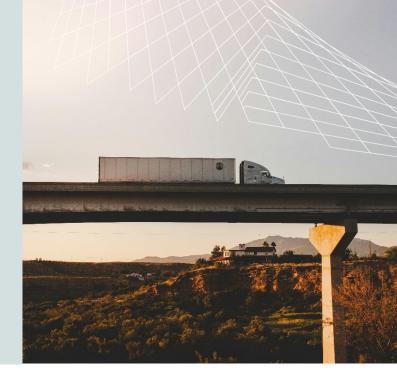PROJECTS

Economic impact of rest stops on the road freight industry

Econometric analysis of the impact of rest stops on road crashes involving heavy vehicles

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LOCATION
Sydney NSW

CLIENT
Transport for NSW

ECONOMETRICS

Background

NineSquared was engaged to develop an approach for assessing the benefits of heavy vehicle rest areas in economic appraisals.

Despite playing an important role in managing heavy vehicle driver fatigue, the economic benefits of rest areas are currently not well captured in economic appraisals. Where they are captured, approaches tend to vary from project to project, and there is limited guidance on how to capture the economic benefits of rest areas for drivers in a consistent manner.

Cost-benefit analysis (CBA) is the preferred evaluation method of the NSW Government and Transport for NSW (TfNSW) and is a required part of a business case to support funding proposals. CBA aims to measure the economic, social and environmental impacts of a particular decision on the NSW community, including individuals, firms and the government. CBA considers both qualitative and quantitative impacts of an initiative and estimates the costs and benefits in monetary terms where practicable. CBA measures the incremental costs and benefits involved in an initiative, relative to a situation without the proposed action.

To support economists in conducting CBA for TfNSW initiatives, TfNSW released an updated TfNSW Cost-Benefit Analysis Guide, which sets out standard principles, concepts, methodologies and procedures. TfNSW also released the TfNSW Freight Benefit Guidelines which provides approaches to capturing freight benefits of transport projects that accrue to freight customers to better represent these customers in planning, project development and investment decision making. The guide enhances the value-for-money case for transport projects by enabling previously under-represented or qualitative benefits to be better incorporated in economic appraisals and managed throughout the development and delivery of transport projects.

NineSquared was engaged to develop a standardised approach and guidance for quantifying the benefits of the provision of new rest areas or upgrades to existing rest areas and develop guidance to practitioners by quantifying freight benefits relating to rest areas. The team delivered a technical paper that set out the approach to develop the standardised methodology and demonstrates how the methodology can be applied. A guidance document was also prepared as a supplementary document to the Freight Benefit Guidelines.

Our role

During this engagement NineSquared was responsible for:

- Framework development, which encompassed a literature review, benefits workshop with key stakeholders within TfNSW, and the preparation of a benefits map to establish relationships between interventions and actions.

- Methodology development, which encompassed a variety of analysis to establish relationships and functions to underpin the quantification of key benefits in the standardised methodology.

- Application and documentation, which involved the practical application of the methodology to two case studies, and the development of a Guidance document to support practitioners in quantifying the benefits of rest areas.

NineSquared utilised a range of economic, econometric, spatial and data analysis techniques to develop methodologies for the quantification of productivity, safety and other benefits.

Econometric modelling techniques were used to understand the primary causes of heavy vehicle crashes, which is crucial for assessing how rest areas can improve safety. Literature on heavy vehicle crashes suggested that driver behaviour and the road environment were key risk factors that influence the likelihood of a crash. It was important, therefore, to distinguish what factors are relevant when attempting to isolate the impact of rest areas from other extraneous features.

NineSquared's approach applied a framework that directly accounts for relevant factors or proxies, to develop a framework that considers potential sources of statistical bias. Analysis of fatigue related crash locations, frequency and their proximity to the nearest rest area was conducted to inform the development of two empirical econometric regression models. The first of these explored heavy vehicle crashes on high traffic volume routes. The second examined the crashes on low traffic volume routes.

The main parameters of these empirical models were the driving distances to key rest area types to explain the percentage changes in crash frequency at a given site.

NineSquared developed a robust empirical model that ensured the effects of the independent variables (the distance to rest areas) on the dependent variable (crash rates) was unbiased and consistently estimated. Model performance assessments were also employed to determine estimation errors that indicate unbiasedness and to visualize the difference between observed crash frequencies and those predicted by the team's models to ensure that observed values provide a reasonable understanding of the trends and factors influencing heavy vehicle crash rates.

FOR FURTHER INFORMATION

For more information, find one of our experts at ninesquared.com.au/people