

## Economic Development Impacts of Connected and Automated Vehicles (CAV)

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**Abstract :** This paper will present a combination of two seemingly unrelated models, which are the one for estimating economic development impacts as a result of transportation investment and the other for increasing CAV penetration in order to reduce congestion. Measuring economic development impacts resulting from transportation investments is becoming more recognized around the world. Examples include the UK's Wider Economic Benefits (WEB) model, Economic Impact Assessments in the USA, various input-output models, and additional models around the world. The economic impact model is based on WEB and is based on the following premise: investments in transportation will reduce the cost of personal travel, enabling firms to be more competitive, creating additional throughput (the same road allows more people to travel), and reducing the cost of travel of workers to a new workplace. This reduction in travel costs was estimated in out-of-pocket terms in a given localized area and was then translated into additional employment based on regional labor supply elasticity. This additional employment was conservatively assumed to be at minimum wage levels, translated into GDP terms, and from there into direct taxation (i.e., an increase in tax taken by the government). The CAV model is based on economic principles such as CAV usage, supply, and demand. Usage of CAVs can increase capacity using a variety of means - increased automation (known as Level I thru Level IV) and also by increased penetration and usage, which has been predicted to go up to 50% by 2030 according to several forecasts, with possible full conversion by 2045-2050. Several countries have passed policies and/or legislation on sales of gasoline-powered vehicles (none) starting in 2030 and later. Supply was measured via increased capacity on given infrastructure as a function of both CAV penetration and implemented technologies. The CAV model, as implemented in the USA, has shown significant savings in travel time and also in vehicle operating costs, which can be translated into economic development impacts in terms of job creation, GDP growth and salaries as well. The models have policy implications as well and can be adapted for use in Japan as well.

**Keywords :** CAV, economic development, WEB, transport economics

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