



European
Commission

TRIMIS

TRANSPORT RESEARCH AND INNOVATION
MONITORING AND INFORMATION SYSTEM

D I G E S T

Issue 2

January 2018

**Subscribe to Free Bi-monthly
Research Alerts**

Source: Wadud, Z. (2017).

Fully automated vehicles: A cost of ownership analysis to inform early adoption.

Transportation Research Part D.

DOI: 10.1016/j.tra.2017.05.005

Available [Here](#).

The contents and views included in the TRIMIS research digest do not necessarily reflect the position of the European Commission.

The costs and benefits of automation for private and commercial vehicles



Photo credit: Fotolia

An analysis of the total cost of ownership found a clear benefit to commercial operations from automation. However, high income households will benefit more due to longer driving distances and perceived value of time, which can be used more productively throughout full automation.

Interest in the adoption of fully automated, driverless vehicles has focused mainly on private vehicles but full automation could also be beneficial for commercial vehicles. The role of early adopters in product satisfaction and its communication is crucial for the success of mass adoption. It is therefore important to understand which sectors of the road transport system are likely to adopt full automation first. However, little is known about potential adopters to full automation, especially with regard to personal and commercial vehicles.

A comparison of the total cost of ownership (TCO) of fully automated vehicles in the UK vehicles sector was conducted. This involved extending the TCO analysis by including the costs of time spent driving personal vehicles, and incorporating the potential heterogeneity in TCOs for different income groups.

A number of factors affect purchase decisions which vary between consumer and vehicle types. These include situational factors (e.g. vehicle economics, regulatory environment, vehicle performance, suitability and existing infrastructure) which are measured objectively and psychological factors are often difficult to quantify (e.g. risk perception, corporate culture and company image). Although business purchases (fleet, freight trucks) emphasise situational factors, psychological factors still have a role to play.

TCO analysis has become popular in the context of alternative powertrains for vehicles, this approach was used to compare the relative economic advantages of different competing vehicle technologies.

Read more about TRIMIS at:
<https://trimis.ec.europa.eu>

Continued/...

TRIMIS

TRANSPORT RESEARCH AND INNOVATION
MONITORING AND INFORMATION SYSTEM

D I G E S T

TRIMIS

The Transport and Research and Innovation Monitoring and Information System (TRIMIS) supports the implementation and monitoring of the Strategic Transport Research and Innovation Agenda (STRIA) and its seven roadmaps.

TRIMIS is an open-access information system to map and analyse technology trends, research and innovation capacities, as well as monitor progress in all transport sectors.

TRIMIS is developed and managed by the Joint Research Centre on behalf of the European Commission.

Contact:

European Commission
Joint Research Centre, Ispra, Italy
Email: EU-TRIMIS@ec.europa.eu

The costs and benefits of automation for private and commercial vehicles

The analysis compared costs of owning and driving fully automated vehicles with non-automated vehicles such as personal cars, taxis and trucks. It found that benefits of automation as a ratio of initial TCO, are much higher for commercial applications, and therefore it makes sense to adopt full automation earlier.

	Taxi	7.5 Tonne Rigid truck	18 Tonne Rigid truck	38 Tonne Trailer-truck
TCO current, £/year	36,729	61,888	79,785	126,925
Annualised cost of automation, £/year	2280	2800	2417	2500
Additional interest on capital, £/year	342	420	435	450
Annual fuel saving, £/year	-198	-696	-990	-2126
Driver salary reduction, £/year	-13,500	-16,500	-17,400	-19,800
Changes in TCO, £/year	-11,076	-13,976	-15,539	-18,976
% changes in TCO	-30.2	-22.6	-19.5	-15.0

Total cost ownership for fully automated commercial vehicles (UKP)

It is unclear when full automation will be available in trucks for there are logistical challenges that may need to be overcome (e.g. loading and unloading at origin and destination). Yet a shortage of skilled drivers has been reported in this sector, which indicates full automation could be attractive.

Although full automation in personal vehicles offers benefits for households in the wealthiest percentiles, these benefits are small compared to benefits for commercial taxi operations. Therefore taxis and mobility providers (e.g. private hire, on-demand vehicles) appear to be prime candidates for early adoption of full automation in smaller vehicles.

Although TCO analysis is useful in understanding potential early adopters it does not provide a complete picture as other factors are in play. Giving up the control of driving the vehicle to a computer and the acceptance of 'driverless' technologies is a key barrier to adoption. However, all things being equal, it is reasonable to propose that households or businesses with a large reduction in TCO will be willing to adopt earlier and pay more for full vehicle automation than those with a small reduction or increase in TCOs.

In conclusion, the study identified a clear benefit to commercial operations from automation due to a reduction in driver costs. Private car users from high income households will benefit more from full automation because of the higher driving distances and perceived value of time, which can be used more productively throughout full automation.