

A business model and cost analysis of automated platoon vehicles assisted by the internet of things

Junyan Chen ^a, Haibo Chen ^{a,*}, Jianbing Gao ^{a,**}, Jo-Ann Pattinson ^a, Romina Quaranta ^b

^a Institute for Transport Studies, University of Leeds, Leeds, LS2 9JT, United Kingdom

^b T-System International GMBH, Frankfurt 60528, Germany

Table S1 Details of cost structures of conventional vehicle and automated platoon vehicles for users

Cost type	Conventional vehicles	Platoon leaders	Platoon followers
Mercedes Actros 6555 12x6 Chassis cabin price	£111,600	£111,600	£111,600
Car depreciation rate	Details in Table S2	Details in Table S2	Details in Table S2
Registration	£2135 ¹	£2135 ¹	£2135 ¹
Insurance	£10000/ year ²	£10000/ year ²	£10000/ year ²
Vehicle tax/ first five years	£465 ¹	£465 ¹	£465 ¹
Vehicle tax/ following year	£145 ¹	£145 ¹	£145 ¹
Cleaning price	£41.15/ time ³	£41.15/ time ³	£41.15/ time ³
Monthly cleaning frequency	2 ⁴	2 ⁴	2 ⁴
Car maintenance	Details in Table S3	Details in Table S3	Details in Table S3
Fuel price	£ 1.28/ L	£ 1.28/ L	£ 1.28/ L
Fuel economy	37L/ 100km ⁵	37L/ 100km ⁵	37L/ 100km ⁵
Fuel saving	--	5%	10%
Average driving distance of motorists in the UK	46353 miles/ year ^{6 7}	46353 miles/ year ^{6 7}	46353 miles/ year ^{6 7}
Traffic fines	Assumption £140/ year	--	--
Navigation and security	--	£400/ year ⁸	£400/ year ⁸
Platoon service	--	Assumption £50/ year	Assumption £50/ year
AD package price (Year 2017)	--	£100,000 ⁹	£100,000 ⁹
AD package depreciation rate	--	The same as vehicle	The same as vehicle
AD package maintenance	--	Percentage is the same as vehicle	Percentage is the same as vehicle
Monthly income/ cost	--	Assumption + £200	Assumption - £100

Table S2 Car depreciation rate ¹⁰

Year	1	2	3	4	5	6	7	8	9	10	11	12
Rate	21.5%	6.4%	13.6%	8.0%	6.0%	4.0%	7.0%	4.5%	3.5%	4.5%	3.5%	3.5%

Table S3 Details of car maintenance fee ¹¹

Items	Value
Oil and filter change	£60/ 6000 miles
Tire rotation	£35/ 3500 miles
Wiper blade replacement	£11/ 9 months
Engine air filter replacement	£47/ 40000 miles
Brake pad replacement	£250/ 40000 miles
Tires replacement	£800/ 6 years

Table S4 National and international annual road freight transport in 2018 ¹²
UNIT: Million tonne-kilometre (TKM)

GEO/TIME	National (TKM)		International (TKM)
	Total	Less than 50 km	Total
Belgium	20,592	1,530	6,084
Bulgaria	7,734	1,013	3,775
Czechia	23,543	4,943	7,385
Denmark	12,069	1,223	1,451
Germany	276,151	32,382	18,317
Estonia	1,686	282	1,162
Ireland	9,401	1,624	813
Greece	15,392	2,893	7,154
Spain	158,476	13,937	42,073
France	161,941	16,525	5,006
Croatia	4,235	640	2,673
Italy	111,741	6,941	5,807
Cyprus	865	339	19
Latvia	3,459	700	2,683
Lithuania	3,642	419	4,954
Hungary	12,979	1,544	7,404
Netherlands	33,814	5,921	16,212
Austria	16,914	4,584	3,515
Poland	114,692	10,539	61,783
Portugal	10,530	1,350	7,725
Romania	14,358	1,841	9,926
Slovenia	2,256	641	5,392
Slovakia	6,477	1,237	8,433
Finland	25,970	2,271	980
Sweden	40,662	4,389	836
United Kingdom	151,973	7,742	3,192
Norway	18,974	2,671	1,133
Switzerland	10,716	3,665	512

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