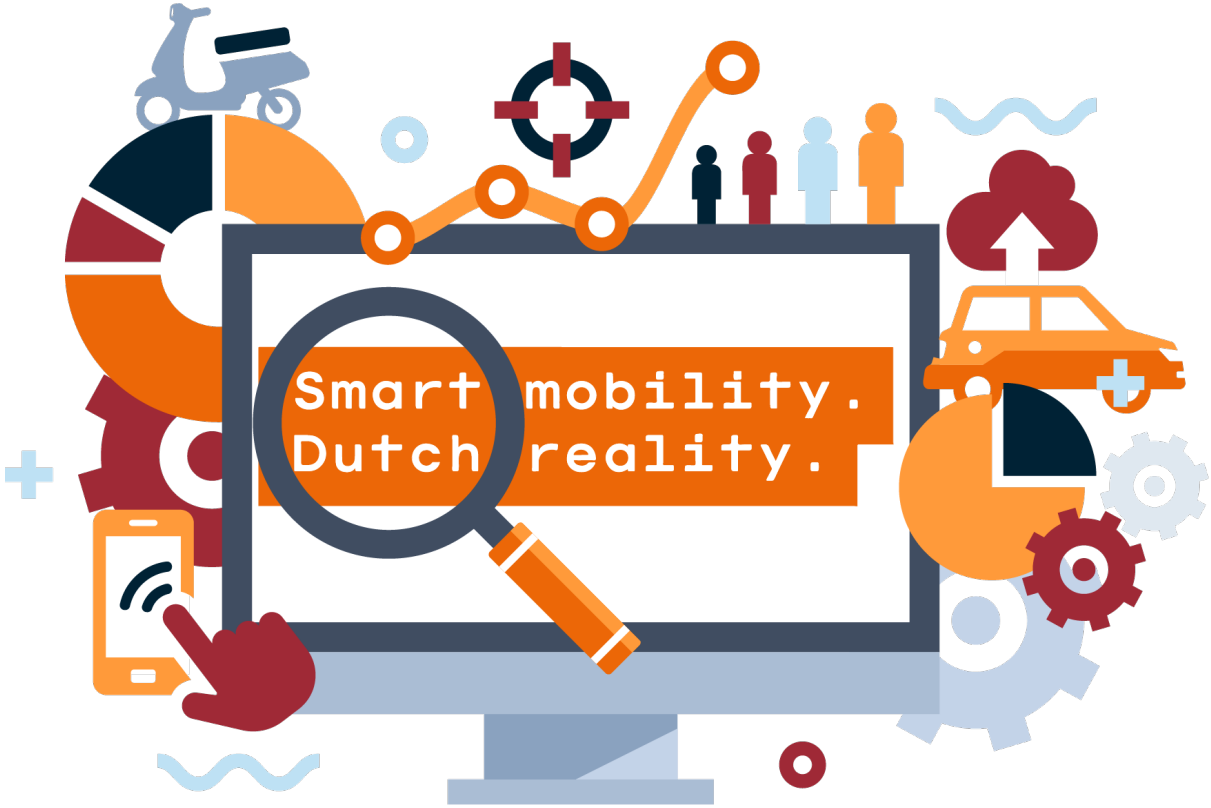
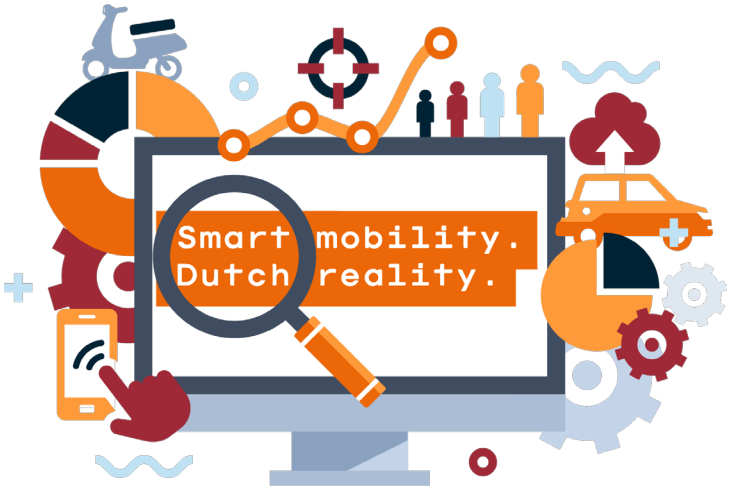
Ministry of Infrastructure
and Water Management



Smart Mobility Monitor 2025

Full English version

Smart Mobility Monitor 2025



This is the third edition of Smart Mobility Monitor. This monitor provides an overview of the latest trends, developments, and applications in the world of smart mobility.
We started mapping these smart mobility trends, developments, and applications in 2023, and each year we look at the current state of affairs. In terms of applications, these include advanced driver assistance systems (for example lane assist), up-to-date in-car travel and route information, and shared mobility services.

Innovations by market players and laws and regulations, especially within Europe, mean that smart digitalization and automation solutions can no longer be ignored in our mobility system. Road users today use many applications. This monitor provides insights into the following three categories:

- Vehicle automation
- Traffic management and information services
- Mobility services

Various themes

The three categories are discussed in this monitor through a number of recurring themes: the 'availability', 'use', and 'effects' of smart mobility applications. We also provide the first insights into costs and benefits in this edition.
The subsections on availability highlight the concrete applications that are currently offered and the expected growth of these applications. The 'use' subsections show the extent to which these applications are used by drivers, the level of knowledge, and how users rate these applications. The monitor also highlights what is already known about the effects of applications. For example, the safety effects and potential distractions of driver assistance systems and navigation services.
The costs and benefits of the services offered to consumers and public authorities are also examined. This should be seen as an initial, global view, providing insight into costs and benefits, including costs for hardware, software, data storage, management, maintenance, apps, subscriptions, etcetera, as well as returns in the form of efficiency, safety, comfort, travel security, sustainability, etcetera.

Data-based policy decisions

With the insights from the Smart Mobility Monitor, public authorities at all levels can increasingly make policy decisions on smart mobility applications based on facts and figures. The monitor provides opportunities to encourage positive trends or, conversely, to intervene in undesirable developments. Taking advantage of these opportunities helps make the mobility system safer, more sustainable, and more efficient, with more quality for travelers.

The source of the information given is indicated at the bottom of most pages. A source reference with, if possible, a link to the relevant document is included after each smart mobility category. These documents are only available in Dutch, but in some cases they do contain an English summary. The last page of the Smart Mobility Monitor includes a list of abbreviations used.

Contents

Vehicle automation

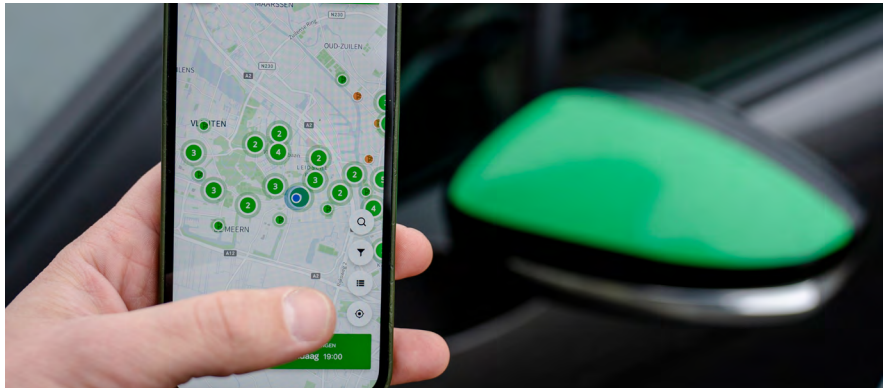
The vehicle automation category focusses on smart mobility applications that support and sometimes partially execute the driving task or parts thereof. They are generally developed to improve road safety or driving comfort. The level of automation in vehicles varies from vehicle to vehicle, but in all cases, it is becoming increasingly sophisticated.
In the future, systems will therefore be able to take over driving tasks from the driver more and more. The speed of this development is difficult to predict. Also, potentially negative effects (as a result of increasing use) only come to the surface later, giving additional cause for monitoring. In this monitor, we limit ourselves to driver assistance systems and do not address fully automated driving systems (ADS), as these vehicles were not yet driving on Dutch roads during the monitoring period.

Traffic management & information services

Traffic management increases the safety, flow, and reliability of the road network. Traffic management addresses incidents, road works and effective control of icy conditions amonst other things.
In addition, traffic management can play a role in optimizing the use of tunnels, bridges, and rush-hour lanes. Automation and digitization play a major role in many of these tasks. This includes physical assets, such as variable message signs above the road indicating the speed limit and closed lanes. Road users also receive quick, targeted in-car information on current situations and applicable traffic rules via various information services.

Mobility services

Mobility services in this monitor focus mainly on shared mobility. Shared mobility is an overarching term for all means of transportation available to multiple users, where the user is also the driver, but not the owner of the means of transportation. This includes shared bicycles, mopeds, and cars. Encouraging shared mobility is particularly aimed at keeping the city and region livable and accessible, and helps enable urban building projects.



Vehicle automation

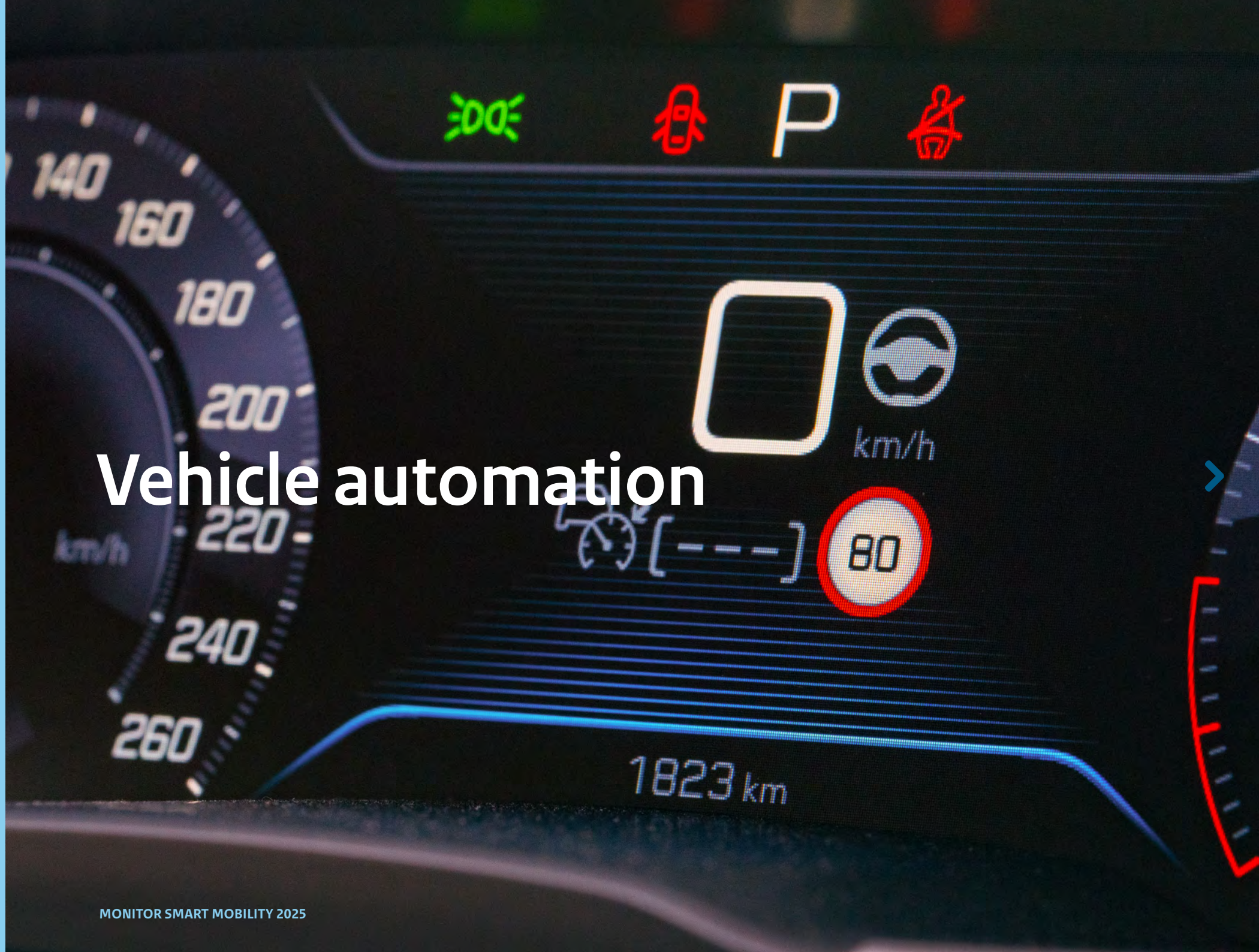


Figure 1: Selection from ADAS Dictionary www.adasalliantie.nl

Category	Name driver assistance system	Abbreviation system	Dutch name	Brief description	Mandatory in new vehicles	Turned on when car starts
(Adaptive) speed and distance assistance systems	Intelligent Speed Assistance (advisory)	ISA	Intelligent Speed Assistant (informative)	Informative: displays the speed limit to the driver. Advisory: alerts the driver when the vehicle exceeds the speed limit. Limiting: limits the speed of the vehicle to the current speed limit when exceeded.	Yes, from 7 July 2024	Yes
	Adaptive Cruise Control	ACC		Automatically maintains distance from the vehicle in front and reduces speed if it detects that the vehicle in front is getting too close.		
	Cruise Control	CC		Provides the ability to lock the vehicle's speed so that the accelerator can be released.		
	Speed Control Function	SCF	Speed limiter	Ensures that the vehicle does not travel faster than the speed limit set by the driver.		
	Speed Limit Information Function	SLIF	Speed limit recognition	Displays traffic signs with speed limit on a screen in the vehicle and warns the driver when they are exceeded.		
Emergency braking systems	Anti-lock Braking System	ABS	Anti-lock Braking System (ABS)	Ensures wheels do not lock during braking.	Yes, from 1 July 2004	Yes
	Autonomous Emergency Braking	AEB	Autonomous emergency braking system	Intervenes in the event of danger by bringing the vehicle to a stop using emergency braking. Automatically delivers maximum braking force when the driver brakes.	Yes, from 7 July 2024	Yes
Lane supporting systems	Lane Keep Assist	LKA	Lane assist	Provides steering corrections and/or a warning when lane departure is unintended.	Yes, from 7 July 2024	No
	Lane Departure Warning	LDW		Warns when the lane is unintentionally departed from without using the direction indicator.	Yes, from 7 July 2024	Yes
	Emergency Lane Keeping	ELKS		Actively steers to keep the vehicle in the lane.	Yes, from 7 July 2024	Yes
	Lane Centering	LC		ps vehicle in the center of the lane.		
	Autonomous Emergency Steering	AES		Detects an imminent collision that cannot be avoided by braking and actively intervenes by operating the steering wheel to avoid obstacles.		
Monitoring systems: environment	Forward Collision Warning	FCW		Warns of impending collisions.	Yes, from 7 July 2024	Yes
	Blind Spot Warning	BSW	Blind spot warning	Warns the driver with a light signal, usually in or near the side-view mirror, when the vehicle is overtaking or being overtaken.		
	Rear Collision Warning	RCW		Detects the area behind your vehicle and warns of a possible collision.		
Monitoring systems: vehicle and occupants	Driver Drowsiness and Attention Warning	DDAW	Driver drowsiness and attention warning	Recognizes driver fatigue and issues a warning signal or intervenes by means of a controlled stop.	Yes, from 7 July 2024	Yes
	Advanced Driver Distraction Warning	ADDW	Advanced distraction warning	Recognizes driver distraction and issues a warning.	Yes, from 7 July 2026	Yes
	Rearview Camera	RC	Rearview camera	Provides a view of the area behind the vehicle using cameras or parking sensors.	Yes, from 7 July 2024	Yes
Parking assistance systems	Assisted Parking		Parking assistant	Steers automatically when parallel parking, the driver only has to accelerate and brake.		
	Remote Control Parking	RCP		Independently parks the vehicle in a parking space under driver supervision.		
Information systems	Traffic Sign Recognition	TSR	Traffic sign recognition	Displays road signs on a screen in the vehicle.		
	Navigation Systems		Navigation system	Displays instructions (visual and/or auditory) along the route to be taken to a destination.		
A combination of: • (adaptive) speed and distance assistance systems; • lane support systems; • monitoring systems	Driver Control Assistance System	DCAS		The collective name for a highly advanced driver assistance system that supports the driver in braking, accelerating, and steering while a system (DMS) monitors the driver to see if they are watching the road.		

This is A SELECTION OF a carefully compiled review by the ADAS Alliance. The total overview can be found at www.adasalliantie.nl. The content is based on collected available data, but this does not guarantee that the information is complete or error-free. No rights can therefore be derived from the ADAS Dictionary 2025. The ADAS Alliance is open to additions via www.adasalliantie.nl

Source 4: ADAS Alliance - ADAS dictionary (2025)

Notable vehicle automation insights

Availability

The penetration (adoption) of driver assistance systems in the vehicle fleet will be accelerating from now on, partly due to the European constraints of some driver assistance systems. The penetration rate depends partly on the numbers of new sales (now rising again after a decline in 2021 and 2022), the share of electric vehicles (35% of new sales in 2024), imports/exports, and a growing average vehicle age (11.7 years in 2024). On average, there are 9 driver assistance systems in newly sold passenger cars in 2024 (8.3 in 2023). The number of driver assistance systems in vans has increased from 2.7 (2023) to 5.0 (2024) per vehicle. Trucks have the highest number of driver assistance systems per vehicle, at 14.6 (10.9 in 2023).

Use

Most car users know which driver assistance systems are in their vehicle. But about 30% think they do not have a system when they do, and just over 30% think they have a system when they do not. These percentages are similar to previous years. The proliferation of systems, the failure of some vehicle manufacturers to share information about the driver assistance systems present, and the (sometimes confusing) naming play a part in this.
Knowledge of driver assistance systems and the correct behavior when using them has increased slightly compared to 2023. This applies to people who own cars and to those who rent or borrow a car.
Many users expect systems to perform the same anytime, anywhere, while there are constraints with regard to, for example, road conditions, weather conditions, and speeds.

Effect

The safety effects of vehicles equipped with driver assistance systems are predominantly positive. There are proportionally fewer traffic accidents caused by vehicles with driver assistance systems.
Systems such as ACC and CC, which maintain speed, do increase the risk of traffic accidents. However, combined use of driver assistance systems can again reduce the risk of traffic accidents. In addition, the use of ACC can lead to longer headways, more forceful braking, and slower acceleration, negatively affecting traffic flow.

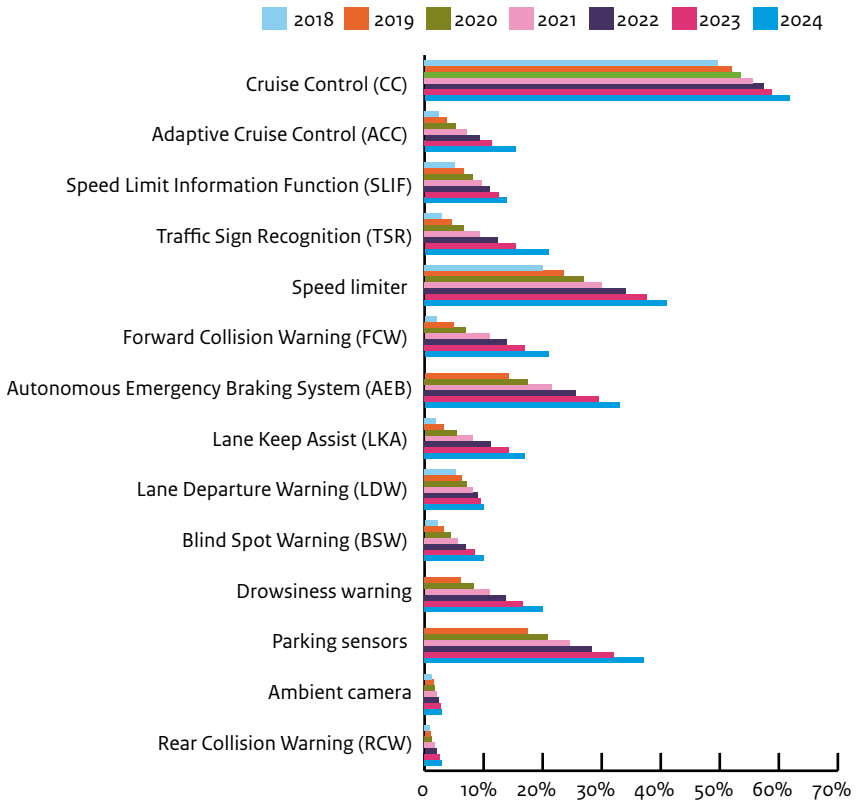
Costs

The cost of vehicle automation to consumers is difficult to determine. Increasingly, driver assistance systems are fitted as standard or offered in packages, making them difficult to separate from the purchase price. Package prices of driver assistance systems vary between 1% and 5% of the purchase price. The increasing complexity of vehicle automation in particular is affecting repair costs and insurance premiums. It is unclear to what extent this is compensated by a lower risk of accidents.

The share of driver assistance systems in the passenger car fleet

The percentage of vehicles equipped with driver assistance systems continues to grow annually, by up to about 4%. We see this in new sales as well as in the total fleet. We now see that approximately 62% of all passenger cars have cruise control, 41% a speed limiter, and 33% an autonomous emergency braking system.
The requirement for the presence of certain driver-assistance systems in new cars from July 2024 is expected to ensure further growth of driver-assist systems in the fleet.

Figure 2: percentage of driving assistance systems in passenger car fleet



Source 1: RWS - Survey of driving task support systems (ownership, use, valuation, and knowledge level) (2024)
Source 2: RWS - Driving task automation monitor (ownership, awareness, use, and knowledge level) (2024)

The average number of driver assistance systems per vehicle is increasing

Since July 2024, more driver assistance systems are mandatory in passenger cars, vans, and trucks. This is clearly reflected in the average number of driver assistance systems per new vehicle sold:

- For passenger cars, this number has increased from 8.3 in 2023 to 9.0 in 2024. The transition to more electric vehicles (EVs) (35% of new sales in 2024) also contributes to this. On average, there are more systems in EVs than in gas and diesel cars.
- Previously, vans had few driver assistance systems. In 2023, they had an average of 2.7 per vehicle. This increased to 5.0 per vehicle in 2024. In addition to the mandatory driver assistance systems, the faster replacement market and electrification of the van fleet also play a role here.
- Starting with the first measurement in 2019, we see that trucks have the highest average number of driver assistance systems compared to passenger cars and vans. Last year, we saw an increase from 10.9 in 2023 to 14.6 in 2024.
  Trucks and vans are also relatively new compared to passenger cars; the average age of a truck is 8.8 years and of vans 9.1 years. The average age of passenger cars in the Netherlands is 11.7 years (RAI). The commercial benefits of driver assistance systems in trucks, through for example reduced driver load, more efficient routing, and more efficient consumption, has presumably led to their faster increase.

Figure 3: average number of driver assistance systems per new vehicle sold by year of manufacture

	Passenger car	Van	Truck*
2019	5.7	1.5	9.1
2020	6.9	2.0	10.3
2021	7.6	2.2	10.6
2022	8.0	2.4	10.7
2023	8.3	2.7	10.9
2024	9.0	5.0	14.6
* truck is indicative			

Source 3: RWS - Development of ADAS in trucks and vans (update 2024) (2025)
Source 10: RWS - ADAS passenger car, van, and truck Monitor (online dashboard) (2025)

Forecast of penetration rate of mandatory driver assistance systems

From 7 July 2024, a number of driver assistance systems, with the following designation, will be mandatory in all newly sold passenger cars based on EU regulations:

- Emergency Lane Keeping System (ELKS),
- Driver Drowsiness and Attention Warning (DDAW),
- Intelligent Speed Assistant (ISA),
- Reverse detection (via camera or sensors) (RC),
- Autonomous Emergency Braking Systems (AEB),
- Advanced Driver Distraction Warning (ADDW). The advanced driver distraction warning is only mandatory in new vehicle types from 7 July 2024 and only in new cars from 7 July 2026.

In recent years, studies have been conducted regarding ADAS Trend Analyses and the development in the penetration rate of driver assistance systems. In it, the following systems and subsystems were studied based on the definitions in place and the data available at the time: drowsiness warning, ISA, Lane Keep Assist, parking sensors, reversing camera, and AEB. Although the systems and subsystems studied do not fully match current definitions, the study results do provide a useful forecast of the penetration of driver assistance systems required by EU regulations.

Partly as a result of the aforementioned (EU) regulations and technical innovations, we can expect further growth of driver assistance systems in passenger cars. The average number of driver assistance systems in newly sold passenger cars has doubled in six years. By 2024, there were an average of nine driver assistance systems in a passenger car.
The adoption of driver assistance systems that have been made mandatory in new vehicles in Europe is faster than systems that have not been made mandatory. The chart shows the forecast of the adoption of these mandatory systems. A large proportion of new cars sold in recent years already had one or more of these systems (notably autonomous emergency braking systems and parking sensors). ISA did not exist in accordance with the latest definitions until recently, which means that not many cars are equipped with this system today. This current forecast is an update of the 2021 forecast. Overall, the rate of adoption has been revised downwards slightly. There are a number of factors for this, including the price of driver assistance systems, the expected added value of a system, the perceived reliability of a system, operation, maintenance costs, and longer vehicle life.

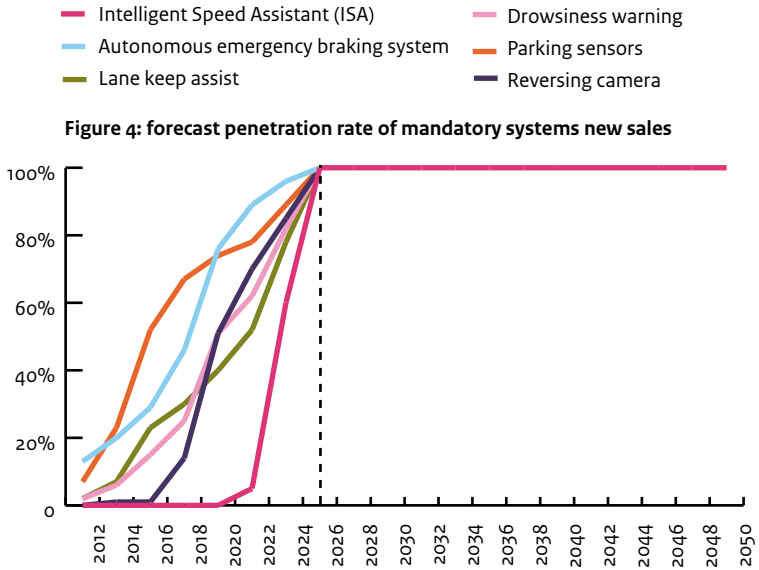


Figure 4: forecast penetration rate of mandatory systems new sales

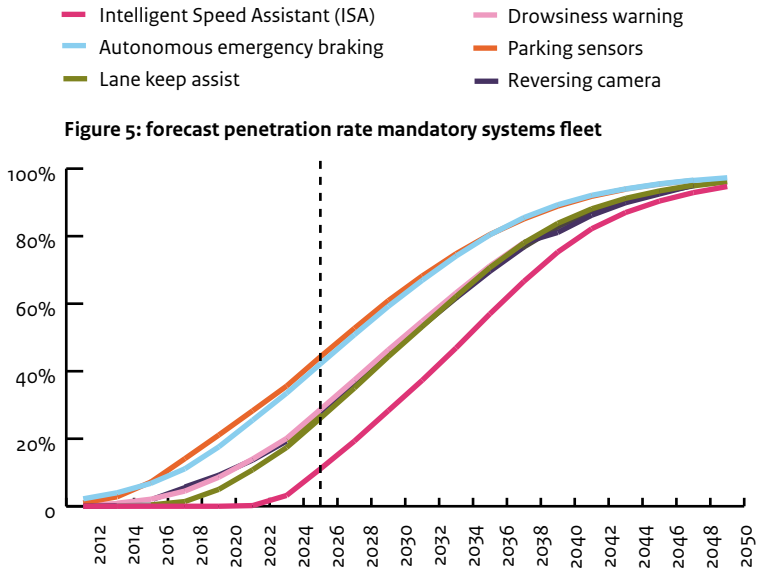


Figure 5: forecast penetration rate mandatory systems fleet

Source 8: RWS - Current state of affairs regarding ADAS penetration rate: update on expected development (2024)

Forecast of penetration rate of non-mandatory driver assistance systems

For non-mandatory systems aimed at longitudinal control of a vehicle (type A), parts of the fleet will have the following systems by 2050: 90% adaptive cruise control (ACC) and 95% cruise control (CC). In 2040, the distribution is more widespread, with the share of CC estimated at 9 out of 10 vehicles, while that of ACC is around 7 out of 10 vehicles. This is a direct result of the fact that CC has been present in a large share of the fleet for quite some time (in 2012, it was already over 60% in new sales and 30% in the fleet).
For the non-mandatory systems aimed at lateral control of the vehicle and special maneuvers (type B and E), the development within the fleet is similar. Adoption of blind spot warning is a little faster and adoption of the ambient camera a little slower. This is directly related to the current share of new sales. This applies with the exception of Lane Departure Warning. This system is growing towards 100% in the fleet, as its functionality is carried over into Lane Keep Assist. A long period with a so-called mixed fleet, in which vehicles drive around with and without certain driver assistance systems, should be taken into account.

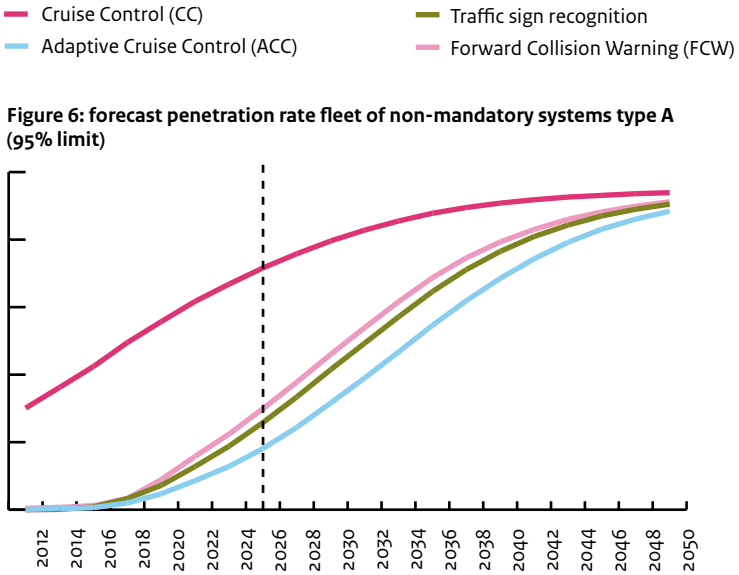


Figure 6: forecast penetration rate fleet of non-mandatory systems type A (95% limit)

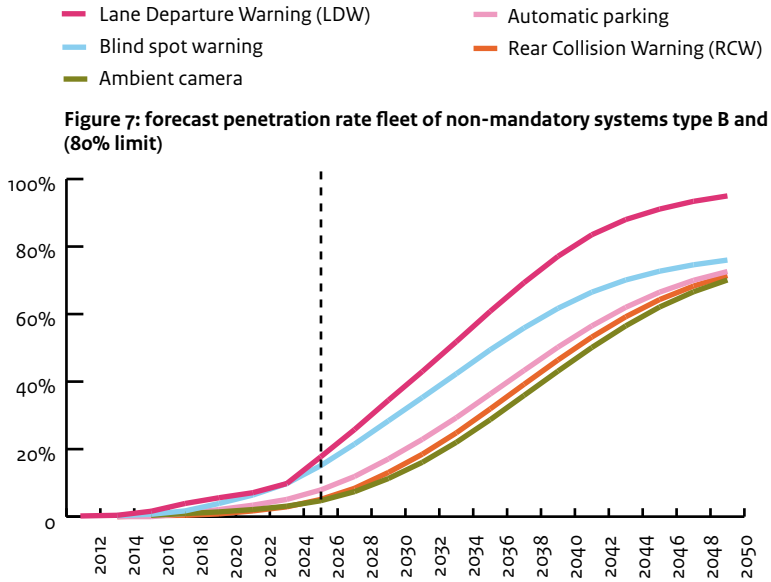
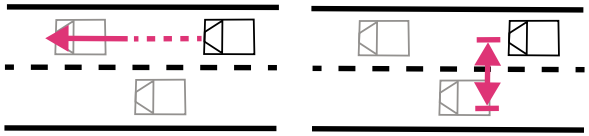


Figure 7: forecast penetration rate fleet of non-mandatory systems type B and E (80% limit)

Figure 8: longitudinal (braking, acceleration) and lateral (steering) driving behavior



Source 8: RWS - Current state of affairs regarding ADAS penetration rate: update on expected development (2024)

Objective and self-reported presence of driver assistance systems in newly sold passenger cars

The figure shows the (objective) presence of the driver assistance system, in total number of newly sold passenger cars by type of driver assistance system. The figure also shows the car owner's self-reported (subjective) knowledge about the presence of the system.
The difference between the objective presence of a system in a vehicle and the self-reported presence by the car owner is called the 'presence gap'.

Based on the table, we have an indication of how big the presence gap by system is in 2024. This means the system is present in the car, but the user of the car is unaware of the fact. The survey was able to establish this for 14 systems and over 3,200 respondents. In 71% of cases, the self-reported presence of a system matches the objective presence. In 2022, this was 73%. This means car owners in 2024 are slightly less aware of what systems are in their vehicles. People are also slightly less likely to know which systems are not in their vehicles; this corresponds to objective absence in 71% of cases (it was 75% in 2023). This has made the presence gap slightly larger than in 2023. Reasons for this may be the growth in the number, complexity, and designations of driver assistance systems.

Part of such a presence gap is caused by an underestimation of systems present in the underlying data of the ADAS Dashboard (VMS | Insight). This is partly because it is unknown for all car brands which systems are purchased as an option. Records of objective presence show, falsely, that a system is not present, while the car owner says they do have the system. People can also make mistakes in systems. For example, someone (objectively) has Lane Keeping, but indicates they have Lane Departure Warning. Both systems result in a mismatch with the objective presence and absence of systems. The non-uniformity of the naming and functionalities of the same systems between different car brands also plays a role.

Figure 9: objective and self-reported presence of driver assistance systems in newly sold passenger cars

	Objective				Self-reported		
Driver Assistance Systems (ADAS)	2020	2022	2023	2024	Present	Given objective	Use/on
Cruise control	58%	59%	61%	59%	86%	92%	93%
Adaptive cruise control	33%	40%	44%	47%	51%	92%	95%
Speed limit recognition					63%		87%
Traffic sign recognition	47%	55%	65%	67%	35%	49%	93%
Warning ISA					38%		85%
Speed limiter					57%		68%
Forward collision warning	59%	71%	77%	72%	58%	84%	95%
Autonomous emergency braking system	73%	83%	89%	92%	47%	66%	95%
Lane keep assist	45%	55%	68%	71%	55%	86%	76%
Lane departure warning	18%	19%	16%	11%	59%	74%	78%
Emergency lane keeping					35%		83%
Lane centering					25%		85%
Blind spot warning	21%	28%	28%	35%	37%	86%	97%
Driver drowsiness warning	47%	55%	61%	63%	34%	55%	90%
Distraction recognition					12%		86%
Navigation system					65%		78%
Traffic information					54%		89%
Parking sensors	72%	76%	80%	85%	85%	98%	94%
Ambient cameras	5%	7%	7%	10%	57%	91%	96%
Assisted parking					20%		72%
Remote control parking	13%	12%	14%	17%	11%	18%	75%
Rear collision warning	5%	8%	8%	14%	36%	77%	94%

Present = self-reported presence in whole sample (n=3,200).
Given objective = share that claims to have system, given that it is objectively present.
Use/on = share that claims to use or have the system on (sometimes).

Source 1: RWS - Survey of driving task support systems (ownership, use, valuation, and knowledge level) (2024)

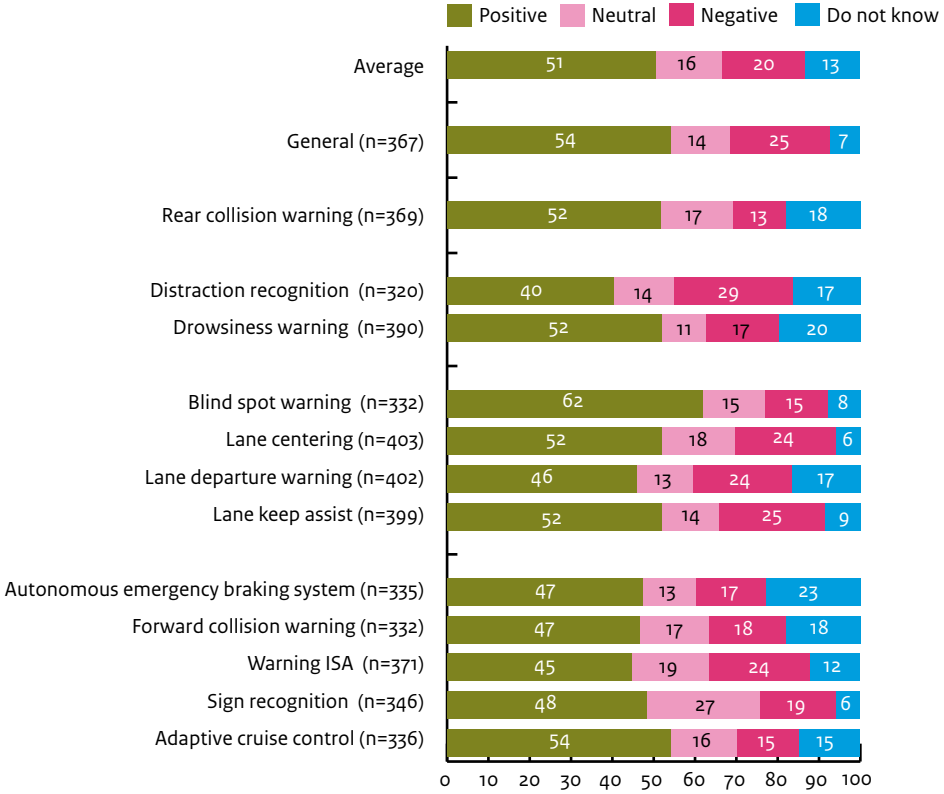
Knowledge level regarding operation and scope of driver assistance systems

The level of knowledge (understanding) of driver assistance systems was tested by presenting drivers with a number of statements. This way, we could indirectly get an indication of whether knowledge about a driver assistance system is positive (sufficient understanding) or negative (still lacking understanding). The response appropriate to the level of knowledge desired for the system was determined in advance for the statements presented.

About 50% of drivers show a positive knowledge level of the operation and scope of the driver assistance system, on average across all driver assistance systems. For distraction recognition, the share is 40% and for blind spot warning it is 62%. With this, the study shows that drivers do not always have the right knowledge of the operation and scope of these systems. In many cases, respondents show a better score for behavioral statements (how people use the systems in practice) than for knowledge statements (to what extent they are aware of how a system works). For example, people say they show the right behavior in practice more often than the score on the knowledge statements indicates.

On average, the knowledge level (of the same systems) has increased to 51% in 2024 (45% in 2023). This percentage varies per individual system.

Figure 10: knowledge level per driving assistance system (ADAS) and total (rounded in percent) (2024)

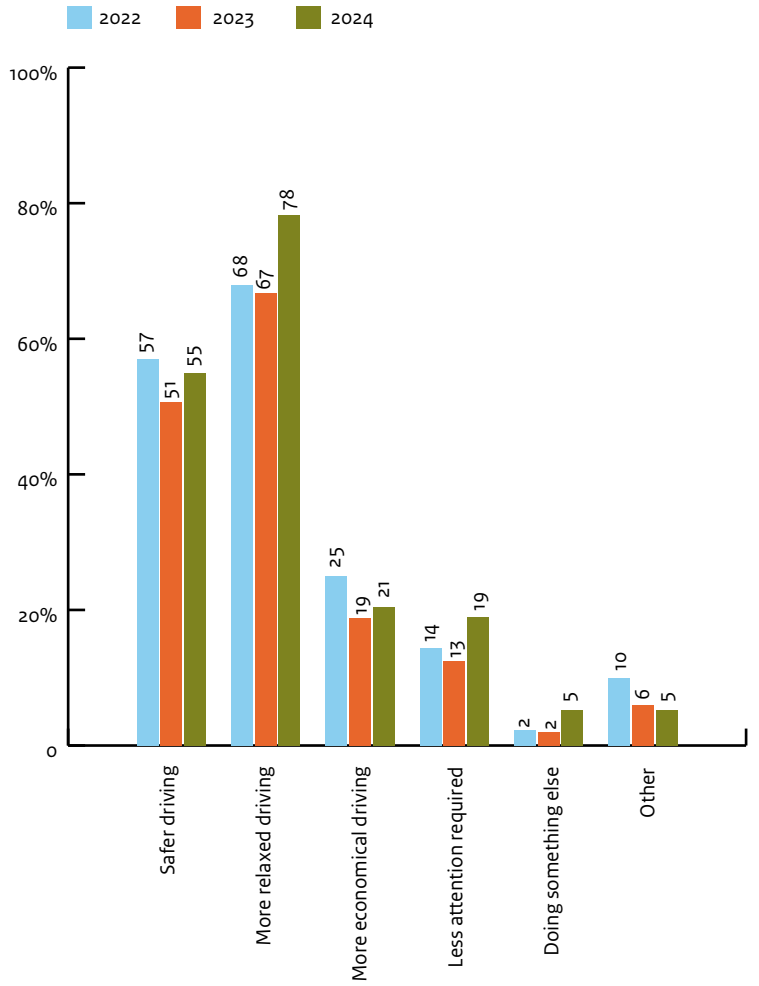


Source 1: RWS - Survey of driving task support systems (ownership, use, valuation, and knowledge level) (2024)

Reasons for using adaptive cruise control and lane centering simultaneously

Drivers may perceive the simultaneous use of adaptive cruise control and lane centering as a form of automatic driving, but it is not. Legally, the driver is still fully responsible for performing the dynamic driving task and the driving assistance systems are only there for support.
Of the nearly 800 people who took part in the study and have both ACC and Lane Centering (LC), almost 90% used these systems simultaneously at some point in 2024. In 2022, this was 85%.
More respondents in 2024 say it makes them drive more safely (55%) and more relaxed (78%) than in 2023 (51% and 67% respectively).
However, in 2024, 19% of respondents also indicated that they themselves would need to pay less attention when using these systems simultaneously. And 5% see an opportunity to do something else (such as consulting a phone) while driving as a result. This means the simultaneous use of ACC and LC can lead to unsafe situations in case of incorrect expectations.
Incidentally, driver monitoring systems, mandatory since 2024, (hands-on-the-wheel sensor, eyes-on-the-road camera) ensure that the driver shows the correct behavior.

Figure 11: reasons for using adaptive cruise control and lane centering simultaneously



Source 1: RWS - Survey of driving task support systems (ownership, use, valuation, and knowledge level) (2024)

Sourcing information on the operation of driver assistance systems

Most people say they have enough information about how the systems work. However, there is a difference in how people are informed and the preferred source of information. The results for 2024 are similar to previous studies.

Figure 12: received information on driver assistance systems for car

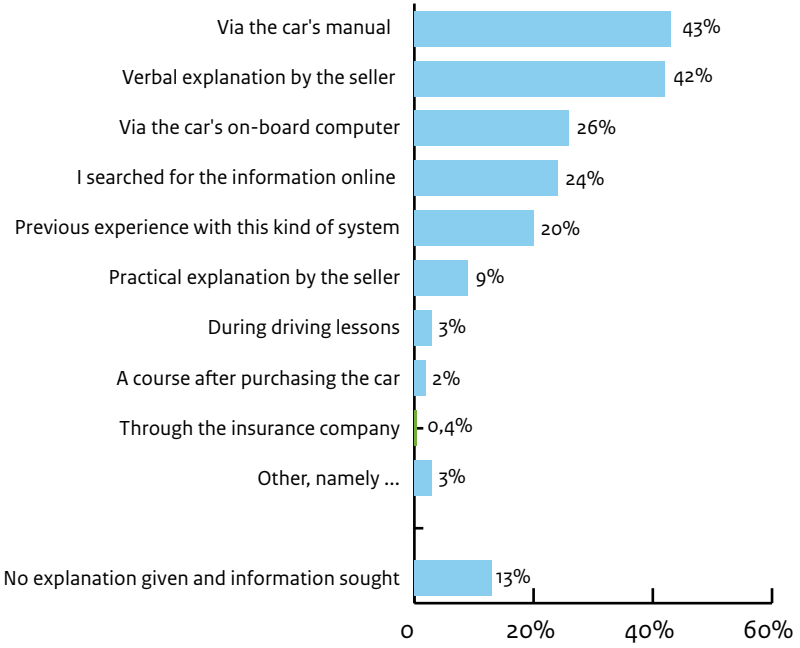
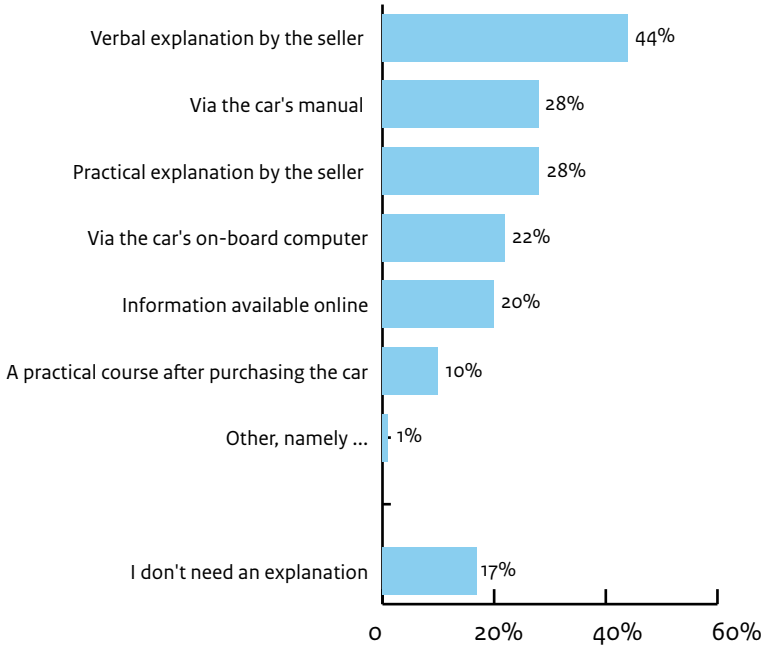


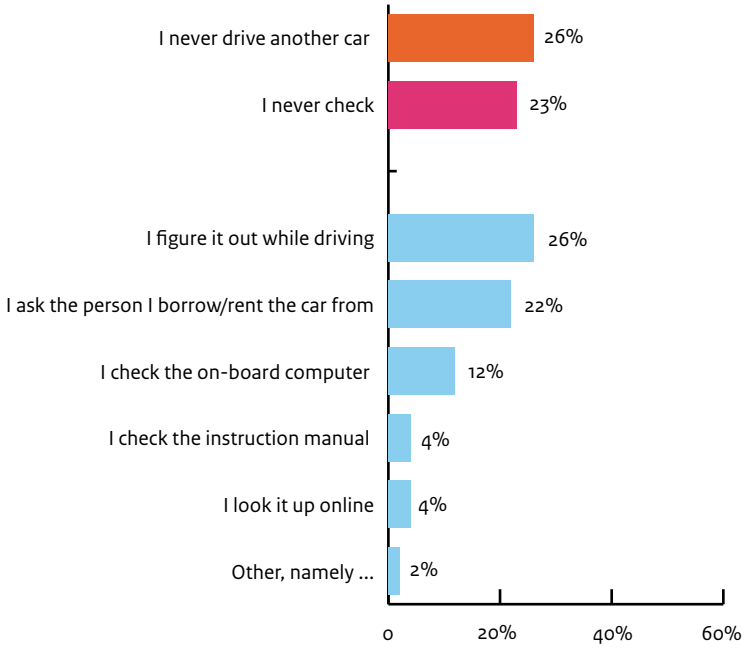
Figure 13: user-requested explanation of driver assistance systems



Source 1: RWS - Survey of driving task support systems (ownership, use, valuation, and knowledge level) (2024)

Three quarters of drivers sometimes drive a car other than their own, such as a rental, loan or shared car. Of these drivers, over a quarter say they figure out what systems are present and how to operate them while driving. A slightly smaller group never checks this (23%). 22% ask the car rental company, for example. Lacking the right level of knowledge as indicated earlier can lead to unsafe behavior.

Figure 14: how do drivers inform themselves about driver assistance systems when using another car than their own?

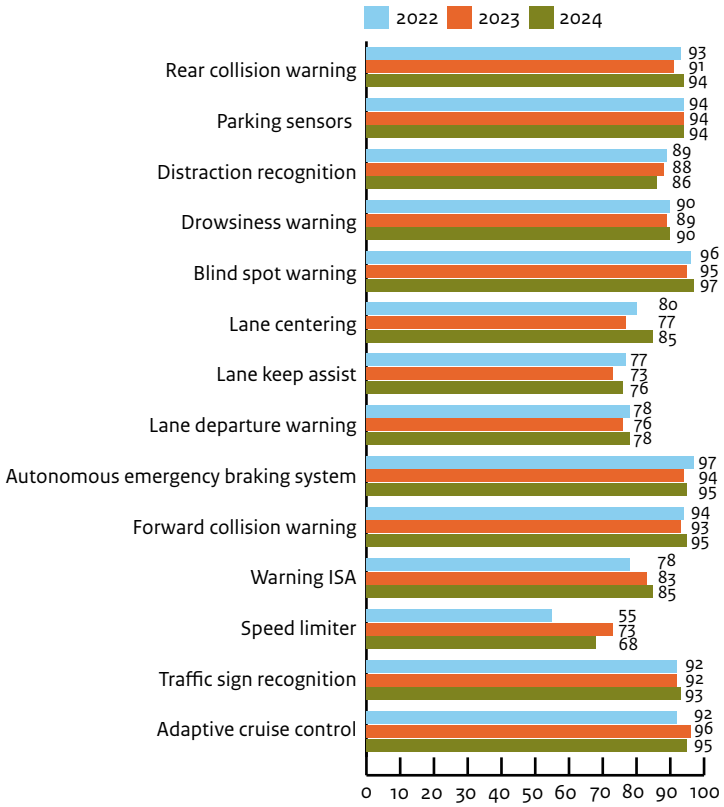


Source 1: RWS - Survey of driving task support systems (ownership, use, valuation, and knowledge level) (2024)

Most car owners use their driver assistance systems

Almost 90% of car users say they (sometimes) use the driver assistance systems available to them. On average across all systems, this usage is up by 2% in 2024 compared to 2023 and remains as high as ever. The use of LC has increased most (8%). Among the other driver assistance systems, the difference compared to last year is limited. Driver assistance systems that determine the lateral position (LDW, LKA, and LC), warning ISA, and the speed limiter are the least switched on/engaged relative to the other systems, but an increase can be seen there as well compared to the previous year (except for the speed limiter).

Figure 15: share of driver assistance systems used, on or switched on (self-reported, in percent)



Source 1: RWS - Survey of driving task support systems (ownership, use, valuation, and knowledge level) (2024)

Use of speed-related driver assistance systems varies by road type

The graph shows the share of kilometers driven in which speed-related driver assistance systems are used on which type of road. Drivers use both ACC and the warning ISA most often on motorways, followed by provincial roads. The use of these speed systems has increased compared to 2023 (max. 9%). The use of warning ISA increased by 5%-8% in 2024 for all road types.

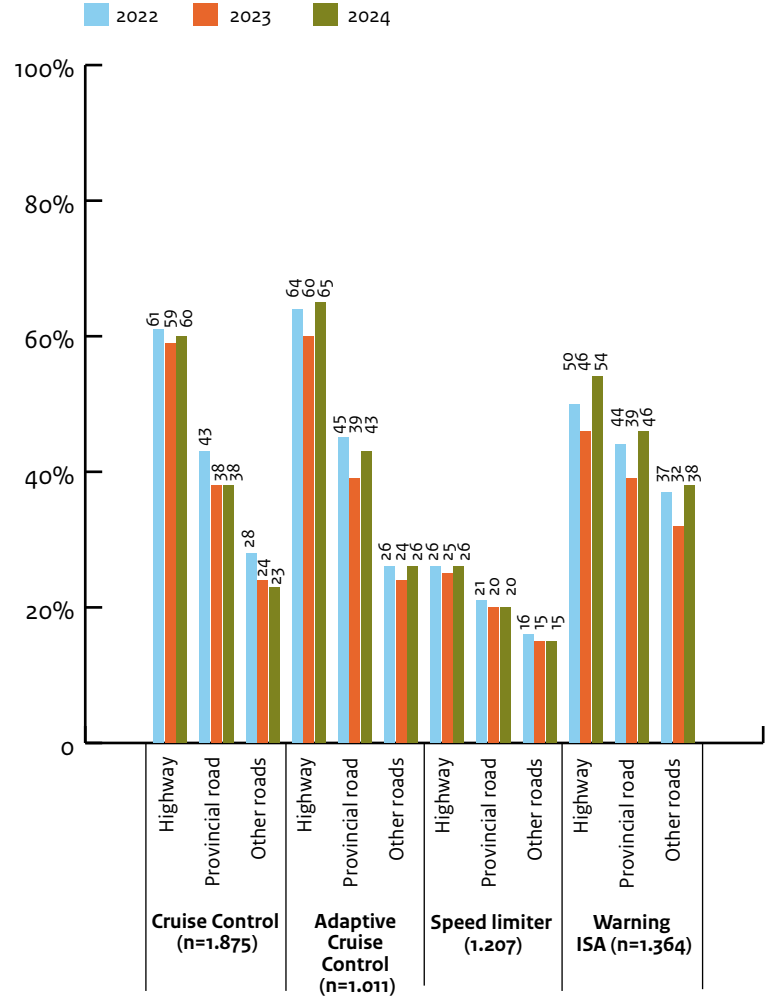
Intelligent Speed Assistance (ISA)

Since 7 July 2024, ISA has been a mandatory driver assistance system that helps drivers stick to the current speed limit. There are several types of ISA systems:

1 Informative: displays the speed limit to the driver.
2 Warning: alerts the driver when the vehicle exceeds the speed limit.
3 Limiting: limits the speed of the vehicle to the current speed limit when exceeded.

The warning version of ISA is the minimum mandatory type.

Figure 16: use of speed-related driver assistance systems, broken down by type of road



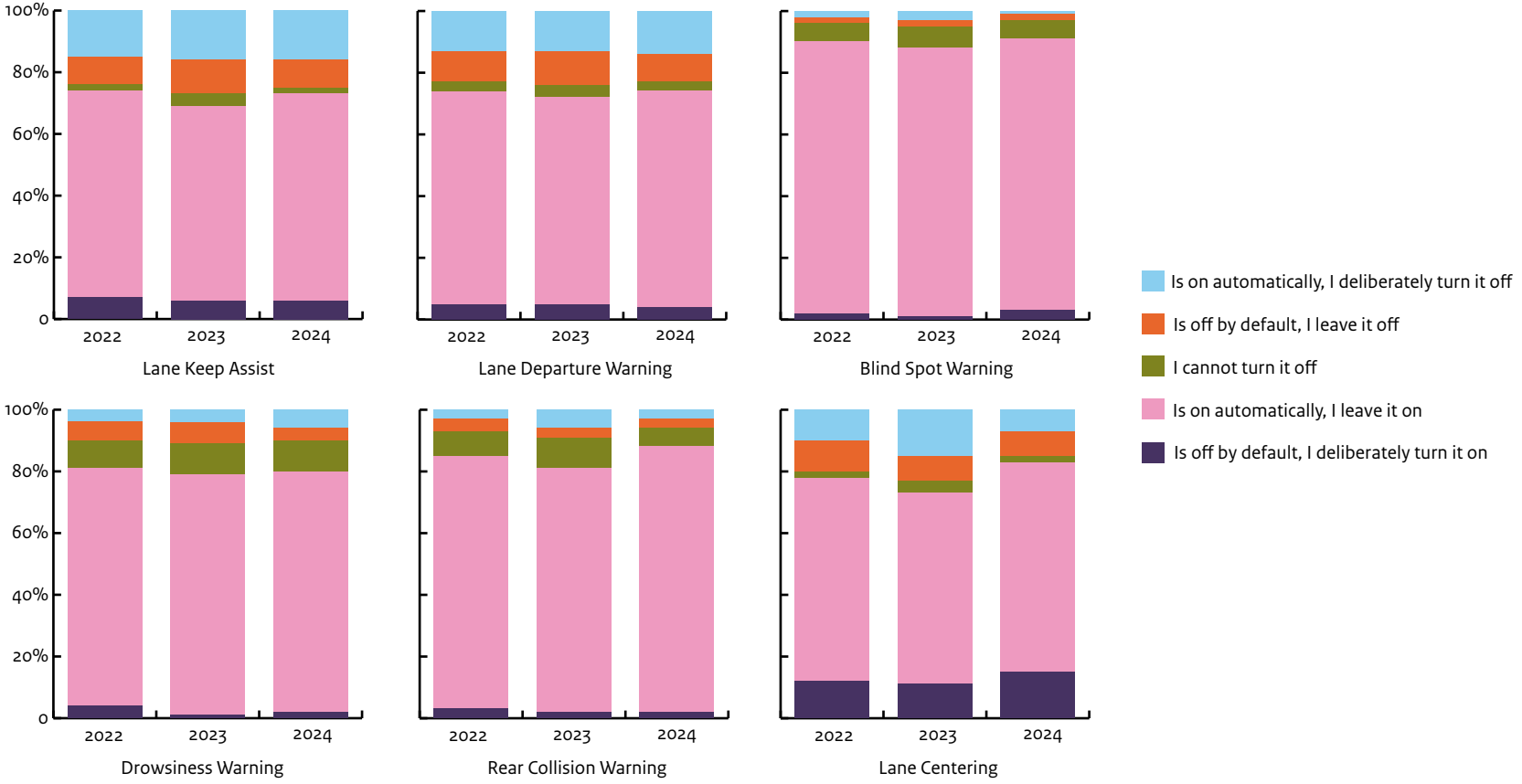
Source 1: RWS - Survey of driving task support systems (ownership, use, valuation, and knowledge level) (2024)

Self-reported use of driver assistance systems in passenger cars

In In most cases, driver assistance systems are on by default and remain on during the journey.
The systems shown here are left on or switched on more often in 2024 (compared to 2023). Deliberately turning off or leaving them off decreases by a few percent for all systems.

Lane Centering is deliberately switched on most often relative to other systems but is also deliberately switched off or left off most often relative to other systems. Lane Keep Assist, Lane Departure Warning, and Drowsiness Warning are also often deliberately switched off or left off relative to other systems.

Figure 17: use of driver assistance systems (switching on and off)



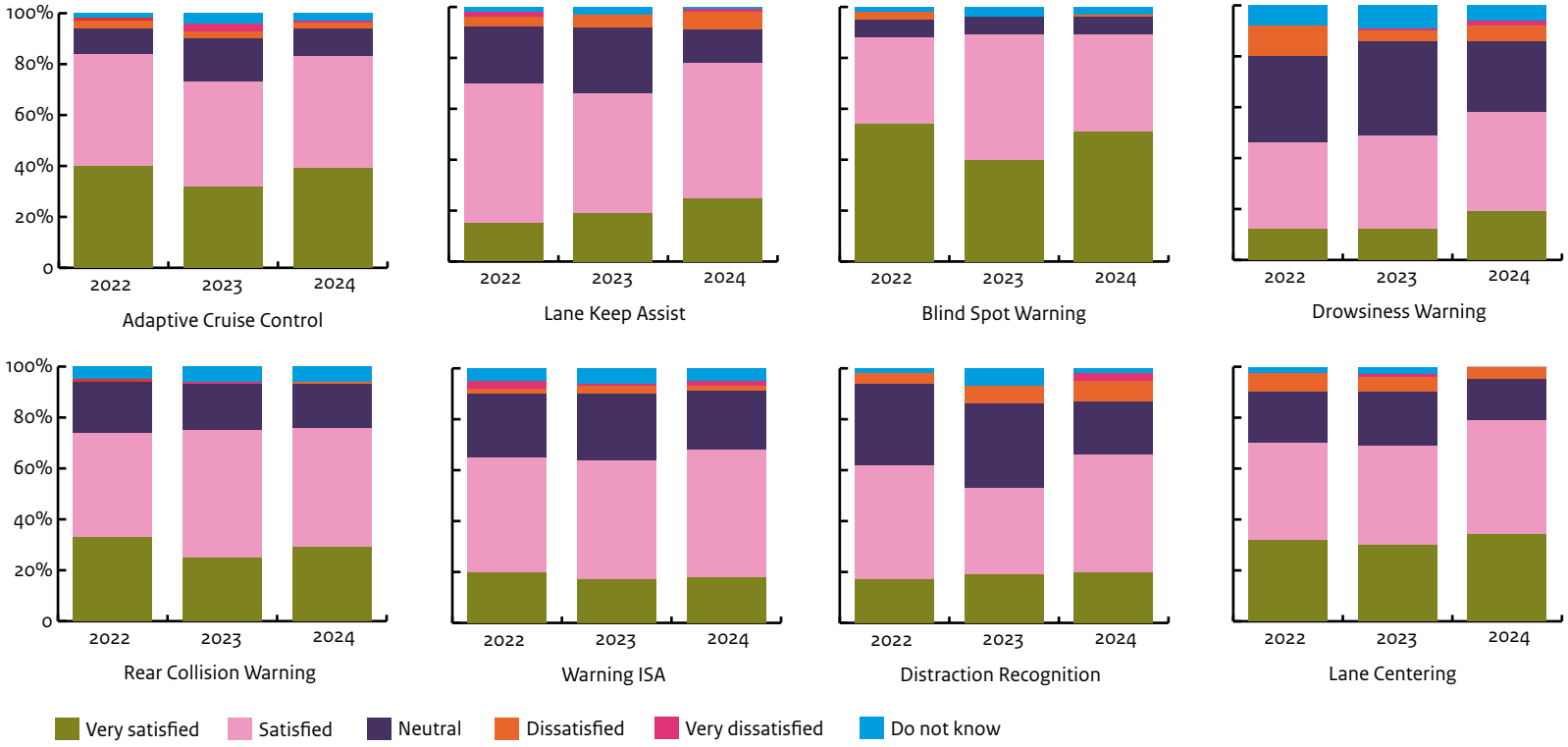
Source 1: RWS - Survey of driving task support systems (ownership, use, valuation, and knowledge level) (2024)

Majority of owners satisfied with their driver assistance systems

About three quarters of users of driver assistance systems are (very) satisfied with their performance. Satisfaction is highest with the blind spot warning (89%). With drowsiness warning, it is lowest (58%). The warning ISA also achieves a somewhat lower share (68%). And 4%-8% of users are (very) dissatisfied with drowsiness warning and Lane Keep Assist.
The most frequently mentioned reasons for satisfaction are: clear information (59%), reliable information or signals (47%), timely notification (46%) or easy to turn on (44%). People are particularly dissatisfied when the opposite is the case. For example, an unjustified or unclear notification or irritating signals.

Compared to 2023, the share of people "(very) satisfied" with these systems has increased by 6% on average in 2024. A possible explanation for greater satisfaction could be better awareness of, longer experience with, and technically better driver assistance systems. Lane Keep Assist saw the largest increase (10%) and it remained the same for blind spot warning. The average share of people who were "(very) dissatisfied" also remained the same as last year (5%). Small differences can be observed for the individual systems.

Figure 18: degree of satisfaction with driver assistance system



Source 1: RWS - Survey of driving task support systems (ownership, use, valuation, and knowledge level) (2024)

What parties impact the ownership and use of driver assistance systems in trucks?

Many parties impact carriers and self-employed drivers with regards to the ownership and use of driver assistance systems. The arrows in the figure below show the relationships between the two. A dotted line indicates a weaker relationship. There are many parties that impact carriers (and self-employed drivers):

- Usually, there is a direct relationship between the carrier and the insurance company. Vehicles may be insured through the leasing company, but that relationship is less direct and less controlled.
- Training centers are the only ones (besides carriers) who are in direct contact with employed drivers.
- Customers set conditions but do not require specific driver assistance systems to be present.

Areas of impact relating to freight transport and the ownership and use of driver assistance systems

The table shows the relationships between the relevant parties.

- Follow-up is mainly a matter for the drivers. They ultimately decide what to do with, for example, alerts.
- Parties that have a major impact on the use of driver assistance systems, such as carriers and training centers, also have some impact on follow-up.
- Insurers currently have a small impact on use and no impact on follow-up, but this could change in the future.

Figure 19: areas of impact relating to ownership and use of driver assistance systems in trucks: parties involved

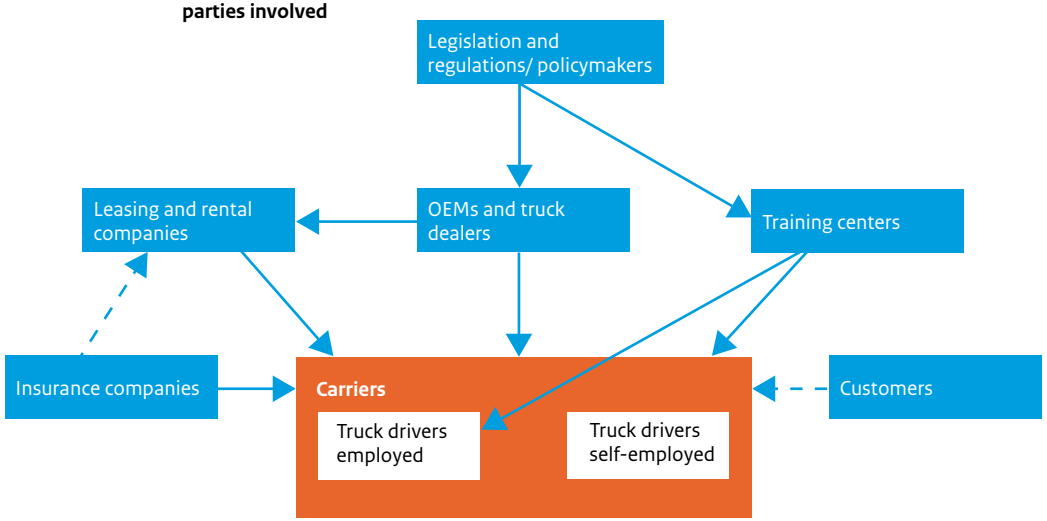


Figure 20: areas of impact relating to ownership and use of driver assistance systems in trucks: degree of impact

Party	Impact on ownership	Impact on use	Impact on follow-up
Legislative and regulatory parties/policymakers at EU and national level	+++	+	
Training centers for education and occupational resettlement		++	+
Carriers	+++	++	+
Leasing and rental companies	++		
OEMs (truck manufacturers) and truck dealers	+++	+	
Customers of carriers, forwarders, and shippers (the customer)	+		
Insurance companies	+	+	
Employed truck drivers		+++	+++
Self-employed truck drivers	+++	+++	+++

Source 6: Panteia - Target groups for freight traffic ADAS and information systems (Insights and exploration) (2023)

Predominantly positive view of safety effects of vehicles equipped with driver assistance systems

SWOV (the Foundation for Scientific Road Safety Research) has consulted national and international sources and collected quantitative data on differences in accidents caused by vehicles with and without driver assistance systems. This data was translated to the Dutch situation to estimate road safety effects. Although the reliability is limited, a predominantly positive effect is estimated on the basis of the figures: fewer traffic accidents were caused by vehicles equipped with driver assistance systems. However, the amount of data available is limited and the results should be seen as a snapshot due to the rapid development of driver assistance systems.

Systems such as ACC and CC, which maintain speed, increase the risk of traffic accidents. In contrast, FCW and AEB systems, which automatically brake or warn of a collision, significantly reduce accidents. Detection of drowsiness and distraction has a slightly smaller positive effect. For systems such as vulnerable road user detection and 360-degree vision, the effects are neither clearly positive nor negative. The table shows indications of the median effect based on all data. The effect was obtained from actual accident data (practical data).

The --, -, +/-, +, ++ in the figure gives an indication of the positive or negative effect of the driver assistance system on traffic accidents. The background colors support this indication.

Figure 21: impact estimates of advanced driver assistance systems on traffic accidents

System	Acronym	Number of studies	Impact (all data)	Impact (practical data)
Cruise Control	CC	1	--	--
Adaptive Cruise Control	ACC	3	-	-
Speed Limit Information Function	SLIF	2	+	?
Intelligent Speed Assistance	ISA	2	+	?
Speed Control Function	SCF	2	+	?
Forward Collision Warning	FCW	5	++	+
Autonomous Emergency Braking	AEB	14	++	++
Rear Automatic Braking	RAB	2	+	+
Lane Departure Warning	LDW	6	+	+
Lane Keep Assist	LKA	3	+	++
Vulnerable Roaduser Detection	AEB VRU	7	+/-	+/-
Traffic Sign Recognition	TSR	1	+	+
Surround View	SV	4	+/-	+/-
Blind Spot Warning	BSW	10	+	+
Assisted Parking	AP	5	+/-	+/-
Rear Collision Warning	RCW	3	+/-	+/-
Drowsiness/Distraction Detection	DMS	2	+	++
Alcohol Lock	AL	2	+	?
Adaptive Headlights	AH	7	+/-	+/-
Navigation Systems	Navigation	1	+	?

Source 7: SWOV - Safety effects of advanced driver assistance systems (ADAS) (2024)

When different systems are combined, the effects are estimated to be predominantly positive. A study examining the combination of LDW with FCW showed a negative effect on the number of traffic accidents.

Whereas ACC as a separate system still gives a negative effect, it shifts to a positive effect on traffic accidents when combined with other systems (such as FCW).

Figure 22: impact estimates of advanced driver assistance systems on traffic accidents: combination of systems

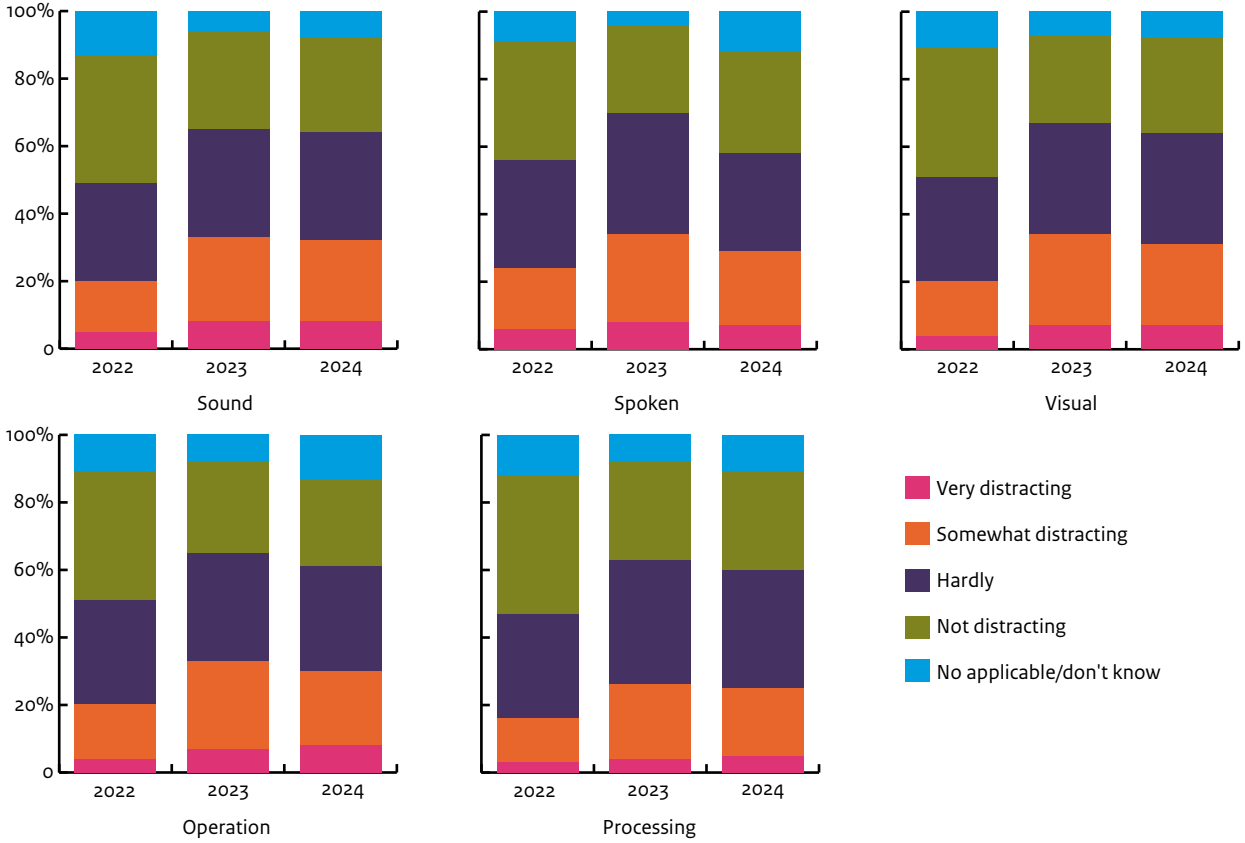
Combination of systems	Acronym combination of systems	Number of studies	Effect
SAE level 0: No Driving Automation			
Autonomous Emergency Braking	AEB	14	++
+ Forward Collision Warning	AEB, FCW	3	++
+ Lane Departure Warning	AEB, LDW	2	++
Lane Departure Warning	LDW	6	+
+ Lane Keep Assist	LDW, LKA	8	+
+ Forward Collision Warning	LDW, FCW	1	-
+ Autonomous Emergency Braking	LDW, FCW, AEB	1	+
SAE level 1: Driver Assistance			
Adaptive Cruise Control	ACC	3	-
+ Autonomous Emergency Braking	ACC, AEB	1	+/-
+ Forward Collision Warning	ACC, AEB, FCW	1	++
+ Lane Departure Warning	ACC, AEB, FCW, LDW	1	+
Lane Keep Assist	LKA	3	+
+ Lane Departure Warning & Lane Centering Assist	LKA, LDW, LCA	1	+/-
+ Lane Departure Warning & Autonomous Emergency Braking & Adaptive Cruise Control	LKA, LDW, AEB, ACC	1	++
+ Autonomous Emergency Steering & Forward Collision Warning & Vulnerable Road User Detection & Blind Spot Monitoring System	LKA, LDW, AEB, ACC, AES, FCW, VRU, BSMS	1	++
SAE level 2: Partial Automation			
Assisted Parking	AP	2	+
Adaptive Cruise Control & Lane Centering Assist & Lane Departure Warning & Lane Departure Prevention	ACC, LCA, LDW, LDP	2	+
Adaptive Cruise Control & Lane Centering Assist & Forward Collision Warning & Autonomous Emergency Braking	ACC, LCA, FCW, AEB	1	++
+ Lane Departure Warning & Vulnerable Road User Detection	ACC, LCA, FCW, AEB, LDW, VRU	1	+

Source 7: SWOV - Safety effects of advanced driver assistance systems (ADAS) (2024)

Driver assistance systems can cause distraction for drivers

For all driver assistance systems (with the exception of the four parking assist tools) in the study, vehicle owners were asked to what extent they think the use of these systems could cause distraction from the driving task. Not included in this is the form of distraction supporting the driving task by drawing attention to an unsafe situation or information. Where applicable to a system, vehicle owners were also asked about the degree of the expected distraction. Distraction can be caused by sounds from the systems, by spoken text, by visual information, by operating the system or by processing information provided by the system. In 2024, about two-thirds of drivers say they expect driving assistance systems to cause little or no distraction from the driving task. In 2022, it was just over 60%.
Some drivers expect driving assistance systems to be "very" or "somewhat" distracting while driving. On average, this applies to 30% of drivers, across all systems and across all possible forms of distraction (sound, spoken, visual, operation, and processing). Compared to the 2023 study, this is a decrease of 2.5%.

Figure 23: degree of possible distraction by type of information



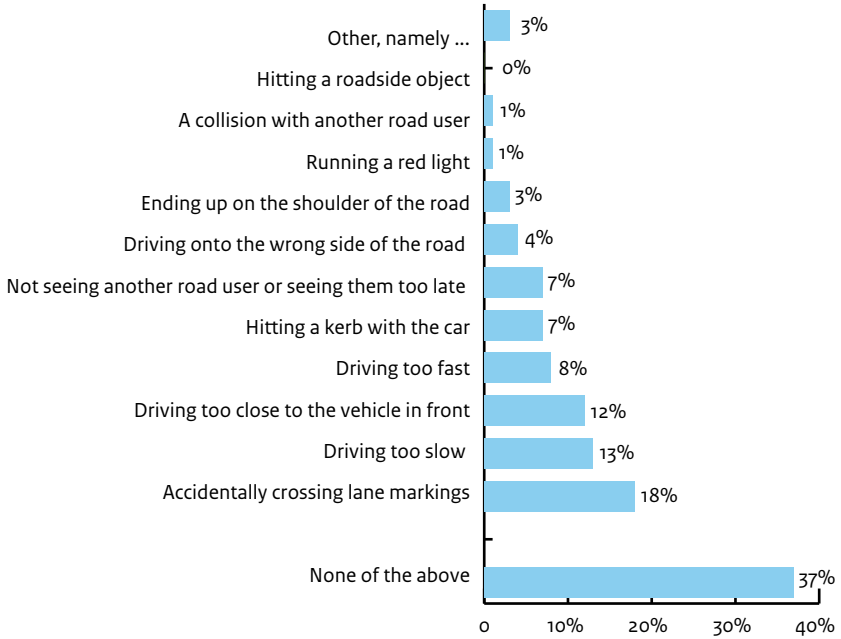
Source 1: RWS - Survey of driving task support systems (ownership, use, valuation, and knowledge level) (2024)

Consequences of distraction by driver assistance systems

In 2024, people were asked to what extent they themselves have ever been distracted while driving when using driver assistance systems. About half of the users of driver assistance systems say they are distracted at times. Depending on the driver assistance system, distraction can be experienced in various ways (sound, spoken, visual, operation, and processing).

Of those who have been distracted while driving by driver assistance systems, this did not lead to (potentially) dangerous situations in over a third (37%) of the cases. Accidentally crossing lane markings (18%), driving too slowly (13%) or driving too close to the vehicle in front (12%) are the most frequently mentioned dangerous situations due to distraction. A collision with another road user or object is mentioned by less than 1%.

Figure 24: consequences of distraction by driver assistance systems



Source 1: RWS - Survey of driving task support systems (ownership, use, valuation, and knowledge level) (2024)

Costs of vehicle automation

Vehicle automation can have an effect on increased road safety, improved driving comfort, and more efficient driving behavior. Consumers pay for the costs of vehicle automation through the purchase price of the car and through recurring costs such as insurance premiums, damages, and maintenance. It is, therefore, difficult to say exactly what part of these costs can be attributed to vehicle automation. The insight into the costs and benefits of vehicle automation in this monitor should be seen as a general consideration.

One-off costs: purchase price

The cost of driver assistance systems is difficult to separate from the total purchase price of a car. Increasingly, these systems are built in as standard, so they are not listed as a separate cost. When they are optional, it is often in packages for which the composition changes annually. In addition, the price varies by year and model.
In higher segments (C to E), driver assistance systems are usually included as standard. In segment B, some systems are standard, but many can be purchased as options. In segment A, driver assistance systems are often less available, sometimes not at all. Package prices typically vary between 1% and 5% of the total purchase price.
In the early stages of new technologies, costs are high due to research, development, and limited production capacity. As production processes improve and demand increases, costs tend to fall. Nevertheless, future price trends remain uncertain, as new, advanced features may in turn lead to higher costs.

Recurring costs: damage and maintenance

The impact of driver assistance systems on purchase prices is difficult to determine, but they do have an impact on recurring costs. Between 2015 and 2018, damage repair costs per claim increased by 12%, mainly due to higher part prices (+25%) and increasing training costs for staff. This cost increase can be attributed in part to driver assistance systems. Parts are becoming more expensive as vehicle automation becomes increasingly complex. US research (AAA, 2023) confirms that driver assistance systems increase repair costs by an average of 37%. In addition, driver assistance systems must be recalibrated after replacement. For example, camera calibration after a windscreen replacement at Carglass costs between €200 and €240.

Driver assistance systems reduce the risk of accidents but increase the cost in case of damage. The Association of Insurers (Verbond van Verzekeraars) calculated that the risk of being involved in an accident can drop by up to 37% if a car is equipped with a driver assistance system (depending on which driver assistance system is built in). KPMG predicts that the number of claims will decrease by 0.3% annually until 2030, despite more vehicles coming to the Netherlands and the Dutch driving more kilometers in total. Still, the total value of the claims market is expected to grow 6% annually. This is due to the sharply rising average burden of claim caused by:

- increasing complexity of damage repair, for example due to higher personnel costs and more working hours;
- more expensive materials and components due to advanced technologies. In short, driver assistance systems reduce accidents, but if damage does occur, the costs are significantly higher.

Recurring costs: insurance premiums

In 2023, car insurance premiums rose by about 11%. On average, this amounts to €109 a year. This is because repair costs for electric vehicles are significantly higher than costs for a regular car. The impact of driver assistance systems on this increase is unclear. Any lower probability of accidents is expected to have a lowering effect on premiums, while higher claims charges increase premiums.

Figure 25: classification of passenger cars into segments

Segment	Characteristics	Examples
A segment	City cars, very compact, economical, suitable for short trips and urban traffic.	Volkswagen Up!, Fiat 500, Toyota Aygo
B segment	Small cars, slightly roomier than A segment, versatile and suitable for city and short distances.	Ford Fiesta, Volkswagen Polo, Renault Clio
C segment	Compact mid-range, family cars, more space, comfort, and better performance.	Volkswagen Golf, Ford Focus, Toyota Corolla
D segment	Medium-sized cars, spacious family cars, comfortable and suitable for longer distances.	Volkswagen Passat, BMW 3 series, Audi A4
E segment	Large luxury cars, lots of comfort, high-end finishes, and advanced technology.	Mercedes-Benz E Class, BMW 5 series, Audi A6

Source 9: Min I&WM - Smart Mobility Cost Monitor (2024)

Source reference vehicle automation

Number	Name source	Year	Website
1	RWS - Survey of driving task support systems (ownership, use, valuation, and knowledge level)	2024	Link
2	RWS - Driving Task Automation Monitor (ownership, awareness, use, and knowledge level)	2024	Link
3	RWS - Development of ADAS in trucks and vans (update 2025)	2025	Link
4	ADAS Alliance - ADAS dictionary	2025	Link
5	Goudappel - Effects of Driving Task Automation fact sheet	2024	Link
6	Panteia - Target groups of freight traffic ADAS and information systems (insights and exploration)	2023	On demand
7	SWOV - Safety effects of advanced driver assistance systems (ADAS)	2024	Link
8	RWS - Current state of affairs regarding ADAS penetration rate: update on expected development	2024	Link
9	Min I&WM- Smart Mobility Cost Monitor	2024	On demand
10	RWS - ADAS passenger car, van, and truck Monitor (online dashboard)	2025	Link

Traffic management and information services

Notable insights regarding traffic management and information services

Availability

Ownership of navigation services has grown again in 2024. In 2024, approximately 96% of road users owns one or more navigation systems. In 2021, this was 91%. This means supply, i.e. road user ownership of devices and available services from service providers, seems to be just about saturated.

Use

Road users are better informed than ever. On known routes, road users are more likely to be informed by in-car information: 71% in 2024 compared to 59% in 2021. Usage on unknown or less frequently travelled routes is as high as ever, reaching 97% in 2024 and 2021. The preference for in-car information over roadside information is on the rise and has increased by 6% for all age groups in 2024 compared to 2021.

Effects

More and more road users are adjusting their route during their journey in response to traffic jam reports: 81% in 2024 compared to 44% in 2021. This is expected to have a positive effect on traffic flow.
Driving with navigation services has a predominantly positive effect on road safety. This is especially true for unfamiliar routes or environments.
Distraction by information services remains a concern. Information system notifications can be distracting for some road users. This involves receiving and processing information and operating a system. However, this should be seen in comparison to a situation without these systems, where manual navigation requires reading maps and road signs.

Costs

The costs of traffic management and information services are mainly paid for by the government (including traffic control centers, hardware, software, roadside systems). The costs for road user (systems, apps, and data) are limited. The majority of drivers are willing to pay for information if it is very reliable, provides benefits, and does not contain ads. The costs for businesses have not yet been identified.

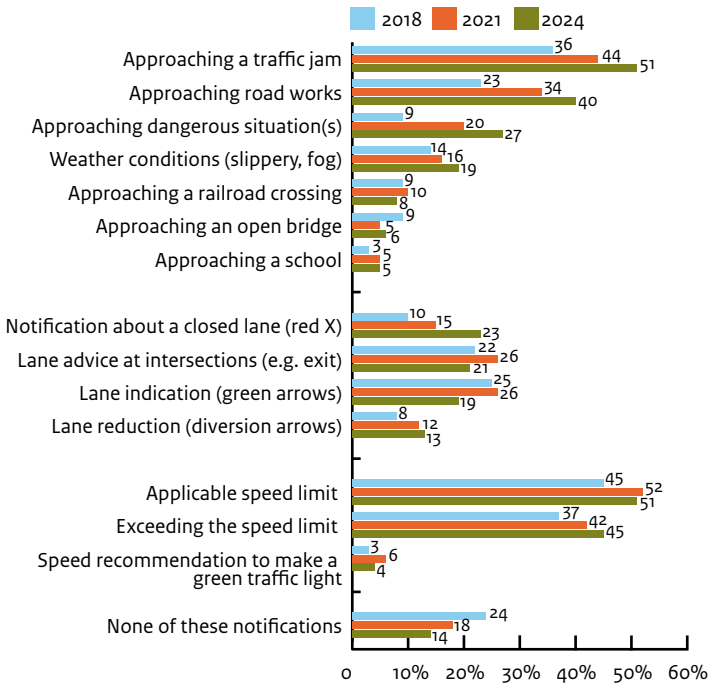
Available in-car information for passenger cars

More and more road users receive notifications with driving task support information in their cars. The number of road users receiving notifications about environmental factors (such as approaching a traffic jam or road works) increased by 6% in 2024 compared to 2021.

In-car navigation: ownership growth, system shift

Ownership of in-car navigation systems is on the rise. In 2024, approximately 96% of road users owns one or more navigation systems (smartphone, built-in or separate navigation apps on smartphones). This was 93% in 2021, 91% in 2018, and only 66% in 2015.

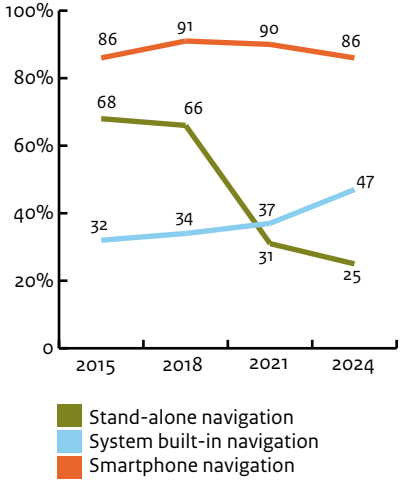
Figure 26: availability of in-car driving task-supporting information



Drivers are better informed than ever

In 2024, 86% of road users use an app on a smartphone for navigation. That seems like a lot, but usage has decreased by 5% since 2018. By contrast, the use of a built-in navigation system has increased by 10% since 2021, reaching 47% in 2024.

Figure 27: development of navigation system ownership



Source 11: RWS – Road traffic-related information services monitor (2024)

Development of traffic management assets Rijkswaterstaat

The figures below chart the developments of the main Digital Traffic Management (DTM) systems for the past 16 years. The number of dynamic route information panels (DRIPs) has declined slightly since 2019 (444 in 2019, 421 in 2024). A decision to further phase them out was taken based on the RWS Basic Quality Level (BQL) framework and a more finely tuned DRIP framework. This will lead to a sharper decline in the coming years. The function of DRIPs is increasingly being taken over by in-car navigation systems, due to their high ownership and use.

The number of ramp meters (RMs) has fallen sharply. The total number of RMs in 2019 was 123; in 2024, there were 87. About half of these are malfunctioning or disabled.

The traffic signaling system (Motorway Traffic Management, MTM) is growing along with the expansion of the motorway network, as many new roads are busy and important arteries. The placement criteria for MTM are currently being updated by Rijkswaterstaat (the Directorate General for Public Works and Water Management), in consultation with policymakers.

Figure 28: trend in the number of DRIPs and RMs

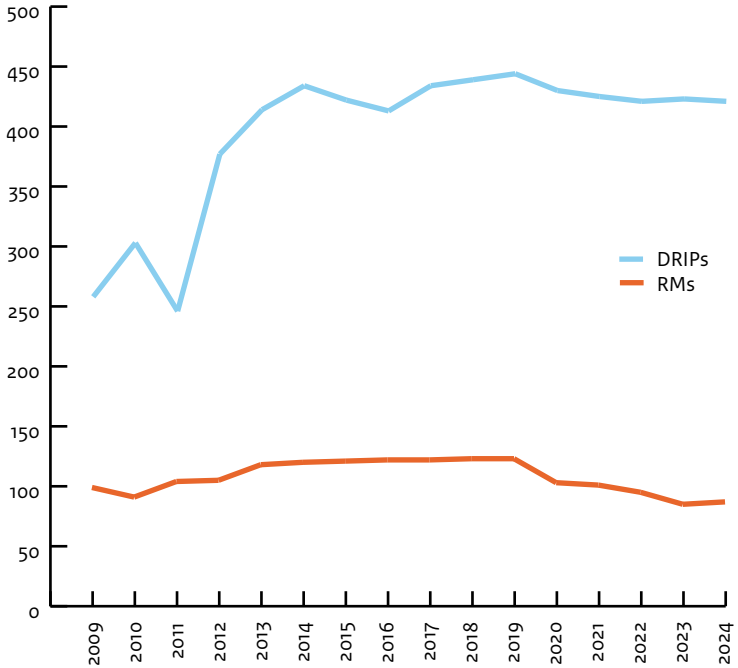
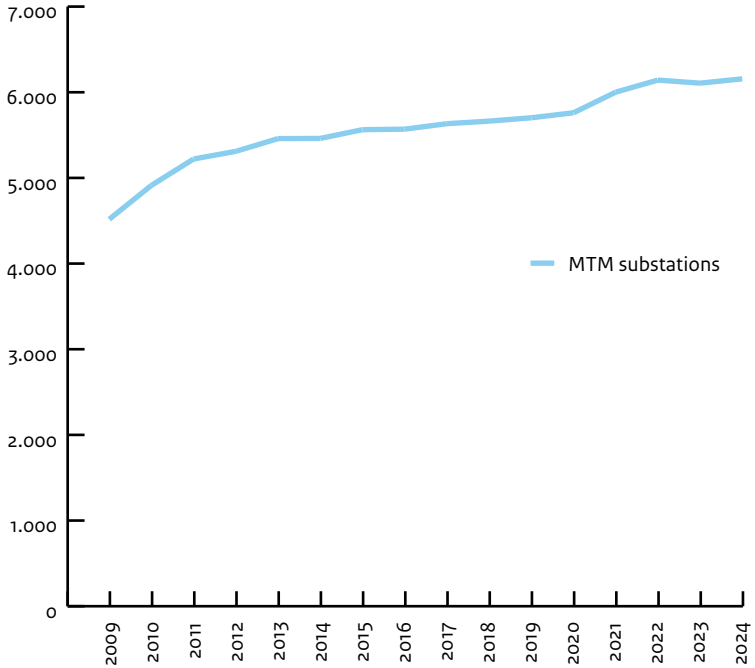


Figure 29: trend in the number of traffic signaling substations (MTM)s



Source 13: RWS - NIS Network Management Information System
Source 14: RWS - Traffic management RWS in focus (2023)

Better informing road users: traffic management for route advice (VM-IVRA)

The VM-IVRA project (traffic management information for route advice or "verkeersmanagement informatie voor routeadvies") aims to align traffic management measures with the social goals of road operators via in-car information systems. The project aims to reduce unwanted effects due to increasing use of in-car systems. This includes traffic on undesirable roads, such as along schools and on roads where cyclists ride on the roadway. VM-IVRA plays a role in the transition from traditional roadside information to in-car information.
Over the past five years, road authorities, the National Data portal Road traffic (NDR), and service providers have jointly gained practical experience with digital traffic management. New services have been developed, and policy data has been digitized. In the final phase, five in-car services for smart route advice have been scaled up.

This allowed digital traffic management to be applied in concrete terms. The aim is to integrate the valuable digital traffic management services and to further develop promising services. This lays the foundation for a wider rollout in the future.
The table shows what information is available for each VM-IVRA application. The table describes the current state of affairs with January 2025 as the reference point. Among open data services, limited information is available on the use of VM-IVRA by service providers. We do know that Flitsmeister reports approximately 1 million advisories per month with regard to environmental zones. NDR knows who the customers are, but not who collects and uses what data.

Figure 30: information by traffic management service for route advice (VM-IVRA), reference point January 2025

Service	**Type**	**Service provider**	**Road users reached (2024)**	**Number of road authorities involved**	**Used for number of works/events**
Announcements	Paid service	Flitsmeister, Waze, ANWB	Total: 5.2 million (messages sent)	63	157
Service	**Type**	**Service provider**	**Road users reached (2024)**	**Number of schools (with school zones)**	**Verified school zones (by road authorities)**
School zones	Open data	ANWB	ANWB (working on implementation)	2670	26%
Service	**Type**	**Service provider**	**Road users reached (2024)**	**Number of road authorities**	**Coverage**
Roadblocks	Open data	Google	Google: unknown	1	5 tunnels
Service	**Type**	**Service provider**	**Road users reached (2024)**	**Number of road authorities**	**Number of environmental/zero emission zones**
Environmental/zero-emission zones	Open data	Flitsmeister, Waze, Google, (ANWB)	Flitsmeister: app.12 million Waze: for verification Google: unknown ANWB: unknown	14	23

Source 17: Twijnstra Gudde – VM-IVRA Review of five years of development, trial, and scale-up (2024)

Better informing road users: Safety Priority Services (SPS)

Within Safety Priority Services (SPS), the Ministry of Infrastructure & Water Management is working with service providers and car manufacturers to deliver more and better in-car safety warnings to road users. The following services are offered:

- Traffic jam ahead of end of the queue warnings
- Alerts for emergency and rescue services
- Alerts based on safety related traffic information
- Traffic rules

Because we have made data-sharing agreements with the researchers, we cannot share specific data on the participating parties. However, there are some general findings:

- Since the launch of SPS in 2022, the number of kilometers driven with active SPS partner services in the Netherlands has increased by 34%. In 2024, there was an improvement of 9% over 2023. This allows users of SPS services to be better informed and safer when traveling.
- When the total number of vehicle kilometers on the Dutch road network is compared to the kilometers driven with SPS services, this results in an SPS coverage of over 1 in 5 vehicle kilometers in the Netherlands.
- All safety regions in the Netherlands are now connected to the system to provide alerts for approaching emergency and rescue services. This has resulted in country-wide coverage for alerts of approaching ambulances.
- A comparison of crowdsourced breakdown and accident alerts with road authority data shows that 90%-95% of crowdsourced alerts are known on average 8-10 minutes earlier than road authority breakdown and accident alerts. This allows road users to be warned of dangerous situations earlier. The road authority gave the first alert in about 5%-10% of cases. Of the crowdsourced alerts, it is noteworthy that two-thirds are based on only 1 source, one-third are confirmed by multiple sources. The number of sources for a crowdsourced alert affects the reliability of a report.

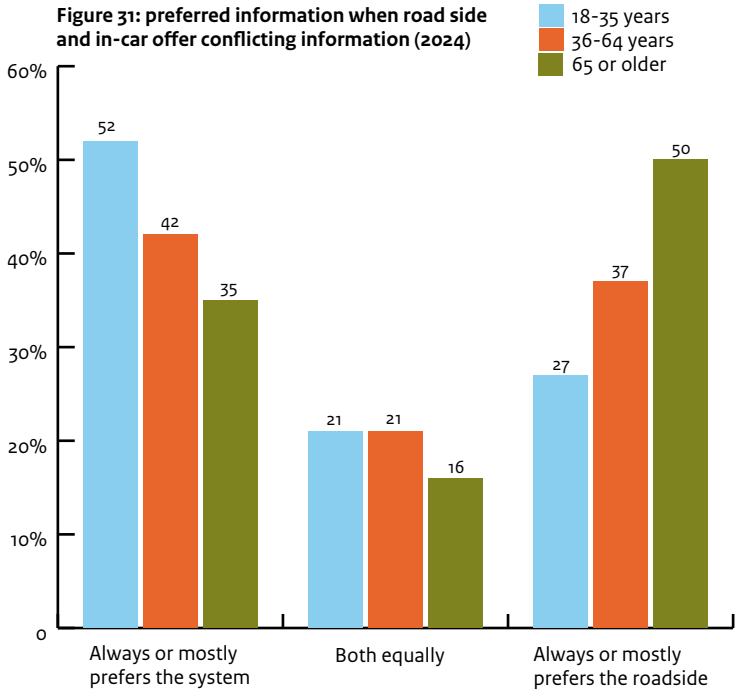
Source 12: Min I&WM - SPS Fact sheet 2024 (2025)

Preferences (digital) information services

Older people follow youngsters in preference for in-car information

In addition to in-car systems, road users receive travel and route information via static and dynamic roadside signs. Static signs provide fixed information such as speeds and important warnings. DRIPs and Graphical Route Information Panels (GRIPs) provide real-time updates on electronic panels, including travel times and road conditions.
In case of conflicting advice between roadside information and in-car information systems, age appears to be a factor: young adults (18-35 years) tend to follow the in-car system, older people (65+ years) rely more on roadside signs. Compared to the 2021 results, the preference for in-car information for all age groups increases by 6% at the expense of roadside information in 2024.

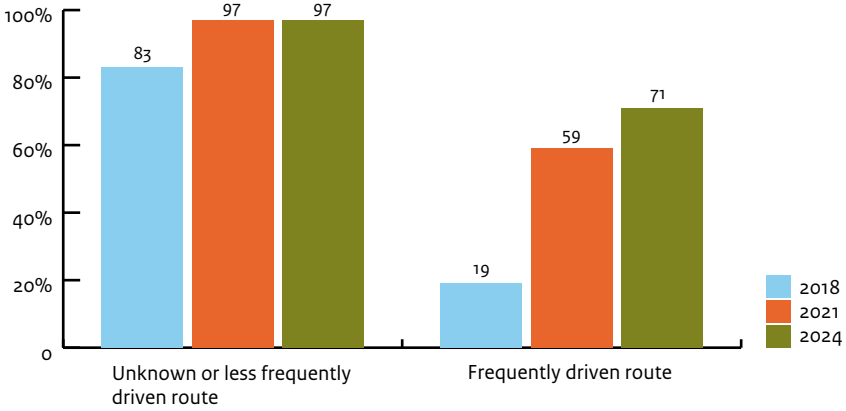
Figure 31: preferred information when road side and in-car offer conflicting information (2024)



Road users receive more information on known routes

The use of travel and route information is highest for unfamiliar or less frequently driven routes. In 2024, almost all road users (97%) use in-car information systems on such journeys. For frequently driven routes, road users also increasingly receive travel and route information while travelling. In 2024, 71% receive this information in the car. In 2021, it was 59% and in 2018 only 19% received travel and route information on frequently driven routes.

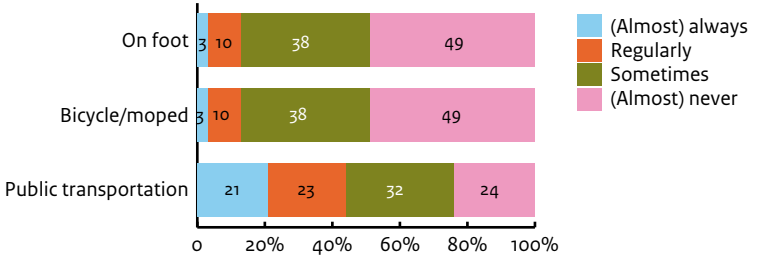
Figure 32: use of in-car information depends on route familiarity



Users of public transportation use travel and route information most often

Road users who sometimes use public transportation, most frequently use travel and route information: 44% do this regularly to often. This proportion is lower for pedestrians, cyclists and moped users: 18%.

Figure 33: consultation of travel and/or route information other means of transportation



Source 11: RWS – Road traffic-related information services monitor (2024)

Follow-up behavior travel and route information by drivers

Drivers bypass traffic jams more often while travelling

By 2024, 85% of road users check and actually follow routes before travelling. Compared to 2021 (92%) and 2018 (80%). 56% regularly or more often change their route before departure in response to traffic jam reports. This is slightly less than in 2021 (60%). But once they are on the road, more and more road users change their route in response to traffic jam or alternative routes provided on trip: 81% in 2024 compared to 44% in 2021. This is expected to have a positive effect on traffic flow.

Figure 34: follow-up behavior pre-trip route information

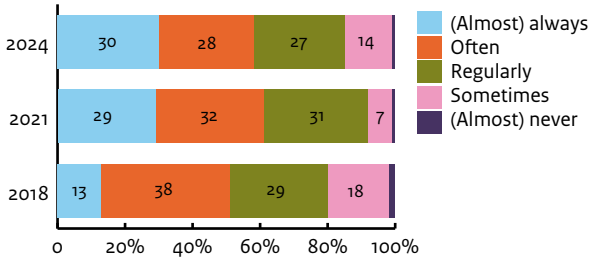
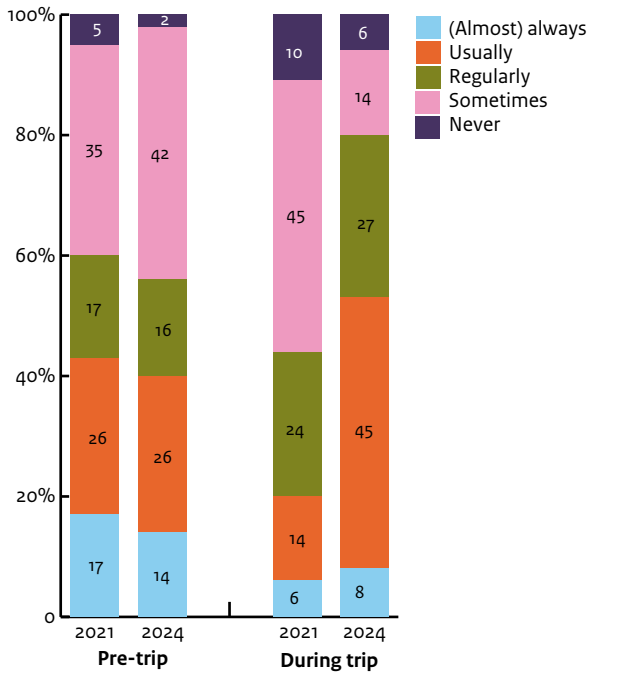


Figure 35: changing route when information reports a traffic jam

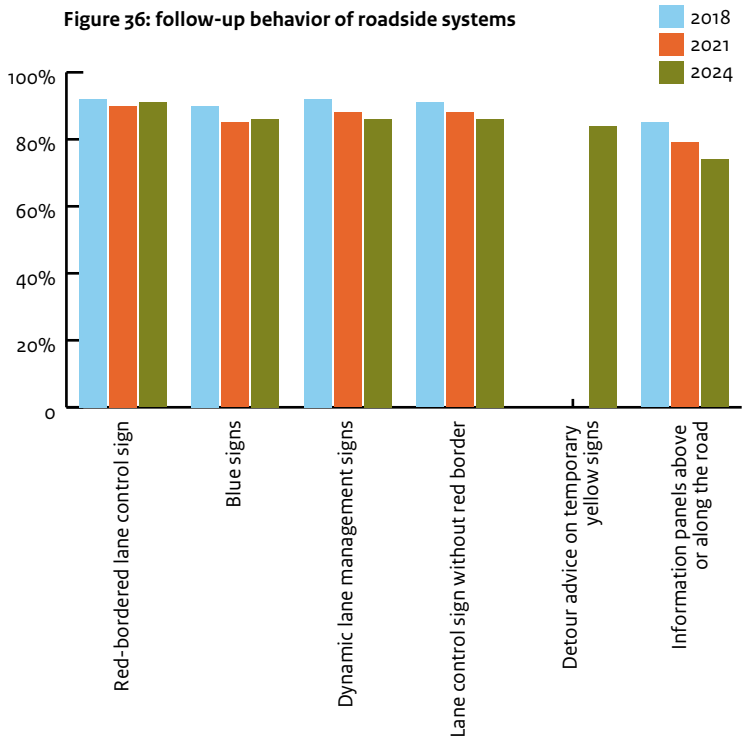


Source 11: RWS – Road traffic-related information services monitor (2024)

Following of lane control signs fairly stable, following of information panels decreasing

Most road users follow information from dynamic road signs. In particular, they adhere to the speed limits shown with the dynamic A1 sign (with the red edge) on the lane controle VMS's (91%). The following of information panels above or along the road has been slowly decreasing since 2018. The high ownership and use of in-car navigation systems is expected to play a role in this. These systems can increasingly assume the function of the DRIPs.

Figure 36: follow-up behavior of roadside systems



Alternative routes popular to avoid traffic jams

When drivers change their journey before departure due to traffic jams, they are more likely to choose a different route in 2024 (87%). In 2021, this was 56%. They are less likely to change their departure time (29% in 2024 and 63% in 2021). These differences are remarkable but cannot be explained on the basis of the study. Once on the road, almost all drivers choose an alternative route if it allows them to avoid traffic jams (90%). This is similar to 2021.

Figure 37: changing travel behavior when pre-trip information reports traffic jam

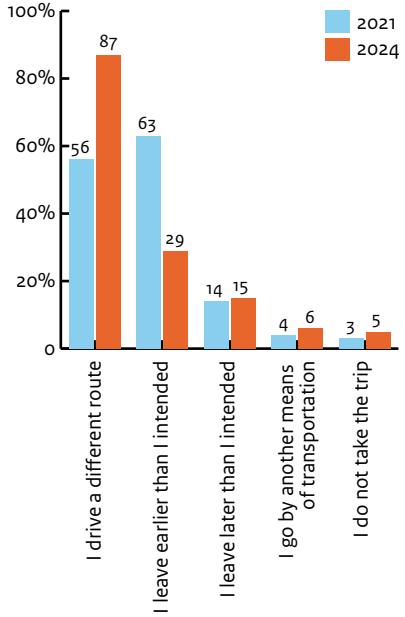
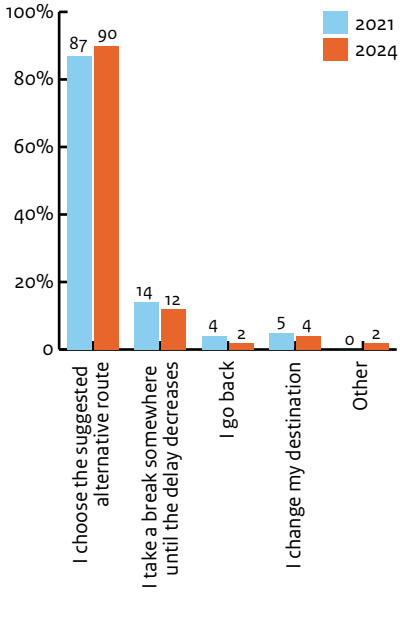


Figure 38: changing travel behavior when information reports traffic jam during trip



Source 11: RWS – Road traffic-related information services monitor (2024)

Driving with navigation services has a positive effect on road safety

This is especially true for unfamiliar routes or environments.

- In addition, this especially applies to situations during the ride that give cause to change the route.
- The positive effects come from reduced kilometers, workload, and risky driving behavior.
- A concern is that users are distracted by the operation of navigation services while driving in an environment with vulnerable participants or in a complicated traffic situation.

The effects of optimized navigation services on road safety are predominantly positive

- The positive trend is expected to continue into the future as the information provided through navigation systems becomes increasingly reliable (partly due to better availability of up-to-date data).
- The trend is positive because systems are becoming increasingly user-friendly. This allows smartphones to be integrated into the vehicle. Information is increasingly complete and includes more details, for example at lane level. Moreover, thanks to higher reliability of information, navigation services can also offer more tailored information to the user.
- Threats include distraction, “noise" in the form of ads, differences between navigation systems and between service providers, a decline in road user navigation skills. The preference for the safest route is not (yet) included in navigation apps. So, there is still room for improvement when it comes to how systems interact with road users.
- Potential distractions do need to be seen in comparison to a situation without these navigation services, where manual navigation requires reading maps and road signs (and therefore could also put considerable stress on the driving task).

Source 15: Min I&WM - Potential effects of in-car navigation services on road safety (2024)

Distraction by information system alerts

Distraction by information systems was further studied for the first time in 2024. Alerts can be distracting for some road users. Of everyone who receives alerts about traffic jams and roadworks, 20% get somewhat distracted. In this case, the operation of the information system causes the most distraction, 20% for traffic jam alerts and 17% for roadworks alerts. This is mainly because the information system requires a response or an action (21%).

Information system alerts can be distracting for some road users

The most commonly cited cause of distraction is that an alert attracts attention outside the driver's field of vision. This means that the alert is displayed in a location that the driver is not looking at directly (47%). An alert can also trigger an active response (processing) by the driver (25%). Distraction by information systems can be considered both negative (eyes off the road, distraction from the driving task) and positive (increasing attention for a decision point or traffic situation).

Figure 39: distraction by in-car traffic jam alert

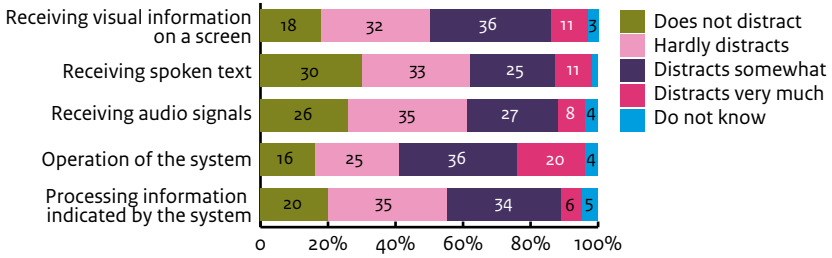


Figure 40: distraction by in-car roadworks alert

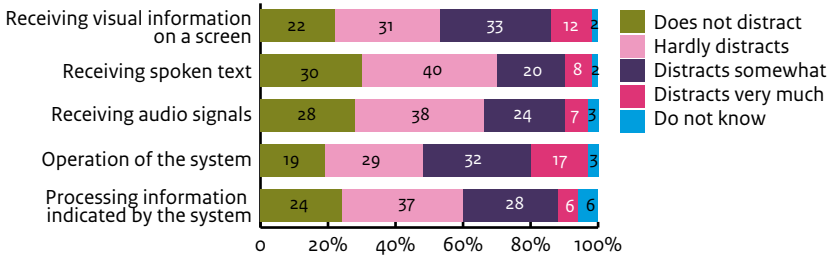
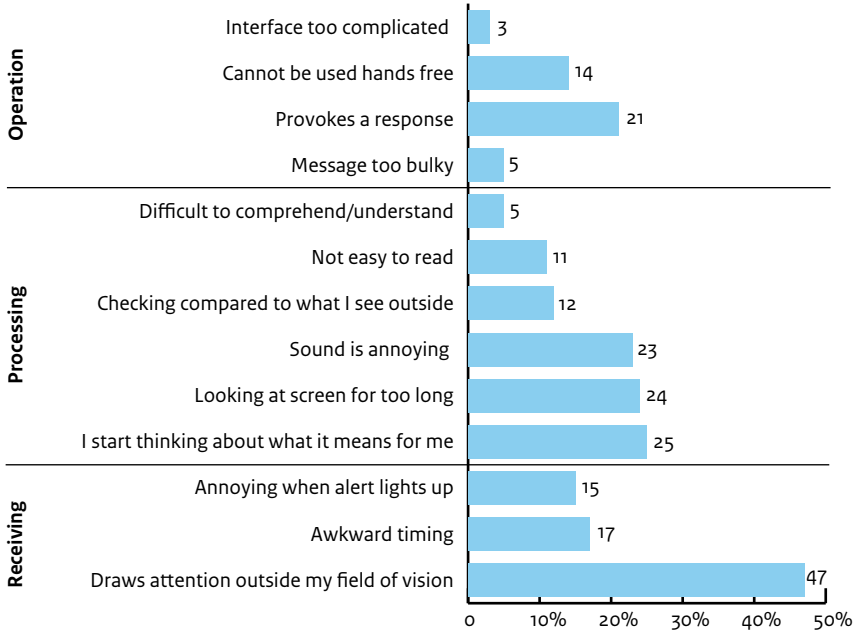


Figure 41: reasons for distraction by driver assistance system alert

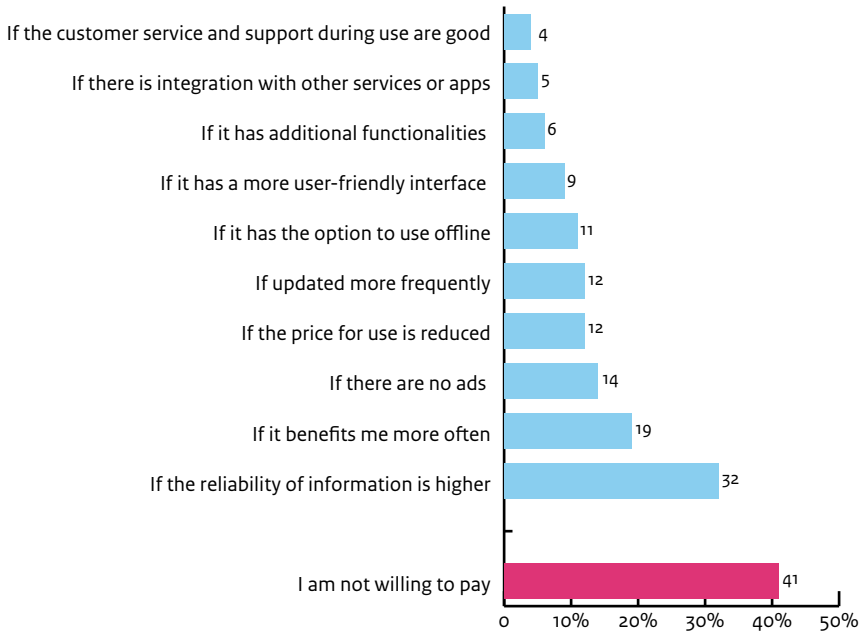


Source 11: RWS – Road traffic-related information services monitor (2024)

Majority of drivers is willing to pay for information

41% of road users who say they do not pay for information systems, are unwilling to pay. The other 59% of road users are willing to pay for information from a system with high reliability (32%), which often provides benefits (19%) or contains no ads (14%).

Figure 42: willingness to pay to use system



Source 11: RWS – Road traffic-related information services monitor (2024)

Cost of traffic management and information services

Digitizing traffic management and information services can improve safety, comfort, traffic flow, and sustainability. It can also save on the construction and maintenance of infrastructure and systems. But there are also costs associated with traffic management and the provision of information services.

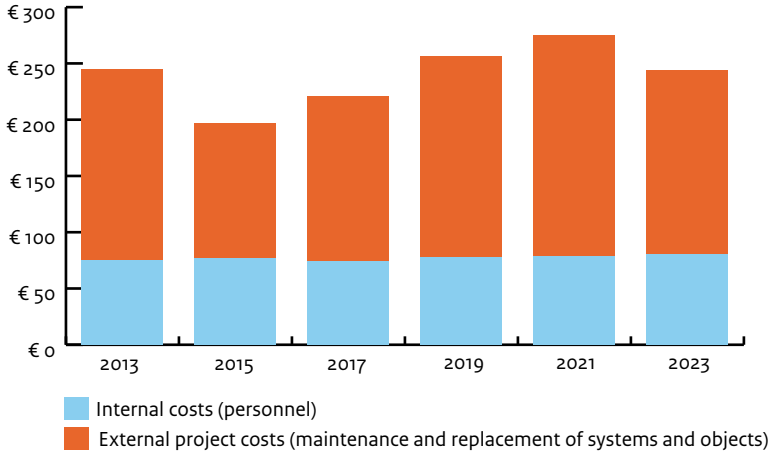
Traffic management and information services: cost for public authorities

The diagram shows the activities carried out and the hardware and software needed to enable traffic management and information services. This overview is based on information from the Directorate General for Public Works and Water Management (Rijkswaterstaat), our country's largest road authority. The various activities listed make it possible to implement seven so-called “network services”. These network services involve travel and route information, object control, and network optimization, as well as enforcement, incident management, work in progress, and winter maintenance measures.
The publication “Rijkswaterstaat Traffic Management in focus 2023” (Verkeersmanagement Rijkswaterstaat in Beeld 2023) depicts the annual costs for the various network services. These are the costs for personnel and for the management and maintenance of systems (hardware and software) and objects located “outside” (DTM). Replacement costs are also known specifically for the latter category.
The total cost for Rijkswaterstaat of running the various network services and maintaining the systems and objects is almost €250 million in 2023. Personnel costs have remained fairly constant over the period. There is more variation in external project costs. These mainly come from maintaining and replacing objects and systems. The variation in external project costs is partly due to the state of the DTM area and partly depends on the budget available to Rijkswaterstaat/Ministry of I&WM.

Information services: consumers costs

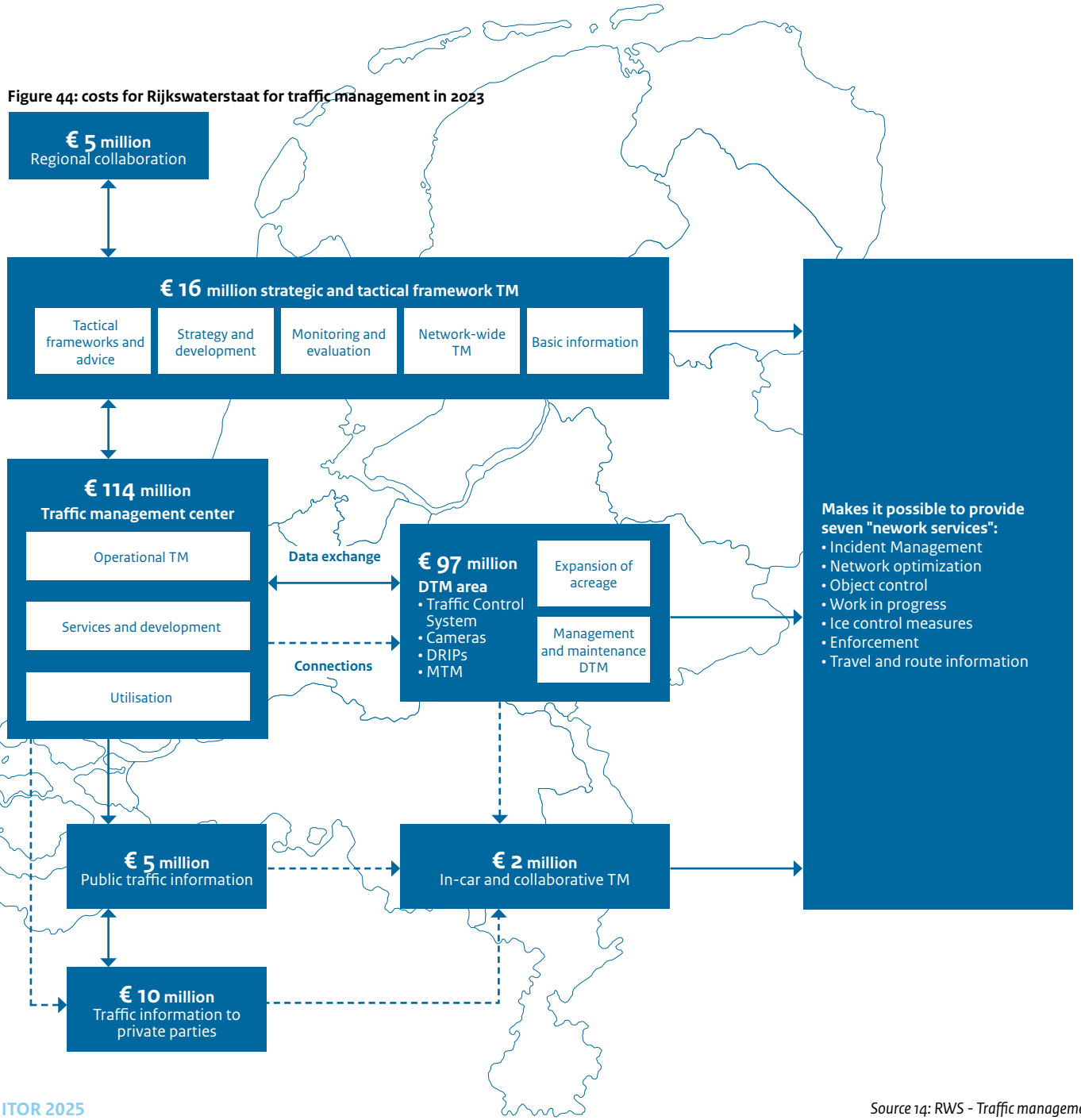
In addition, road users use information services for which they pay, for example in the form of a (built-in) navigation system or application on their smartphone. Annually, navigating via navigation system with real-time traffic information costs consumers an average of €100. Navigating via smartphone costs consumers an annual average of €1 to €4.

Figure 43: development of annual traffic management costs for Rijkswaterstaat (2013-2023) in millions of euros



Source 9: Min I&WM - Smart Mobility Cost Monitor (2024)
Source 14: RWS - Traffic management RWS in focus (2023)

Figure 44: costs for Rijkswaterstaat for traffic management in 2023



Source 14: RWS - Traffic management RWS in focus (2023)

Source reference for traffic management and information services

Number	Name source	Year	Website
11	RWS - Road traffic-related information services monitor	2024	Link
12	Min I&WM - SPS Fact sheet 2024	2025	On demand
13	RWS - NIS Network Management Information System	2025	On demand
14	RWS - RWS traffic management in focus	2023	On demand
15	Min I&WM - Potential effects of in-car navigation services on road safety	2024	Link
16	Goudappel - Fact sheet effects of in-car Traffic Information	2024	Link
17	Twijnstra Gudde - VM-IVRA Review of five years of development, trial, and scale-up	2024	Link

Mobility services

Notable mobility services insights

Availability

In the long term, we are seeing an upward trend. By 2024, the number of shared cars in the Netherlands dropped by 6% compared to 2023. In 2024, about half (50.1%) of all shared cars is electric; by comparison, 14% of all passenger cars in the Netherlands are electric.
The shared moped market is a highly fluctuating market, with only two providers in the Netherlands as of 1 January 2025. Compared to 2023, the number of shared mopeds decreased by 19% in 2024. The number of shared (cargo) bicycles remains at about the same level in 2024 as in 2023.

Use

The use of sharing systems increased by 1% in 2024 compared to 2023 and 5% compared to 2022. Use of the other sharing systems has remained approximately the same.

Costs

Using a shared car can already be more economical than owning your own if you drive less than 10,000 kilometers per year.

Shared mobility collaboration program

Shared mobility collaboration program

Municipalities, regions, provinces, and the national government have launched a national collaboration program entitled Natuurlijk!Deelmobiliteit (N!D) (Dutch). The collaboration program aims to achieve a coherent approach and direction for shared mobility for public authorities, together with the market. Shared mobility helps to make the urban construction task possible and keep the city and region livable and accessible for everyone. The efforts of different authorities are valuable but would be more effective in collaboration. In this way, N!D builds up more collective knowledge and can use it to implement more effective and efficient policies for shared mobility at local, regional, and national levels. For example: N!D wants to make the use of shared mobility easier as part of travelers' door-to-door journey. In addition, N!D wants to provide the clearest possible (investment) perspective for a healthy shared-mobility sector. The spearheads of the program are to equalize policies, conduct joint research, carry out projects that are in common interest, and share knowledge and expertise widely. The ultimate objective is to improve travelers' user experience with shared mobility so that shared transportation is more widely used. N!D does this through (agreements regarding) a clear division of roles in the Netherlands. N!D is building a shared perspective and policy, in which shared mobility serves (proven) public interests and in which a healthy market can develop.
Commissioned by N!D, I&O Research developed a standard questionnaire and protocol in November 2023 that can be used to conduct recurrent user surveys on shared mobility (shared car, shared bicycles, and shared mopeds). This report describes how the questionnaire and user survey protocol were created. In doing so, the report provides a starting point to conduct standardized user research on shared mobility.
The periodic survey should provide insight into the development and effects of shared mobility. This helps make shared mobility part of the existing mobility system. A second objective is to retrieve (management) information with users' experiences, considerations, and behavior.

Source 21: Natuurlijk!Deelmobiliteit website (2025)

Availability and forms of shared cars

A long-term upward trend, however, the number of shared cars in the Netherlands decreased by 6% in 2024 compared to 2023

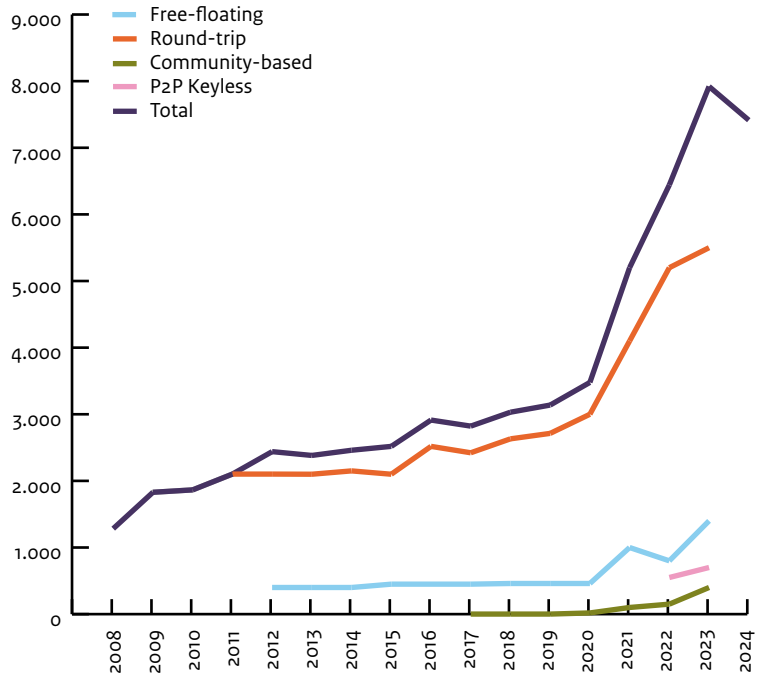
Over the long term, we see steady growth in the number of shared cars (excluding Peer-to-Peer shared cars with physical key transfer). Peer-to-Peer (P2P) car sharing is a form of car sharing where individuals rent out their own car through a platform. In 2024, we see a decrease for the first time: from 7,920 in 2023 to 7,414 shared cars.

P2P shared cars with physical key transfer are not included in the CROW figures. The data on this is not always available and the number of car sharing initiatives varies. This makes it more difficult to label cars as shared cars and count vehicles. To ensure the purest possible database, CROW has not counted this group since 2022.
Within the CROW database, we distinguish four categories of shared cars:

1. Round-trip car sharing: you return the shared car to the place where you picked it up;
2. Free-floating car sharing: you leave the shared car at a place of your choice within the service area;
3. Community-based: a regular group shares a shared car within a closed pool of users;
4. Keyless Peer-to-Peer is sharing a private car with others through a platform.

About half (50.1%) of all shared cars in the categories surveyed are electric. This share increased fractionally compared to 2023. The pace of electrification is faster than that of all cars in the Netherlands, where the share of electric passenger cars is almost 14%. In addition, the average age of shared cars is between 2 and 5 years (depending on the provider). By comparison, the average age of the more than 9 million passenger cars in the Netherlands is almost 12 years. As a result, the average number of driver assistance systems in shared cars is higher than in the overall fleet in the Netherlands. 9% of P2P cars with physical key transfer is electric or hybrid.

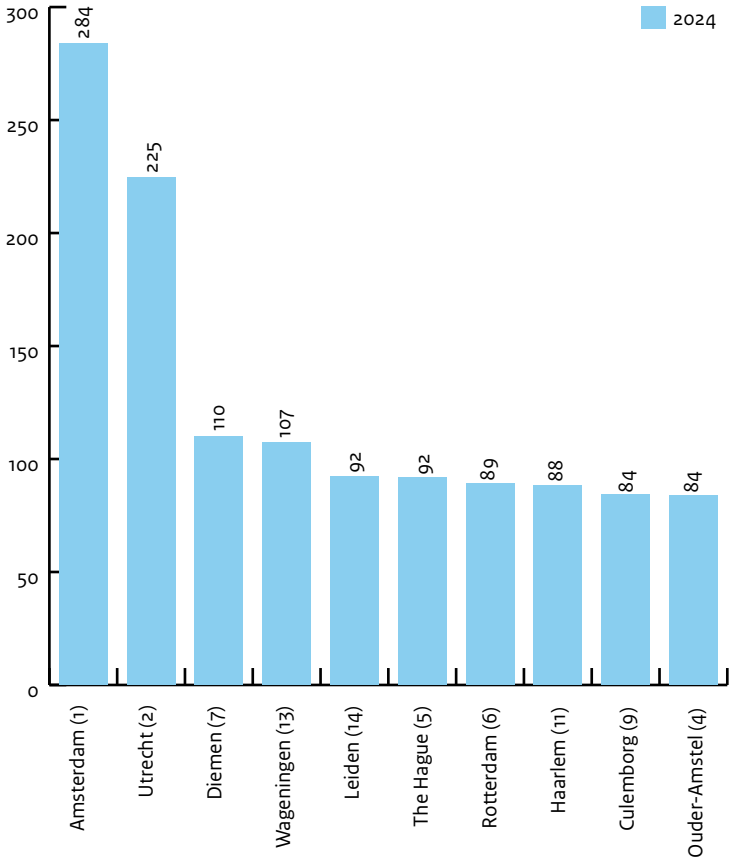
Figure 45: development of the number of shared cars in the Netherlands



Source 18: CROW - Shared Mobility Dashboard (2025)

The top 10 of the number of shared cars per 100,000 residents per municipality changed slightly in 2024 compared to 2023. Amsterdam and Utrecht still lead the top 10. Wageningen, Leiden, Haarlem, and Culemborg are new in the top 10.

Figure 46: top 10 municipalities, number of shared cars per 100,000 residents



Source 18: CROW - Shared Mobility Dashboard (2025)

Numbers of shared two-wheelers

The following insights are based on estimates, due to the lack of a standardized measurement method for supply, use, and effects of shared mobility.

Compared to 2023, the number of shared mopeds decreased by approximately 19% in 2024

Shared mopeds

There are several providers of shared mopeds in the Netherlands. Providers require a municipal license for this. Initially, the provision of shared mopeds experienced major growth. However, municipal policy on allowing providers of shared mopeds has changed in recent years and has led to a significant decline in the number of shared mopeds. In 2024, there were still around 8,600 shared mopeds in the Netherlands. On 1 January 2023, the figure was 10,500 (and 14,900 in 2022).

The number of shared (cargo) bicycles remains about the same in 2024

Shared bicycles

There are several providers of shared bicycles in the Netherlands. Each municipality decides which providers to allow within the municipality. Dutch rail operator NS offers shared bicycles in-house and is the largest provider of shared bicycles with the “OVfiets”. Currently (2025), there are about 22,000 “OVfietsen” available in almost 300 locations in the Netherlands. The total number of shared bicycles is around 26,700 by 2024, according to CROW. This number is similar to 2023. In 2022, there were around 24,900.

Shared cargo bicycles

Shared cargo bicycles are also offered in several municipalities. In 2022, a total of 650 shared cargo bicycles were available. By 2023, this number rose to 950. In 2024, availability has slightly decreased to around 930 shared cargo bikes. At the end of 2024, there was one remaining provider of shared cargo bicycles.

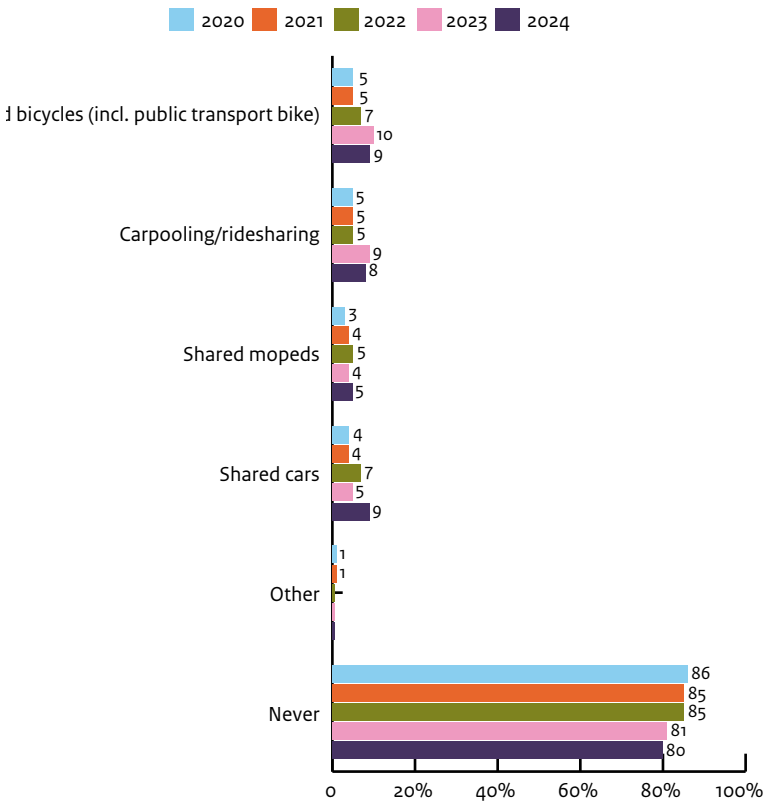
Development of the use of shared mobility

The use of sharing systems increased by 1 percentage point in 2024 compared to 2023 and with 5% compared to 2022. The increase is due to the use of shared cars (+4%). Use of the other sharing systems has remained approximately the same.

Use of shared mobility increases by 1 percentage point in 2024 compared to 2023

In recent years, the share of Dutch people who have used car sharing systems in the past three years increased from 16% to 20% (NTS 2024). The differences compared to previous years are small, but because we see the development over several years, we can speak of an increasing use of car sharing. Dutch people borrow a car from family and friends slightly less frequently than in 2023. More often, Dutch people use shared cars through a company, private cars through an online platform, and shared cars owned by a regular group of users. Use of rental cars and shared cars through the employer remains the same (NTS 2024).

Figure 47: users of forms of shared mobility

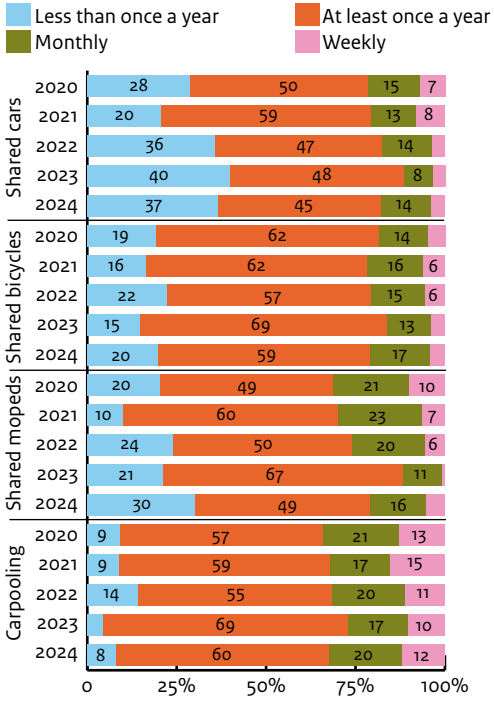


Source 20: Min I&WM - National Travel Survey 2024 (2025)

Frequency of the use of shared mobility

People who use shared mobility mostly do so occasionally. The share of users using shared mobility weekly or monthly is 18% for shared cars (12% by 2023), 21% for shared bicycles (in 2023 16%), and 21% for shared mopeds (in 2023 12%). Carpooling and ridesharing are done more regularly, by 33% of users (27% in 2023).

Figure 48: frequency of use of shared mobility

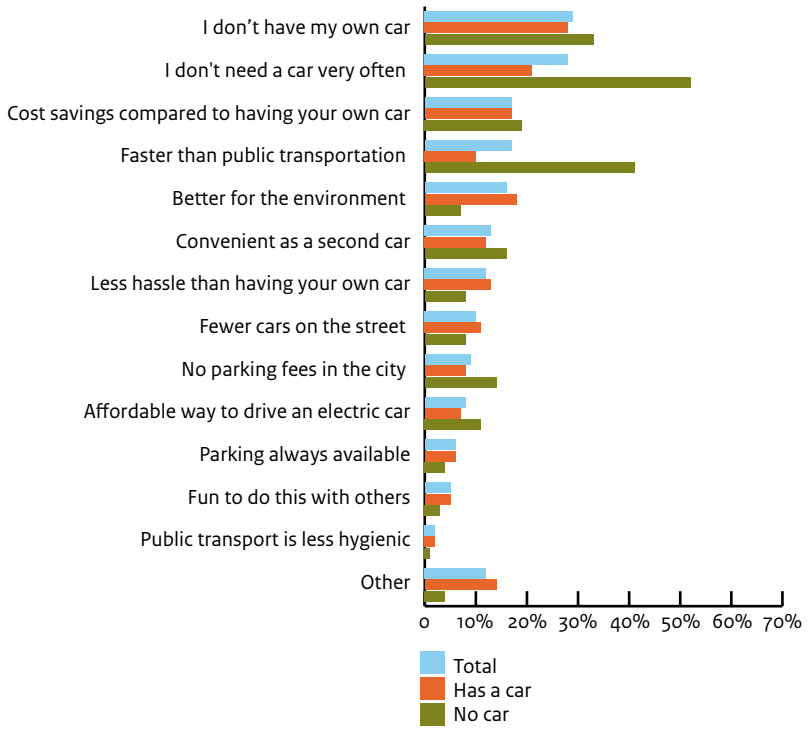


Source 20: Min I&WM - National Travel Survey 2024 (2025)

Main motives for car sharing

The NTS 2024 shows a clear difference in reasons for car-sharing between households that do not (yet) own a car and those that do. Respondents from a household without a car were more likely to mention explicitly not having their own car, being less likely to need a car, the cost, and finding it less of a hassle than having their own car. They are also more likely to experience using a shared car as faster than public transportation, compared to households with a car. The latter group also cited cost savings, convenient as a second car, and easier and cheaper parking as reasons for using a shared car.

Figure 49: reasons for using shared cars (2024)

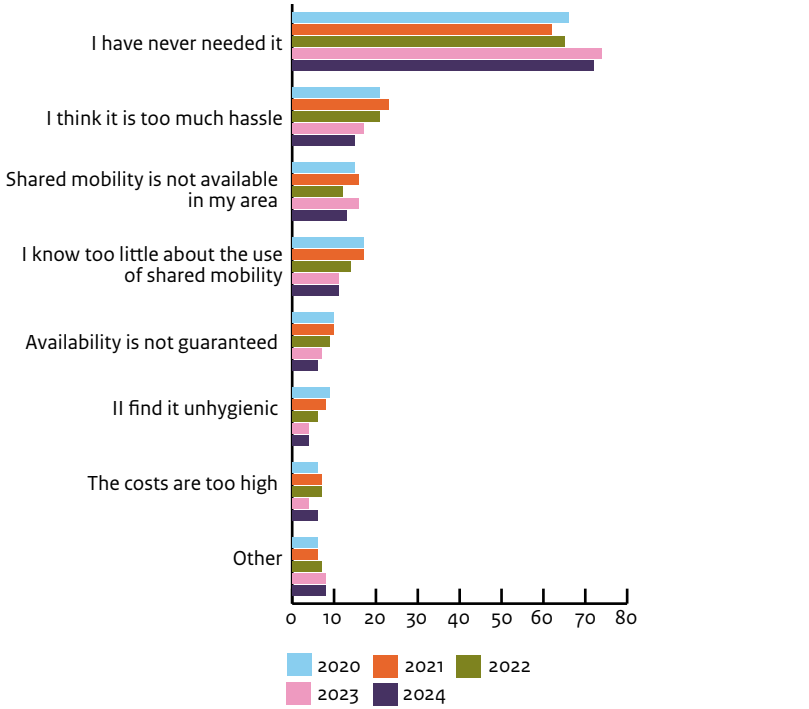


Source 20: Min I&WM - National Travel Survey 2024 (2025)

Reasons not to use shared mobility

The main reason for not using shared mobility (other than shared cars) is that it has not been needed yet. For the shared car, the main reason for not using it is that people already have their own car. In 2024, this applies to 72% of non-users; in 2023, it was 74%. There is a group that says they find shared mobility too much hassle (15%) or know too little about it (11%, the same as 2023, but less than previous years). As in previous years, in 2024 there are about the same number of people who say shared mobility is not available in their area. Price remains a relatively little mentioned reason for not using it (6%).

Figure 50: reasons for not using shared mobility (shared bicycles, shared mopeds, carpooling) (in percent)

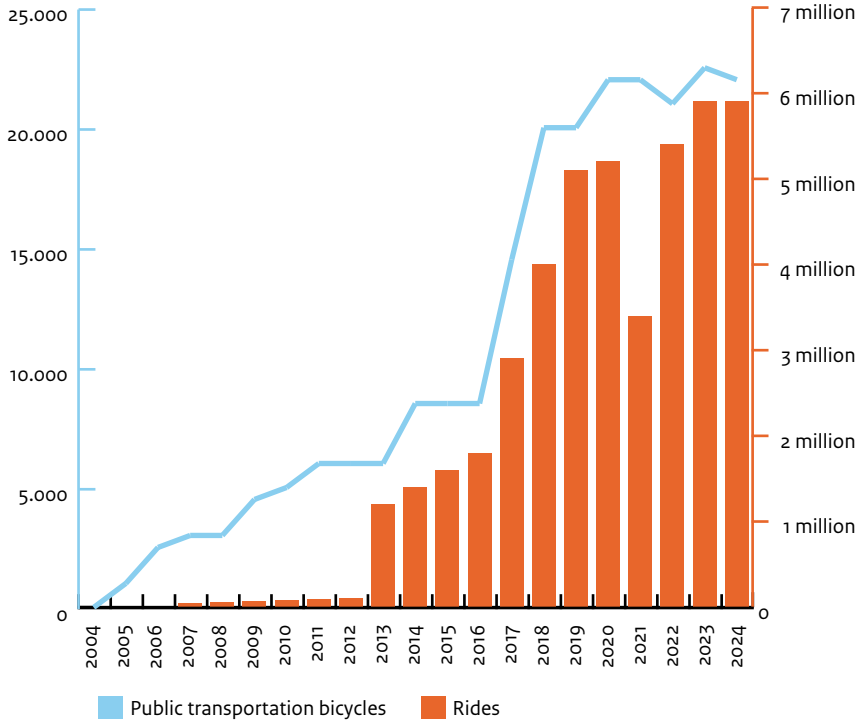


Source 20: Min I&WM - National Travel Survey 2024 (2025)

Using the OVfiets

It is difficult to estimate how many share bicycles are used in the Netherlands, as good data is not available. CROW (knowledge institute for infrastructure, public space, traffic, transport, work, and safety) has developed the Shared Mobility Dashboard that provides an overview of different providers and numbers, but not all providers provide (complete) data. Rail operator NS does have a clear picture of the OVfiets, its public transportation bicycles. Over the last five years, the number of public transport bicycle rides increased from 5.1 million in 2019 to 5.9 million in 2024. During the Covid pandemic, the number of OVfiets rides dropped to over 3.4 million in 2021. Travelers made about 35,000 more trips in 2024 than in 2023. There were about 22,000 public transportation bicycles in circulation in 2024, spread across nearly 300 locations.

Figure 51: total number of public transportation bicycles and trips



Source 19: NS website (OVfiets used record number of times) (2025)

Effects of car sharing

The National Travelers Survey 2024 shows that for just under half of the users of the various forms of car sharing, car sharing has no effect on car ownership (46%: as many own cars). Almost one in three (30%) say they have not bought their own car (yet). A small proportion (12%) say they have purchased or have gotten rid of a car (12%) by using a shared car.

NTS 2024 further shows that for 62% to 71% of users, using a shared car had no effect on the number of trips they made by another means of transportation. In the categories “brought by car”, “bus, tram, subway” and “taxi”, an effect does seem to be taking place. Shared car users made less use of these categories, although the differences with the other modes are small.

Figure 53: effect of car sharing use on use of other modes of transportation (2024)

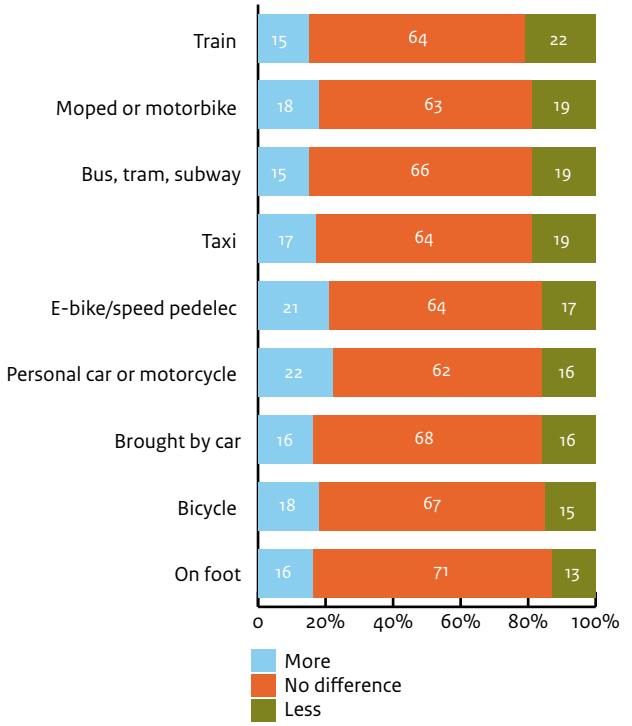
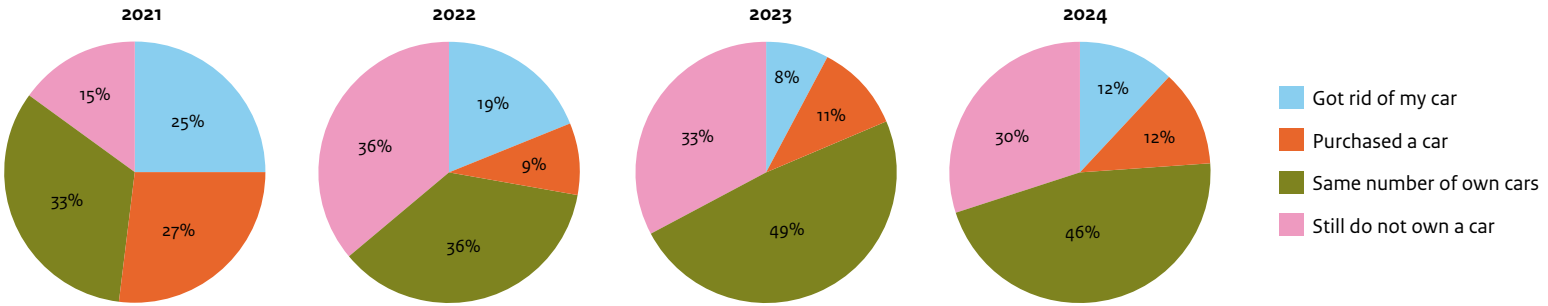


Figure 52: effects of using shared cars



Source 20: Min I&WM - National Travel Survey 2024 (2025)

Cost of mobility services for consumers and government

Mobility services are solutions that offer flexible transportation, such as shared cars, shared bicycles, public transportation, taxis, ridesharing, and MaaS, often through digital platforms. This monitor reports the costs of public transportation and shared mobility. This does not include the cost of taxis, ridesharing, and MaaS.

Public transportation: consumer costs

Consumer

The consumer costs for public transportation are difficult to demonstrate, as it depends on travel distance, region, time of day, fare differentiation, and concession. Despite the complexity, estimates of rates per kilometer have been made.

Train

NS fares for second class depend on the travel distance: short journeys of 1 kilometer cost €2.60/km, while longer distances are cheaper, with €0.20/km for 100 kilometers and €0.15/km for 200 kilometers.

Bus/tram/subway

Fares for bus, tram, and subway vary by concession and often consist of a boarding and a kilometer fare. Tram rides are on average shorter than subway and bus rides, therefore the estimated kilometer price is higher: €0.40 per kilometer. For bus and subway, it is estimated to be €0.26/km.

Between 2015 and 2023, public transportation fares rose between 19% (train) and 28% (bus). The price level of transportation in general rose by 30% on average during this period.

Public transportation: public authority costs

In 2019, total spending by Dutch public authorities on traffic and transport was around €12 billion. 36% of this went to public transportation. This is offset by revenues (for example usage fees for rail). Ultimately, costs were €4 billion higher than the revenues. The negative balance has increased by about 5% since 2008 (when costs exceeded revenues by €3.8 billion).

Shared mobility: consumers costs

Fixed costs for shared transportation are lower than for car, bicycle, or moped ownership. Depending on usage, shared transportation may be more economical. In addition, shared transportation gives the user flexibility (not depending on public transportation times and can usually be driven to the final destination) and the user does not need space to park the vehicle. On the other hand, using it like using traditional transportation costs money.

Shared cars

The distance driven is notably what determines the rate. A rental period of 1 hour and a distance driven of 5 kilometers is about the same price as a rental period of 15 minutes and a distance driven of 20 kilometers.
The rates of various car sharing providers have increased since 2022. In 2022, a 20-kilometer ride and a four-hour rental period cost between €17 and €31. In 2024, it cost between €25 and €47.

Shared bicycles

Whether the shared bicycle is more economical than the tram, bus or metro depends very much on the rental period. A 5-kilometer round trip (2 times 2.5 kilometers) costs around €3.15 by tram (GVB) and bus (U-OV). Only price trends regarding the OVfiets are known: in 2017, the daily fare was €3.85. Between 2017 and 2024, the rate increased by 18%. By comparison, inflation in the same period was 29.4%.

Shared mopeds

The rates for shared mopeds are similar, as are the fare structures.
A 5-kilometer round trip costs around €3.15 by tram (GVB) and bus (U-OV).
A 5-kilometer round trip on a shared moped (two times 2.5 kilometers, assuming 7.5 minutes per trip) costs on average €5.80. In 2022, a 5-kilometer ride and a four-hour rental period cost between € 4.1 and € 5. In 2024, it cost between € 4 and € 6. So, a shared moped is almost twice as expensive per kilometer as public transportation.

Source 9: Min I&WM - Smart Mobility Cost Monitor (2024)

Figure 54: costs of shared mobility for a 5-kilometer trip

Rental period	15 minutes	1 hour	4 hours	3 days
Shared cars	€4 - €23	€7 - €16	€19 - €47	€121 - €163
Shared bicycle - regular back to one	€0.4 - €4.6	€1.4 - €4.55	€4.6 - €6.5	€14 - €68
Shared bicycle - regular back to many	€0.4 - €2.6	€1.4 - €3.3	€4.6 - €9	€15 - €37.5
Shared bicycle - electric back to one	€1.5 - €1.7	€3.8 - €6.6	€13 - €26	€90 - €475
Shared bicycle - electric back to many	€1.5 - €2.8	€3.8 - €6.6	€11 - €26	€50 - €90
Shared bicycle - electric (hybrid) free floating	€4.4 - €4.9	€16.1 - €16.6	€63	-
Shared mopeds	€4 - €6	€10 - €13	€28 - €40	-

Figure 55: costs of shared mobility for a 10-kilometer trip

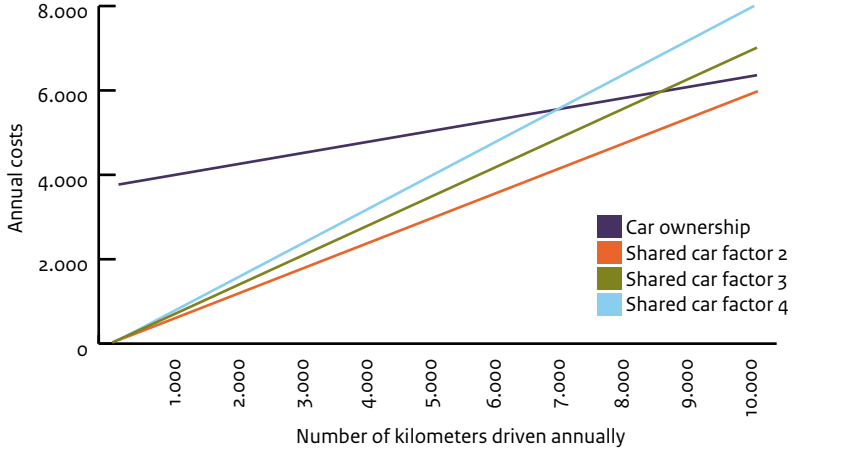
Rental period	15 minutes	1 hour	4 hours	3 days
Shared cars	€4 - €18	€12 - €22	€25 - €47	€126 - €163
Shared bicycle - regular back to one	-	€1.4 - €4.6	€4.6 - €6.5	€14 - €68
Shared bicycle - regular back to many	-	€1.4 - €3.3	€4.6 - €9	€15 - €37.5
Shared bicycle - electric back to one	-	€3.8 - €6.6	€13 - €26	€90 - €475
Shared bicycle - electric back to many	-	€3.8 - €6.6	€11 - €26	€50 - €90
Shared bicycle - electric (hybrid) free floating	-	€16.1 - €16.6	€63	-
Shared mopeds	-	€17 - €22	€39 - €49	-

Source 9: Min I&WM - Smart Mobility Cost Monitor (2024)

Comparing costs of car ownership and shared car use

Whether shared transportation is more economical than car ownership depends on usage. Because of fixed costs, the price per kilometer for car ownership depends heavily on the number of kilometers driven per year. The more you drive, the lower the cost per kilometer. Due to the high fixed costs of car ownership, the shared car is more economical for people who need a car sporadically. Where the tipping point is depends on how much you use the shared car during the rental period. If someone uses the shared car "efficiently" and drives it on average for half the annual rental period, the shared car is more economical even at an annual distance of 10,000 kilometers. If you drive 25%of the annual rental period, then car ownership is more economical if you drive more than 7,000 kilometers.

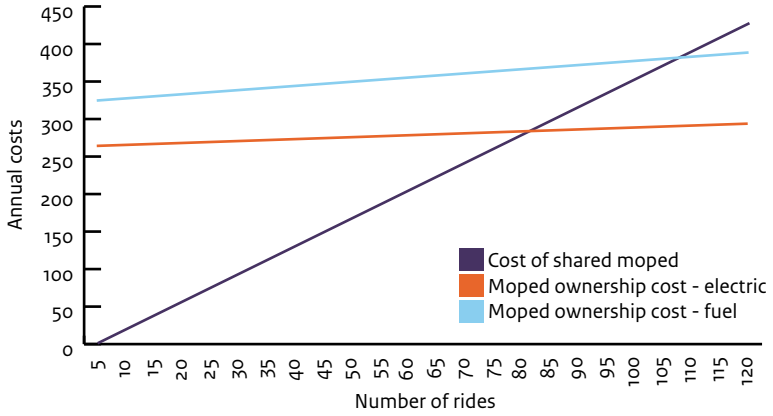
Figure 56: annual cost of shared car/car ownership, assuming 1.5 minutes of driving per kilometer (Factor 2 is 1/2 of rental period driving, 1/2 not driving. Factor 3 is 1/3rd driving, 2/3rd not driving. Factor 4 is 1/4th drive, 3/4th not driving.)



Comparison of costs of moped ownership and shared moped use

The average ride on a shared moped in 2022 took 11 minutes and the average distance was 3.5 kilometers. This ride costs an average of €4. Whether shared moped use is more economical than moped ownership depends on usage. With similar usage – an average trip duration of 11 minutes and average distance of 3.5 kilometers – the shared moped is more economical than a private electric moped, as long as the number of trips remains below 80. Shared mopeds are more economical than private fuel mopeds if the number of trips is below 110.

Figure 57: annual cost of shared moped/moped ownership, assuming an average trip of 3.5 kilometers and an average trip duration of 11 minutes



Source 9: Min I&WM - Smart Mobility Cost Monitor (2024)

Shared mobility: benefits for public authorities

Various public authorities facilitate shared mobility, with the benefits depending on the choices and context within a municipality. For example, shared mobility can reduce parking pressure, reduce emissions, reduce space consumption, reduce traffic congestion, and ensure more efficient use of public transportation by complementing and encouraging it (research by Greenwheels shows that car-sharing users are about 10 times more likely to take public transportation than car owners). In addition, shared mobility accelerates the electrification of the vehicle fleet, contributes to reduced noise pollution, better air quality, and the energy transition. It also provides municipalities with a tool to promote sustainable and healthy mobility. It also encourages inclusiveness by reducing car ownership dependence and supporting target group policies.

From a social perspective, shared mobility offers further benefits: shared cars can be an addition/alternative for residents in neighborhoods where the number of parking spaces are kept low. It enables densification and affordable housing construction through optimal use of the existing mobility system, while contributing to a circular economy by consuming fewer scarce resources. In short, shared mobility offers a wide range of benefits for sustainability, mobility, and livability.

hared mobility: costs for public authorities

It is not certain that the cost of shared mobility is higher than the cost of facilitating traditional transportation. Facilitating "traditional transportation" also involves costs (for example in terms of enforcement, parking spaces, etcetera). The aim is to provide insight into cost items public authorities may face when facilitating shared transportation. The actual costs incurred by municipalities depend on policy choices made and existing regulation.

Figure 58: possible cost items for and charging on by public authorities with regard to shared mobility

Type	Explanation	Charged on to provider/ consumer	Recurring/one-off
Setting up parking space/hub	Placing signs and painting boxes. Sometimes charged on to providers through the parking fee, sometimes the municipalities pay these costs themselves.	Fully, partially or not	Recurring
Charging stations	The installation costs of a charging station are sometimes passed on to the provider, in some cases municipalities choose to bear (some of) these costs.	Fully, partially or not	Recurring
Enforcement	Additional enforcement work due to illegal parking. Legal liability is complicated, which is why fines are often not handed out.	Fully, partially or not	Recurring
Communication	Costs for e.g. neighborhood notices, information evenings, and campaigns.	Not	One-off
Policy advisers, project managers, and management	Policy advisers and project managers focused on policy and boosting shared mobility. Costs for complaint handling, management, and maintenance.	Not	Recurring
Servicing target groups	Reduced rate for groups of residents (e.g. less well-off). These costs are sometimes in part, sometimes fully borne by municipalities.	Partially	Recurring
Digital costs	Development of digital dashboards to monitor shared mobility, but also for future digital enforcement.	Not	Recurring
Cooperative initiatives	Residents of municipalities can start cooperative initiatives themselves. Public authorities may incur costs for organizing e.g. information evenings.	Not	One-off

Source 9: Min I&WM - Smart Mobility Cost Monitor (2024)

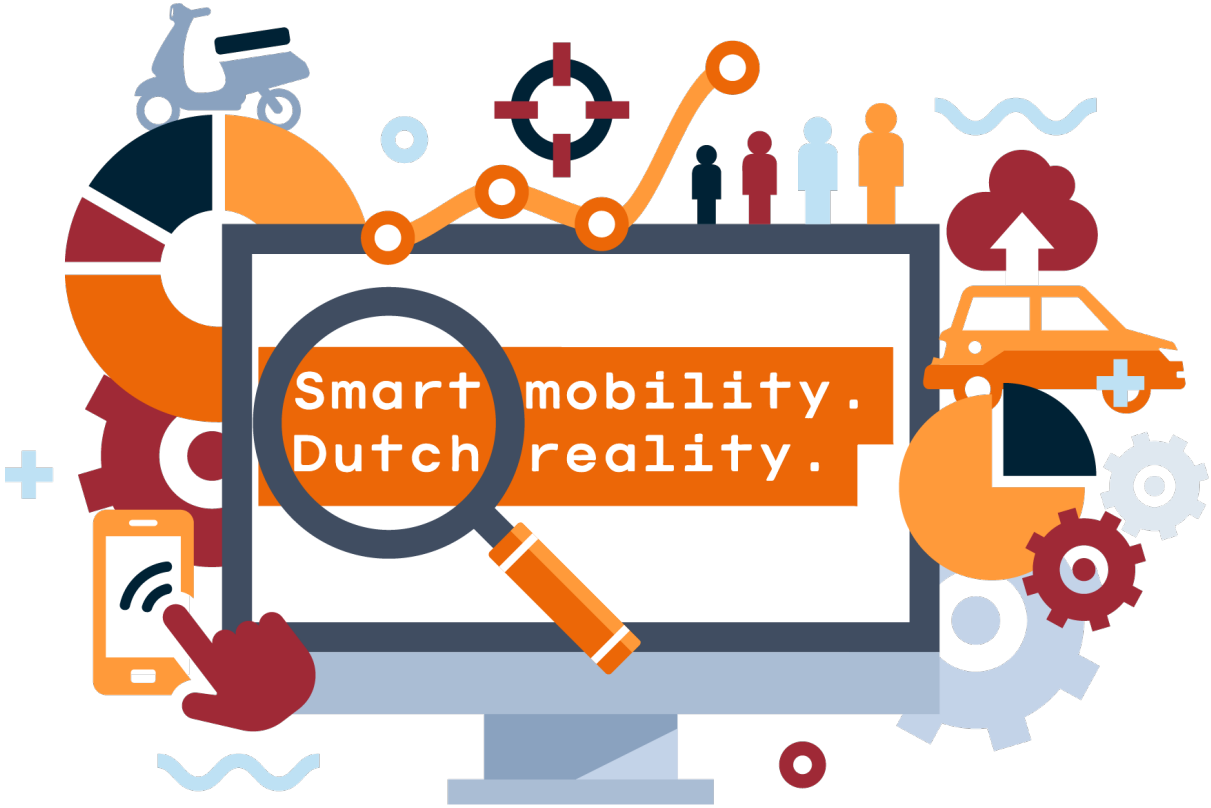
Source reference mobility services

Number	Name source	Year	Website
18	CROW - Shared Mobility Dashboard	2025	Link
19	NS website (OVfiets used record number of times)	2025	Link
20	Min I&WM - National Travelers Survey 2024	2025	On demand
21	Natuurlijk!Deelmobiliteit website	2025	Link

List of acronyms

Term	Acronym
Adaptive Cruise Control	ACC
Advanced Driving Assistance System	ADAS
Advanced Driver Distraction Warning	ADDW
Automated Driving Systems	ADS
Anti-lock Braking System	ABS
Anti-lock Braking System	ABS
Assisted Parking	AP
Autonomous Emergency Braking	AEB
Autonomous Emergency Steering	AES
Blind Spot Warning	BSW
Business-to-consumer car sharing	B2C
Cruise Control	CC
Driver Control Assistance System	DCAS
Driver Drowsiness and Attention Warning	DDAW
Dynamic Route Information Panel	DRIP
Dynamic Traffic Management	DTM
Electronic Stability Program	ESP
Electric vehicle	EV
Emergency Lane Keeping	Every
Forward Collision Warning	FCW
General Safety Regulation	GSR
Geographical Route Information Panel	GRIP
Intelligent Speed Assistance	ISA
Intelligent Traffic Control System	ITCS
Knowledge Institute for Mobility Policy	KiM

Term	Acronym
Knowledge institute for infrastructure, public space, traffic, transportation, work, and safety	CROW
National Traveler Survey	NTS
Lane Centering	LC
Lane Departure Warning	LDW
Lane Keep Assist	LKA
Ministry of Infrastructure and Water Management	Min I&WM
Mobility as a Service	MaaS
Motorway Traffic Management	MTM
National Data portal Road traffic	NDR
Original Equipment Manufacturer	OEM
Peer-to-peer car sharing	P2P
Rear Collision Warning	RCW
Reversing Camera	RC
Remote Control Parking	RCP
Rijkswaterstaat (Directorate-General for Public Works and Water Management)	RWS
Society of Automotive Engineers levels of driving task automation	SAE level
Speed Control Function	SCF
Speed Limit Information Function	SLIF
Stichting Wetenschappelijk Onderzoek Verkeersveiligheid (Road Safety Research Foundation)	SWOV
Ramp Meters	RM
Traffic Sign Recognition	TSR
Urban Data Access Platform	UDAP
Traffic Management	TM
Traffic management information for route advice	VM-IVRA
Zero Emission	ZE



Smart Mobility Monitor 2025

Full English version