

RAC
Report on
Motoring
2008

Report Two

20

Years of Motoring
Technology

RAC



Introduction

In celebration of its twentieth year, three special RAC Reports on Motoring¹ are being produced. The first was published in July and provided a definitive picture of how motoring in Britain has changed over the last 20 years.

This second Report provides an insight into how technology has transformed the face of motoring over the past 20 years and what changes we may see in the future.

Drawing on new research amongst Britain's motorists and a range of other sources of information including Government statistical data, this second Report provides an analysis of the key technological advances that have affected the way we drive and our driving experience over the last 20 years.

¹ The RAC Report on Motoring started life 20 years ago as the LEX Report on Motoring. The name changed in 2000 following the sale of RAC Motoring Service to Lex Services plc. For clarity, all previous versions are consistently referred to as the RAC Report on Motoring.

Foreword



Paul Everitt
Chief Executive,
Society of Motor Manufacturers
and Traders

Twenty years ago and as technology improved, we all expected our cars to get bigger, as a sign of our success. And today, the average new car boasts more computer technology than it took to put the first man on the moon. Thanks to this technology, the cars we drive today are cleaner, safer and more fuel efficient than ever before. Technology that just a few years ago was the reserve of multi million pound concept cars is now available in the most basic of models and yet remarkably, the real cost of a new car has fallen.

As consumer expectations climb, the demands on technology climb too. The motoring public drive choice and competition in the market place as the industry strives to keep pace. Every model, whatever the price, has to meet the most exacting of standards.

Twenty years ago it was not unusual for the owner of even the most modern vehicle to undertake a variety of regular maintenance tasks. Today with stringent emission limits, electronic control systems and sensor technology only a fully trained technician should be lifting the bonnet. For some this means car ownership has lost the charm of previous generations, for most however it means fewer services, lower maintenance costs and reliability as standard.

As I look back, I feel proud to be associated with an industry that has contributed so much to improving urban air quality and reducing the number and severity of road accidents. And as we look to the future and the increasing challenge of climate change, I know the motor industry will continue to develop technology that will make a fundamental difference, at a price people can afford.

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Executive summary

This Report explores in detail the technological changes seen over the past 20 years in terms of safety, security, convenience and efficiency. It looks at how technology has affected our driving experience, the way we drive and how we draw on the technology available to us.

There are a series of key findings in the Report:

- 85% of motorists think the complexity of cars today means people need to be shown how to use in-car technology properly.
- Technology may have made driving safer, but 59% of motorists feel that reliance on in-car technology makes people less safe drivers and only 37% believe technology has had a positive effect in making people more safe drivers.

- There is still a large degree of uncertainty over technological items that are fitted as standard by law, for example ABS and immobilisers.
- Do-it-yourself servicing has declined dramatically in the last 20 years with the vast majority of cars serviced by professionals. Today only 11% of motorists service their own car or have it done by a friend/relative, compared to 38% in 1988.
- Technical advances have fallen into two camps: 'active' and 'passive'. 'Active' technologies such as SatNav and in-car entertainment are not always positive, as they can cause driver distraction, while 'passive' technologies such as ABS are undervalued as they are not fully understood or deemed less important due to their automatic functionality.
- Despite improvements in vehicle security – technology, the number of motorists who have had their cars vandalised is high, with more than one in five reporting vandalism towards their car in the last three years.
- The latest advances in technology to manage traffic are not always fully understood by motorists, meaning their full effectiveness cannot be realised. This is particularly the case with Active Traffic Management (ATM). When this was broken down by region, respondents in the West Midlands and London were more supportive of ATM at 74% and 63% respectively, suggesting that those areas that have direct experience of ATM on a regular basis probably see the benefits more than those that have not.

What are the biggest changes in the past 20 years in cars?

(motorists chose up to three)

- Top three answers (in order)
- improved safety
 - improvements in technology
 - cars have become more reliable



What are the best in-car technological innovations in the past 20 years?

(motorists chose up to three)

- Top three answers (in order)
- airbags
 - seatbelts
 - ABS



What needs to happen now to reduce our car dependency 20 years from now?

(motorists chose up to three)

- Top three answers (in order)
- improvement of investment in public transport
 - investment in alternative fuels / bio-fuels / electric
 - safer roads for cycle and pedestrian usage



“ The car knows so much more about itself, the driver and the journey than it ever used to. It has made the process of driving a whole lot safer, because you can trust the car to deal with other stuff while you concentrate on getting from A to B.

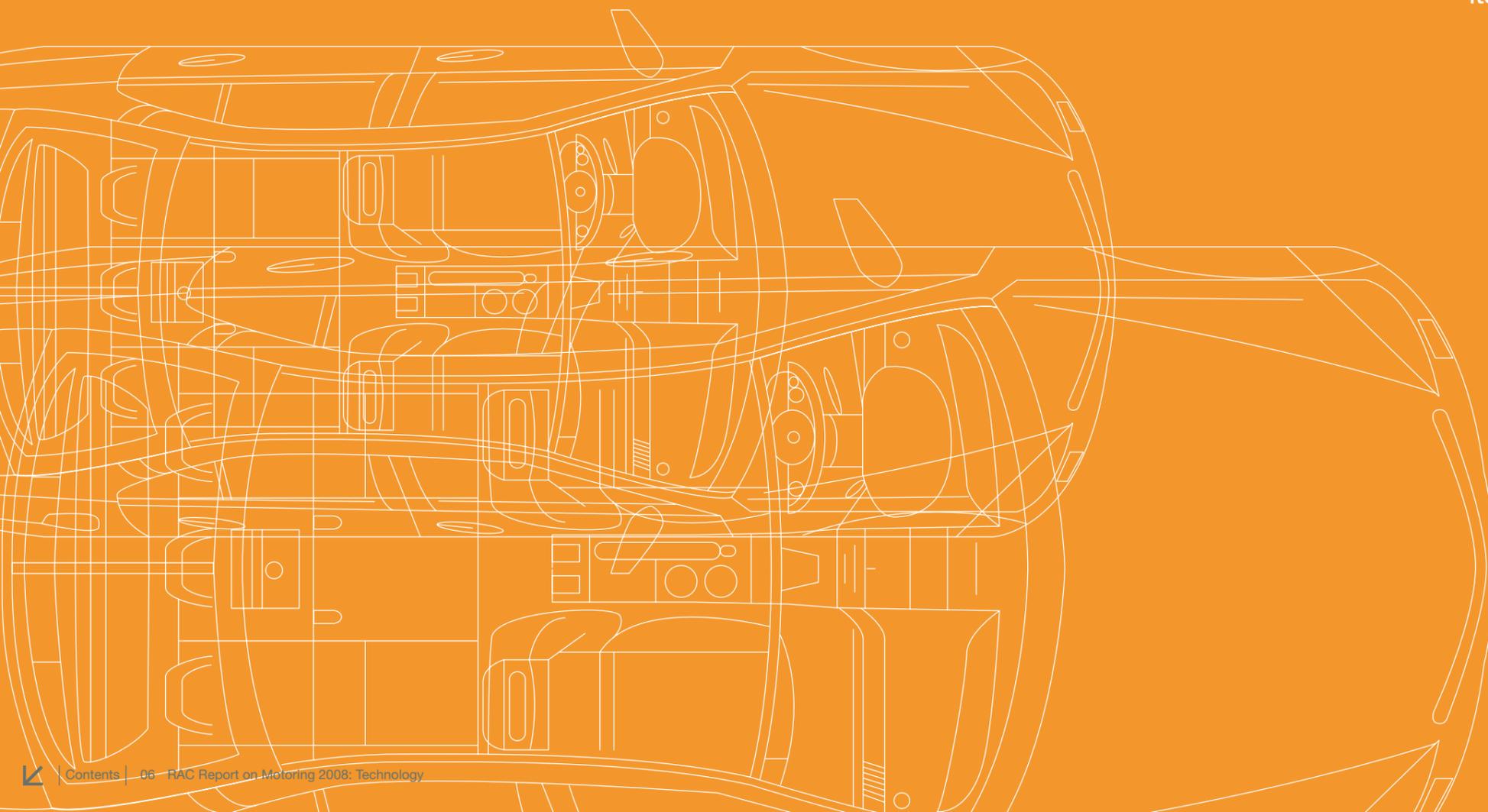
Anthony, motorist from Hertfordshire

”

Chapter One

How has technology changed?

How has technology changed over the past 20 years? All cars, even the smallest and cheapest are now packed with the latest technology. But do motorists really understand and appreciate what all this technology can do for them, can they use it to its full potential and do they even want it?



In-car technology

Even though cars today may look broadly similar to those of 20 years ago, technology has completely transformed the car. There are now infinitely more features to make the driving experience safer, more comfortable and more pleasurable.

In 1988 the Ford Escort was Britain's best selling car, now renamed the Ford Focus. The difference between the two cars is not simply the styling but also the level of in car technology.

Today cars are increasingly equipped with computer consoles that control more than just one thing. Now it is possible to control the audio equipment – radio or MP3 player, satellite navigation (SatNav), traffic information, engine/gearbox/suspension settings as well as mobile telephones all from the steering wheel.

This presents the driver with two major challenges – understanding how to use it all and how not to become distracted by trying to use it while driving.

1988 Ford Escort 1.6L Specifications and features

- 1 Front wheel drive
- 2 Fully independent suspension
- 3 Five speed manual gearbox
- 4 Body toned bumpers
- 5 Four wheel covers
- 6 Padded, fully adjustable head restraints
- 7 Four speakers
- 8 High security locks
- 9 Self seek FM cassette audio system
- 10 Ashtrays
- 11 Electric aerial (XR3i)
- 12 Heated windscreen
- 13 Fuel computer
- 14 Anti-lock brakes
- 15 Cabriolet power roof (XR3i)
- 16 Tailgate wash/wipe
- 17 Three-speed illuminated heater blower switch
- 18 Trinket tray with integral coin slots
- 19 Velour carpet
- 20 Front sport seats
- 21 In-built carphone



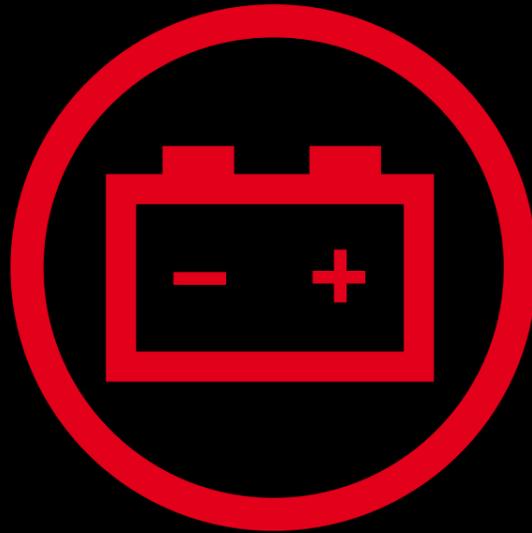
2008 Ford Focus TDCi Specifications and features

- 1 Driver and front passenger airbags
- 2 Front and rear curtain airbags
- 3 Tyre pressure sensors
- 4 Intelligent protection system
- 5 Adaptive front lighting system
- 6 Computer console
- 7 Anti-lock braking system (ABS)
- 8 Electronic Stability Program (ESP) Traction control
- 9 Universal Serial Bus (USB)/iPod connectivity port
- 10 Advanced navigation system
- 11 Alloy wheels
- 12 Air conditioning
- 13 Lane departure warning
- 14 Collision warning
- 15 Power steering
- 16 Cruise control
- 17 Climate control
- 18 Voice command control
- 19 CD autochanger
- 20 Parking distance sensors
- 21 Tailgate wash/wipe
- 22 Bluetooth Hands Free Phone and Voice Control
- 23 Ford Easy fuel capless refuelling system
- 24 Leather heated seats
- 25 Electric windows
- 26 Anti-lock brakes with electronic brake-force distribution
- 27 Ford key-free system
- 28 Thatcham CAT 1 immobiliser

Fig.1 1988 Ford Escort 1.6L compared to 2008 Ford Focus TDCi

Fig.2 Dashboard warning symbols

94%
of people recognised
this as the battery symbol



94%
of people recognised
this as the oil symbol



50%
of people recognised this
as the airbag symbol



2%
of people recognised this as the
coolant temperature symbol



1%
of people recognised this as the
engine symbol



Motorists' understanding of technology in their cars

Cars of today have more technology fitted to them than ever before. But do people know what is fitted to their cars, do they know how to use it properly and how often do they actually use it?

These new technologies fall broadly into two camps - passive safety technologies, for example ABS that do not require driver input for them to work and active technologies that require driver input such as SatNav.

While there is an extensive range of sophisticated in-car technology available in cars today, the majority of motorists do not have many safety features over and above, airbags (92%), ABS (70%), seatbelts with sound/warning symbols (68%). This means if current new car sales continue at around 2 million a year, and the average age of a car is maintained at 5.2 years, it will take some 10-15 years before the majority of motorists can take advantage of advanced safety features such as brake assist, ESP, blind spot sensors, collision warning, and lane departure warning.

Dashboard warning symbols

Similarly there are now more warning lights than ever before - making drivers even more dependent on the information being given to them by their cars. In addition to the traditional lights for oil pressure and battery charging there are new ones warning us if fluids are low and if technology is not working or even switched on.

When shown a series of dashboard warning symbols motorists are not always clear about what they refer to.

Many symbols appear to be common or broadly similar across all manufacturers. But there is a wide range of variation as to what a symbol actually means. For example, an oil symbol can mean either levels or pressure is low, an ESP or airbag symbol could mean it is disengaged but it could also mean that it is malfunctioning or it is in operation.

Colours also have significance; red normally means danger/stop immediately, orange/amber, that something needs attention, and green purely information. But this can vary as well.

New technologies are bringing with them even more confusion. Take for example the Vauxhall, BMW and Honda lane departure symbols.

Helping the motorist understand

In our survey, 85% of motorists agreed with the statement - "The complexity of cars today means people need to be shown how to use in-car technology properly". This would normally be done when a new vehicle is handed over by the dealer, but a formal handover does not always happen, particularly with company cars.

With second hand purchases, there is an increased reliance on the instruction manual. When asked, 85% of respondents agreed with the statement - "Car manufacturers need to improve the clarity of information on car technology, including making manuals more user friendly".

RAC calls for

Pan-European code of practice to be implemented standardising the dashboard display symbols and lights. It should be made easier for motorists to understand the meaning of warning lights as well as the level of risk they face.

Wider use of LCD screens in new cars to provide drivers with plain English explanations of warnings and associated remedies.

Car manuals need to be developed and written in a more consumer friendly way with downloadable quick user guides for the second hand car market. Manufacturers should also ensure that their warning symbols and explanations are readily accessible online, so that customers can identify problems quickly.

Dealers should consider inviting new owners of second hand cars to be briefed on the technology and how their new car operates.



Vauxhall lane departure warning



BMW lane departure warning



Honda lane departure warning

What do drivers most want in their next car?

What people would like to have in their next car is not as obvious as it would first seem and there is a link between what people are familiar with and what they want.

Motorists when given a choice will choose convenience and comfort over safety. The 2008 survey showed that motorists are very receptive to having the latest in-car technology – and do not want to return to former low level technologies such as non-electric windows (4%) and individual door locking (4%).

But the most desired safety features are those motorists are most familiar with, more airbags – all round: front (93%), side (89%) and rear (82%) and ABS (88%). Newer technologies are seen as less desirable, even if they provide the same or greater safety benefits. For example over a third of motorists could either do without ESP or don't know enough about it to be able to make a decision. Motorists also rated CD player (89%) and SatNav (63%) as more desirable than collision warning (55%) and lane departure warning (41%).

High mileage drivers are better informed about what technology can do and how to use it. But they also want the things that make driving easier, more comfortable or efficient and therefore the number who want SatNav, climate control, Bluetooth, voice command controls and CD players is high.

89% think a CD player is most desirable



41% find lane departure a desirable technology



Fig.4 Desirable technology
Non-generic symbols illustrating the percentage of what people would like in their car – safety vs comfort/convenience

Desirable technology Safety items		Desirable technology Comfort/convenience	
Airbags:		In-car entertainment:	
driver and front passenger	93	radio	91
front side impact	89	CD player	89
rear	82	DVD player	36
ABS	88	Steering: power assisted	91
Tyre pressure monitoring system	74	Electronic Power Steering (EPS)	64
Brake assist	73	Electronic windows: front	90
Whiplash protection	73	rear	74
Parking sensors	71	Central locking	89
Seatbelts with sound and warning system	69	Immobiliser	87
Intelligent protection system	68	Air conditioning	74
Blind spot sensors	68	Solar reflective windscreen	67
Electronic stability control/ ESP	64	Automatic windscreen wipers	64
Hazard warning lights - automatic	61	AUTO Climate control	63
Electronic Brake Distribution (EBD)	60	SATNAV Satellite navigation	63
Adaptive front lighting	59	Automatic headlamps	63
Collision warning	55	Adaptive Variable Suspension (AVS)	53
LED rear lights	52	Capless re-fuelling	51
Adaptive cruise control	52	Hands-free mobile phone – voice controlled	48
Intelligent speed adaption	45	Key free system	46
Lane departure warning	41	Bluetooth	45
		Automatic brakes in 'stop-start' traffic	43
		Power/engine start button	41
		Voice command controls	28
		Individual locking – rather than central locking	4
		Non-electronic windows	4

Fig.3 Comfort vs safety
Motorists rated a CD player more desirable than safety features such as lane departure warning

An overview of external advances

Technology has also had a major impact on our roads and the way we drive. Speed cameras and active traffic management have changed the roads on which we drive – and not always to the great pleasure of the motorist.

Fuel technology

Despite all the technological changes, fossil fuels are still the prime source of power for the modern car.

Petrol and diesel remain the main fuels used over the past 20 years with Liquid Petroleum Gas (LPG) a distant third. In 1990 just 6%² of new cars registered ran on diesel; in 2007 it was 40%³. Amongst the alternatives, hybrids – combining conventional petrol or diesel with an electric motor – have become the more widely accepted.

And in the last 6 months, the first Fuel Cell vehicles have been launched in California and Japan – fuel cells differ to batteries in that they create energy via a fuel, normally hydrogen, as opposed to just storing and discharging energy as is the case with batteries.

The future of car fuels will be looked at in more detail in the third 2008 RAC Report on Motoring.

SatNav and traffic information

SatNavs were originally developed by the United States military and have been fitted to cars since the early 90s. Traffic monitoring technology trials started on the M25 in May 1990. For the first time, monitoring traffic flows electronically and in 'real time', was possible. The secondary benefit of this was that the data could then be transmitted to cars, giving drivers the opportunity to change routes before getting caught in jams. Then, in 1999, SatNav, digital mobile phone and road traffic information technology was combined to create SmartNav. This enabled in-car SatNav devices to respond to traffic congestion and actively re-route drivers around the trouble spot.

Will the future continue to combine technologies to the greater benefit of the motorist? Will all cars be able to communicate with each other and provide real time information on what they are doing and what is happening on the road around them? If yes, combining satellite, mapping and traffic information technologies will keep drivers better informed and give a greater range of choices.

The key challenge for manufacturers then, is to make sure that these 'active' technologies do not distract motorists to such an extent they cause dangerous driving.

Speed monitoring and awareness

Speed cameras first appeared in the UK in 1992. Their deployment was designed to reduce accidents, injuries and deaths. But they have been contentious from day one, with many motorists viewing them as a way of raising revenue rather than enforcing safety measures.

This view is becoming more entrenched, with three in four motorists surveyed viewing speed cameras as revenue raisers, up from just over two thirds in 2006.

The Government is now taking steps to try and diffuse this negative perception by improving warning signage, as well as the visibility of the cameras themselves. First time speeding offenders in some counties can now attend speed awareness courses instead of collecting points on their licences and a fine.

More positively, almost three in five motorists believe average speed cameras have improved traffic management, even though they were introduced as a road safety measure. Four out of five also view speed awareness signs positively as a way of reducing drivers' speeds.

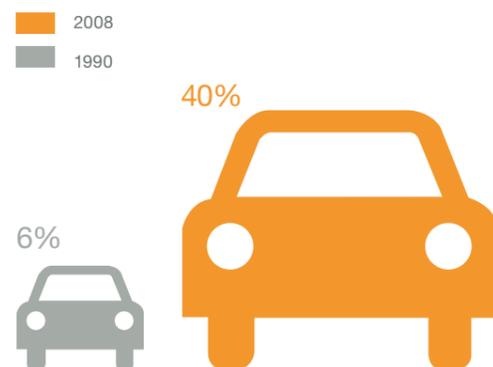
² ACAE new passenger car registrations breakdown by specifications: share of diesel.

³ SMMT motor industry facts 2008.

∨ RAC calls for

A nationwide audit of speed cameras to be carried out to ensure that each one can demonstrate a proven effect in reducing accidents and those which cannot, should be removed.

∨ Fig.5 The amount of registered diesel cars 1990 vs 2008



A typical traffic management information sign



Road and infrastructure engineering

It is not only the car itself that has been transformed over the last 20 years. The road infrastructure has also seen dramatic advances.

But whereas there appears to be an acceptance of charging for using tunnels and bridges, charging for roads is still a contentious issue.

Road user charging

Road user charging covers a variety of systems which require motorists to pay for using roads. Until relatively recently, this has been restricted to tolls on key road bridges in the UK. The application of road user charging has since spread and now includes Toll Roads (such as the M6 Toll Road) where motorists pay to use a defined section of road and congestion charging (such as the London Congestion Charge) where drivers pay to use a designated zone, normally comprising a city centre.

There is a mixed picture on motorists' views towards road user charging. The one emerging theme is that many are yet to be fully convinced by charges:

- 39% of motorists felt that Toll Roads had a positive effect on tackling congestion levels
- 34% agreed with the principle of congestion charging in order to reduce traffic

The one certainty is that motorists' views towards road user charging have become gradually more positive over the last 20 years. In 1989, 9% of motorists said that they supported road tolls on motorways for solving congestion, while 14% supported congestion charging for city centres.

Congestion charging is now a part of many motorists' driving experiences.

Durham achieved the distinction of being the first city in the UK to introduce a charge for entering a part of the city in October 2002. London's Congestion Charge, introduced in February 2003 by the then newly elected Mayor of London, Ken Livingstone, is probably the more famous though. It was extended to cover more of central London in February 2007. Although these two remain the only operational systems, the West Midlands, Greater Manchester, Tyne and Wear, Shrewsbury, Cambridgeshire and Bristol were all given Government funding in 2005 to look at road charging.

Whereas the Durham system is relatively simple in that it only applies to one road, with drivers paying via a simple machine to exit the system, the London scheme is far more complex, using automatic number plate recognition technology to monitor vehicles coming into and out of the congestion zone.

Managing road traffic

With motorways costing more than £29.9m per mile to build and the current widening of the M1 from Dunstable to the M25 projected to cost £308m, road building is an expensive way to ease congestion.

ATM

Active Traffic Management (ATM) is one example of technology providing a less expensive solution. Nationally, more than half of motorists believe that ATM has a positive effect on traffic management and 84%⁴ felt hard shoulder running, in these circumstances, was safe. Approval of ATM increased to 74% and 63% respectively in the West Midlands and London, which have direct experience of the system and its benefits.

⁴Highways Agency

RAC calls for

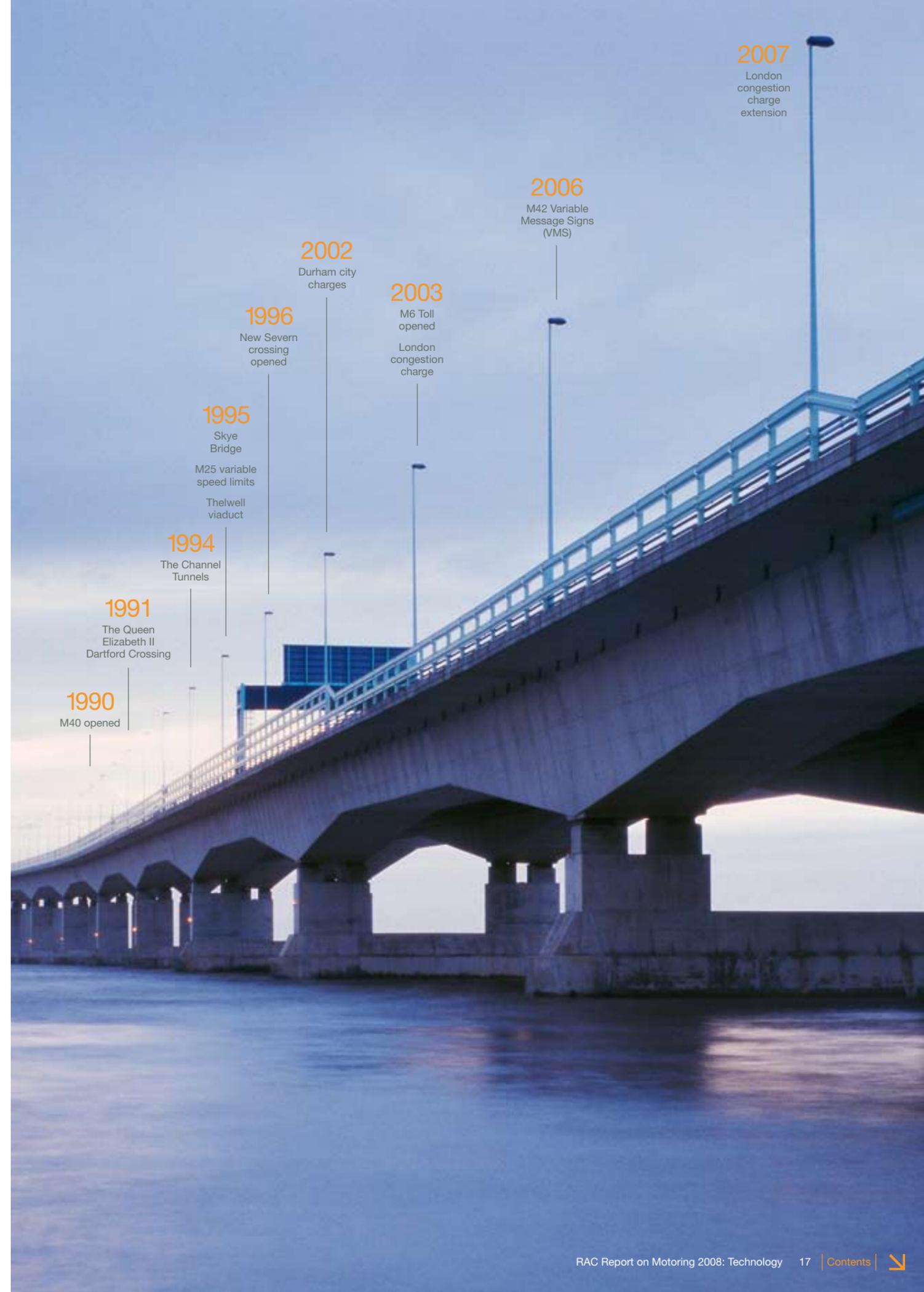
Confirmation from Government that profits from any road pricing schemes will be re-invested in roads and public transport. In addition road tax should be reduced or zero rated if plans for national road pricing schemes are implemented. These actions should help address public scepticism about road pricing and enable an open debate about the difficult challenges we face.

Current Government plans for hard shoulder running and ATM should be implemented in their outlined timescales. These schemes should also be rolled out on all suitable motorways, with thorough feasibility analysis and targeted public communication and driver education. As our research has suggested, RAC recognises we cannot simply build ourselves out of congestion.

Fig.6 The cost of building motorways



The new Severn crossing was opened in 1996



2007
London congestion charge extension

2006

M42 Variable Message Signs (VMS)

2002

Durham city charges

2003

M6 Toll opened

London congestion charge

1996

New Severn crossing opened

1995

Skye Bridge

M25 variable speed limits

Thelwell viaduct

1994

The Channel Tunnels

1991

The Queen Elizabeth II Dartford Crossing

1990

M40 opened



I routinely check tyre pressures and wear and tear, the engine oil level, radiator fluid level and windscreen washer levels. Other than this, I rely upon regular service checks by a professional motor mechanic.

**Ian, motorist
from Norfolk**

”

Chapter Two

The way we use technology

Technology has transformed the car over the past 20 years. But how has that impacted on the way we drive and own our cars? Do we drive more safely or do all these new gadgets distract us as never before? As cars have become more complex do we really understand what goes on under the bonnet and do we even care?



Road safety

Cars today are much safer than in 1988. Even the most basic models now have side-impact bars, ABS and airbags as standard.

All this is evidence of the ever-higher safety standards to which car companies design and build modern cars. So much so that in the first 2008 RAC Report on Motoring, three in five motorists pointed to improved safety as the single biggest change in cars over the last 20 years.

The roads are unquestionably safer as well. According to Government statistics, since 1988 the number of deaths and serious injuries on Britain's roads has halved.

There is a big difference between cars and motoring being safer and safer drivers. Cars and motorists are safer through passive technologies such as ABS and airbags, as the reduction in road injuries and deaths illustrate, but not all technologies are making us safer drivers. Those that require the driver to actively operate them, such as in-car entertainment and SatNavs make motorists less safe as their attention is diverted away from driving. Nearly half (46%) of motorists admit to being distracted by their in-car technology whilst driving and almost six out of 10 believe that too much reliance on in-car technology makes people less safe.

While mobile phones grab the headlines as the most distracting of the new technologies, over half of motorists actually rate their radio/CD player as the biggest cause of distraction while they drive, with climate controls, mobile phones, and SatNavs all in joint second at just over one in three.

Fig.7 What distracts drivers
Percentage of people who have been seriously distracted whilst driving by using in-car instruments and equipment.

Which of the following in-car instruments and equipment cause you to become seriously distracted when driving?

Radio/CD/DVD	54
Heating/air-conditioning	35
SatNav	34
Mobile phone	32

RAC calls for

The focus of safety campaigns should be widened to include all of the in-car distractions, such as adjusting the radio or heating and air-conditioning controls. Motorists need better awareness of how to use in-car technology responsibly.

A selection of features available to the motorist. Clockwise from top right; electric window control for driver and passenger side; passenger airbag; SatNav; rpm counter with icons; headlight controls; climate control and air-conditioning; speedometer with icons; CD player/radio

Over reliance on technology

Map reading skills may become redundant as we rely on SatNav to tell us which way to go and paper road atlases may become museum pieces.

We now have access to every conceivable type of map through in-car systems, the internet or mobile phones.

Our survey clearly shows that motorists believe we have become too reliant on in-car technology (57% agree) and that too much reliance on in-car technology makes motorists less safe drivers (59% agree). Almost half of us also think technology makes us take more risks when driving. This reliance on technology is leading us to lose skills, which while no longer essential, are still important.

The internet has made more information available to drivers before they depart – traffic information, mapping and weather forecasts. There is evidence that people may be supplementing or replacing road atlases with downloadable maps from the internet. The proportion of people who said that they had downloaded maps from the internet in the past six months, doubled from 16% in 2001, to 34%⁵ in 2006.

⁵ nVision Research.

Fig.8 The proportion of people downloading maps from the internet



Fig.9 We have become too reliant on in-car technology
Percentage of people who:

Agree	57
Neither/nor	26
Disagree	18

RAC calls for

Basic map reading skills should form part of the learning to drive process, and a motorist awareness campaign should be carried out to encourage motorists to plan their journey ahead. RAC recommends that motorists keep a road atlas/map in the car in case something happens mid-journey, which diverts them from their planned course.



Improved reliability

Cars have become more reliable over time. But do people really understand what goes on under the bonnet and how many people still do their own servicing?

Basic checks

Most people are confident about checking the basics of oil, water, tyres and lights.

Almost three quarters of motorists are confident of checking their oil, but when the work gets slightly more technical, for example changing spark plugs, this confidence falls dramatically to only a quarter.

Women are generally less confident about doing this than men. Whereas 86% of men do the checks themselves, 45% of female motorists either get their partner/husband or other family member to do it for them.

But the increased computerisation hasn't made motorists complacent, with nearly half disagreeing that 'the sophistication of in-car technology meant they did not have to worry about knowing how to do basic checks themselves'. This view was stronger amongst the 65+ age group, at 57%, than those who are younger.

Servicing

Increases in technology do not appear to have diminished people's understanding of the need to properly maintain a car. But trying to service a modern car without the correct diagnostic equipment is now virtually impossible.

Where a car is serviced is heavily dependent on who owns the car – company cars are more likely to be serviced in a franchised dealer, private in non-franchised.

DIY or done by a friend/relative is almost exclusively the preserve of the private buyer (12%) and has shown a significant decline from 1988, when 23% of respondents stated that they serviced their cars themselves with another 15% getting a friend or acquaintance to do it for them.

The nature of car servicing is also changing.

Service intervals have been getting longer. 20 years ago the average interval was 6 months or 5,000 miles, now 12 months and 10,000 is standard. Variable service intervals are increasingly being introduced. Advances in oil technology giving it longer life, combined with on-board computers that assess how the car has been used and driven, enable the car to determine when it needs its next service.

Fig.10 Basic checks
How confident are you in checking the following?
(Percentage of people responding confident)

	Men	Women
 Oil level	85	62
 Water level	82	55
 Spark plugs	44	7
 Tyre pressure	81	50
 All lights on your vehicle are working	85	72



Crime and security

Car crime is falling and has been doing so consistently, on every measure, since 1995. However, the nature of car crime is changing.

While the number of cars on the road has increased by 49%⁶ over the last 20 years, car crime has fallen by 65% to 1,497,000 incidents in 2007/8, from its peak of 4,350,000 incidents in 1995⁷. In real terms it means the likelihood of a vehicle being subjected to crime of one sort or another has gone from over one in five to one in 20.

Fig.11 shows that motorists in our survey were more likely to have suffered vandalism than theft of, or theft from, their cars, with more than one in five having had their car vandalised in the last three years against 9% suffering some kind of theft. However our survey shows cars that had been stolen were more likely to be damaged when recovered (2008: 70%) than 20 years ago (1988: 52%).

Most motorists take precautions against crime and will always lock doors (97%) and close windows (95%). They are also more security conscious than they were 20 years ago. Now:

- 86% cover valuables/put them in the glove compartment, against 52% in 1988.
- 64% avoid parking in high risk areas, against 44% in 1988.
- 55% use a car alarm, against 13% in 1988.
- 67% have the benefit of an immobiliser, a security device that was not available to motorists in 1988.

While the number of theft claims has reduced by almost half (49.5%) the total cost of claims has reduced by only a quarter (24.9%)⁸. This would suggest that more high value cars are being targeted. According to the British Crime Survey, car owners are more concerned about car crime (15%) than burglary (14%) in urban areas, whereas those in rural areas have the same level of concern (8%)⁹.

Thieves are now focusing their efforts on trying to steal the keys either from owners' houses or from people when they are actually in their cars.

The Car Theft Index¹⁰ clearly shows that the older the car, the more likely it is to be stolen. The average car first registered between 1991 and 1993 is seven times more likely to be stolen (22 thefts per 1,000 registered) than a car registered between 2003 and 2005 (three thefts per 1,000 registered).

Fig.11 Car crime
Percentage of people who have experienced any of the following in the last 3 years.

Theft of car	2
Theft from car – radio/CD/DVD player	5
Theft from car – other items	6
Vandalism towards car	21

⁶ DfT, latest year data available from the Department for Transport (DfT) statistics at the time of writing.

⁷ Crime in England and Wales 2007/08 Findings from the British Crime Survey and police recorded crime, published July 2008.

⁸ ABI Quarterly Motor Statistics Q1 2008.

⁹ Car Theft Index 2006 Report.

¹⁰ Car Theft Index 2006 Report.

As security has improved, stealing a car has become increasingly more difficult in newer cars

“ We will have more alternatives using battery and electricity. Some car manufacturers will hold back this development for as long as possible, until they are forced to react by increasing prices of oil and production. The winners will be the ones that introduce these solutions quickly.

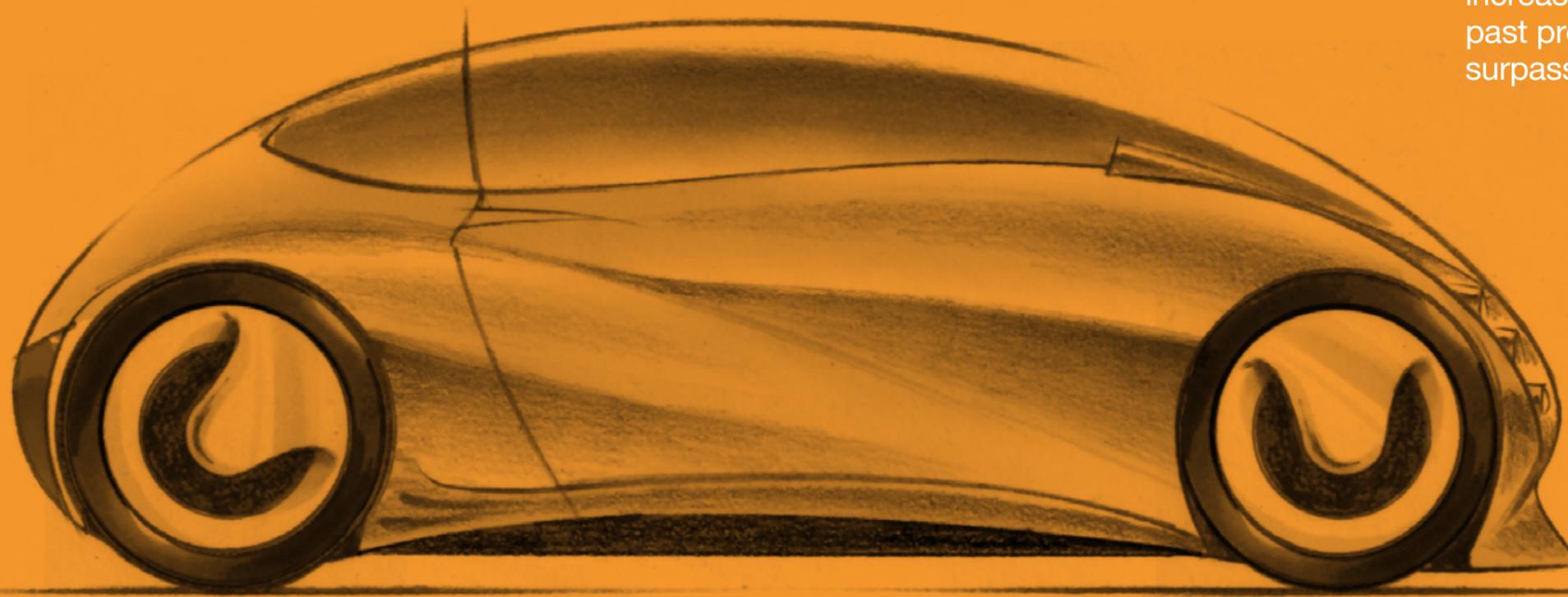
Ruth, motorist from London

”

Chapter Three

How could technology change motoring over the next 20 years?

Car technology is ever evolving. Our perception of what the future holds for cars may be increasingly reasonable but have any of our past predictions been realised? Has technology surpassed our expectations?



↙ An illustration of a possible future car design. Motorists expectations of the future design of cars in 20 years time are realistic. They believe that they will be broadly the same as the cars of today

Predictions over the last 20 years

Some of the predictions made by motorists back in the late 80s and early 90s were amazingly accurate. Some however were well wide of the mark.

The accurate forecasts:

On-board computers

In 1989, 23% of people predicted that on-board computers would provide directions and would be fitted to all cars.

Telephones, faxes and photocopiers

In 1989, 26% of people predicted telephones, faxes and photocopiers would be standard in all executive cars. If you replace fax and photocopier with e-mail, the prediction was spot on.

Commuters

In 1992, 29% of people thought technological advances would allow most commuters to work from home and communicate with their office by computer. In 1991, 12% thought businessmen would set up mobile offices to save office space.

Tolls on motorways

In 1989, 42% of people thought there would be tolls on motorways. The M6 toll is the only one currently in operation but a number more have been mooted.

Taxes

In 1990, 46% of people predicted the Government would raise taxes on fuel ahead of inflation to reduce consumption and 41% forecast the road fund licence would have been raised ahead of inflation as well.

Driving in cities

In 1991, 55% of people believed that you would have to pay extra to drive in major cities and 28% in 1990 thought that electric cars would be commonly used in town.

Airbags

In 1992, 57% thought that all cars would have airbags fitted as standard.



46%

of people predicted the Government would raise taxes on fuel ahead of inflation to reduce consumption

The not-so-accurate forecasts:

Second M25

In 1992, 39% thought that a second M25 would have been built around London and would have taken at least 20 years to start building after all the planning consultation and road protests.

Company cars

In 1990 37%, in 1991 44% and in 1992 39% thought the advantages of having a company car would be removed. It has been reduced, but 50% of the total market for new cars are still company cars of one description or another.

Speed limits

There was a complete lack of unanimity when it came to speed limits on motorways – 32% in 1990 thought they would be raised to 80mph and 14% thought they would be reduced to 60mph, by 1992 24% thought that all speed limits across Europe would be reduced by 10mph.

Channel tunnel

In 1989 18%, and in 1990 20%, thought that the Channel Tunnel would not be completed.

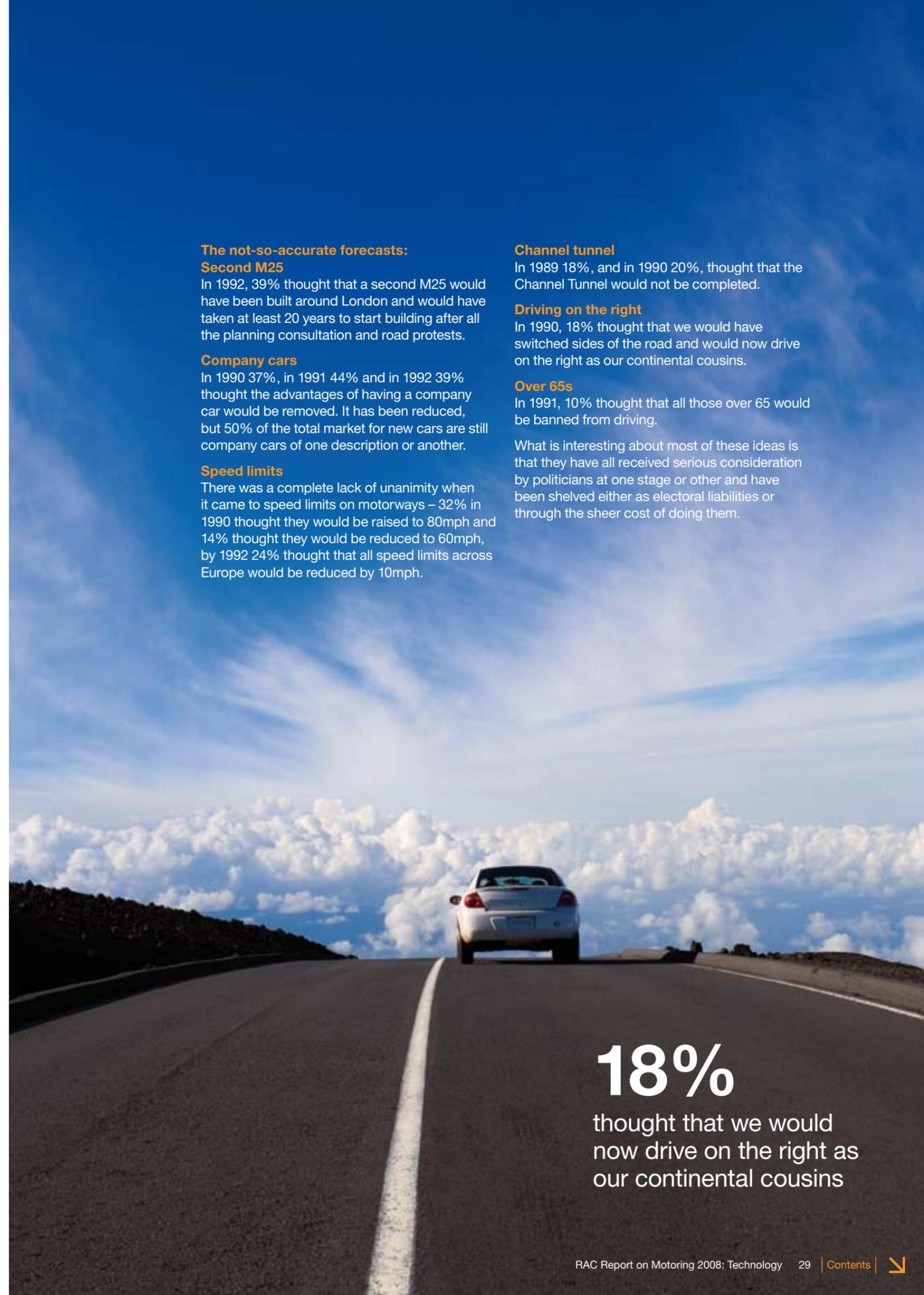
Driving on the right

In 1990, 18% thought that we would have switched sides of the road and would now drive on the right as our continental cousins.

Over 65s

In 1991, 10% thought that all those over 65 would be banned from driving.

What is interesting about most of these ideas is that they have all received serious consideration by politicians at one stage or other and have been shelved either as electoral liabilities or through the sheer cost of doing them.



18%

thought that we would now drive on the right as our continental cousins

Predictions over the next 20 years

The technology that will become commonplace in cars in the next 20 years is probably already in existence.

- 58% of motorists now believe all motorways will be tolled.
- 58% of motorists believe that drivers will have to pay to drive in all cities.
- 51% believe cars will not be allowed into city centres, in 1988 it was 56%.
- 16% now believe car ownership will be limited to one per household up from the 8% who thought the same in 1991.

Motorists now concentrate on the impact of usage or how usage can be offset, so car sharing, restrictions on cars with no passengers all now appear in predictions for the future. Gridlock is now seen as not just a possibility, but an inevitable reality.

Fig.12 Predictions for the next 20 years

16%
now believe that in 20 years time car ownership will be limited to one per household



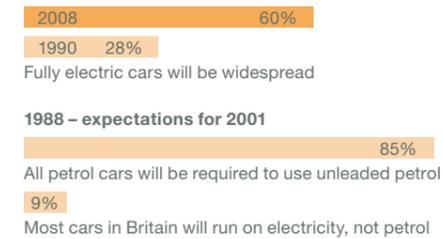
Fig.13 What in-car technology will be a reality in 20 years time?



Fig.14 What road management technology will be a reality in 20 years time?



Fig.15 What fuel technology will be a reality in 20 years time?



Safety and security

Technology will continue to play an ever increasing part in improving safety, thereby reducing the accident rate. But the nature of the problem means that although computer and mechanical reliability can be substantially improved over time, human error will always have a key part to play.

In recognition of this, a number of technologies currently being developed or just coming onto the market – lane change warning, brake assist, road sign recognition and attention assistance (detecting and warning a driver when they are falling asleep) – are designed to assist the driver, aiding or guiding them to avoid a potential accident.

There are also technologies under development that have the potential to remove the control from the driver. Combining satellite navigation with vehicle management systems it is now possible to prevent cars from exceeding the speed limit on any road in the UK. This effectively removes the choice from the driver.

Emissions

Twenty years ago the challenge for legislators and manufacturers was to reduce the amount of pollution being emitted by cars. There is still a way to go, but the combination of EU legislation and the manufacturers seeing commercial benefit in being 'green' has seen dramatic reductions in these harmful emissions.

However, the process of reducing many of the noxious substances previously found in fuels, converts them into Carbon Dioxide (CO₂). So by solving one problem, it has contributed in part to another, that of CO₂ emissions from cars.

The key challenge for the next 20 years is reducing the emissions of CO₂, from the fuels used in cars, or the fuel source that powers the car. There is little point in replacing fossil fuels with battery/fuel cell vehicles that derive their power from equally as CO₂ generating sources. The issue of greener fuels will be explored more fully in the third 2008 RAC Report on Motoring.

60%
of people think that electric cars will be widespread compared to 28% in 1990



Conclusion

Technology has always been a key feature of the motorcar. But while mechanical engineering has continued to develop steadily, it is in the area of computing/electronics that the real leaps have been made.

Almost all new car systems are now dependent on computers to enable them to work. Engine management, braking, steering, SatNav and in-car entertainment all use the very latest computing technology to enhance the driving experience, improve safety and maximise performance.

There has also been a dramatic reduction in cost, thereby enabling similar technology to be present on the most expensive and cheapest cars.

But it is now time to question whether technology is the solution to safety issues that many people have viewed it as. While passive technologies undoubtedly make driving safer and reduce the number of accidents, active technology can work against this. As cars have become easier to drive, motorists are in danger of being lulled into a false sense of security that allows them to be distracted. Some of the distraction, such as radio/CDs and heating controls, have been around for decades, while the newer ones such as mobile phones and SatNav just add to the list.

As new technology has changed our cars, so we should be changing the way we are taught to drive. We need to teach drivers to use technology in the most effective way, to help ensure that they are not distracted by active technology. It is important that motorists use active technology responsibly while gaining a fuller understanding of the passive safety features in their car.

Technology has transformed the way we drive. We are safer, more comfortable and have more entertainment options. We have SatNav to tell us where to go and traffic information that tells us what traffic jams to avoid.

The future will bring cars that are more active in their environment as opposed to the being purely responsive to the inputs of the driver. They will be able to communicate with other cars to avoid accidents, use the roads more effectively and improve levels of safety.

There has been a dramatic reduction in environmental damage through reduced toxicity of emissions. But cutting CO₂ emissions remains a major challenge. Technology will not be able to provide the whole answer to reducing CO₂ emissions in the short to medium term. Viable truly zero CO₂ emission cars are still a long way from reality when R&D, production, fuel source i.e. power stations and disposal is taken into consideration. The key challenge to these alternative energy sources is yielding the same level of performance – speed and range – as fossil fuels without requiring significant periods to refuel.

Our whole economy is based on the ability to move around quickly and easily. Over the past 20 years we have become more dependent on the car to do that. If personal mobility is to be reduced, who will determine this, Government or popular consent? This is a thorny subject, fraught with difficulty but one that will need to be addressed.

The third and final 2008 RAC Report on Motoring will look at these issues in detail.

Appendix A About this Report.

Drawing on 20 years of the Report, new research amongst Britain's motorists, official Government statistics, and various other sources, this second 2008 RAC Report on Motoring provides an analysis of the key technological advances that have affected the way we drive and the driving experience over the last 20 years.

The research for the Report was carried out for RAC by Quadrangle. A total of 1,034 motorists shared their views on motoring in 2008 and how they have changed since 1988 in an online survey during August 2008.

The Report was prepared under the overall editorial control of Tracey Crouch, Head of UK Public Affairs, and has been guided by the expert contributions of the 2008 RAC Report on Motoring Advisory Panel that was chaired by David Bizley, Director of Technical.

The Report was written for RAC by Guy Masters and edited by Rosanna Spero.

The Report was designed for RAC by Curious and printed by Williams Lea.

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Vehicle Compliance Manager, Volkswagen Group UK Limited

Appendix B

About the research.

Research methodology

This Report is based on a large-scale quantitative internet survey and desk research conducted by Quadrangle on behalf of RAC. For the internet survey, Quadrangle interviewed 1,034 British motorists (defined as currently having a valid driving license and driving at least once a month). The survey was completed during August 2008.

The sample was nationally representative on age, gender, socio-economic groups and region. The number of company car drivers was boosted, and as such weighting factors have been applied to restore the overall sample to be nationally representative of households with company cars. The sample was also weighted for market representation of new versus second hand car ownership.

Quadrangle also undertook desk research, using all previous available RAC Reports on Motoring from 1988 – 2008*, and data in the public domain published by the Department for Transport and the Office for National Statistics.

* Until 1999, the reports were called 'The Lex Report on Motoring' and from 2000 'RAC Report on Motoring'.

Statistical reliability

Any figure taken from a sample can never be taken as a precise indication of the actual figures for the total population being sampled. The figures shown are an estimate, within a small margin of error, of the actual figures. The error margin varies with the sample size – the larger the sample is, the lower the error will be. It also varies with the proportions answering so the error is lower for a 90/10 result than for a 50/50 result.

In order to illustrate the use of varying sample sizes and their affect on the statistical significance of results, the table below outlines the degree of statistical error broadly associated with different sample sizes from the car drivers' survey. For example, from a sample of 1,000, if 50% answered in a particular way, we would be 95% confident that the true range is between 47% and 53%.

Sample size	Percentage error 90/10	result 50/50 result
2,000	+/-2	+/-3
1,000	+/-2	+/-3
800	+/-2	+/-3
600	+/-2	+/-4
400	+/-3	+/-5
200	+/-4	+/-7
100	+/-5	+/-10

Glossary

Acceleration Skid Control (ASR) uses sensors to detect when the car is losing traction when accelerating and restricts the accelerator.

Adaptive cruise control uses radar technology to slow the car by applying the brakes to ensure a safe distance is maintained between cars. Once the car in front has moved out of the way, the car will return to its set cruise speed.

Adaptive Variable Suspension (AVS) allows suspension settings for the car to be adjusted by the driver or automatically.

Anti-lock Braking System (ABS) uses sensors to detect when wheels have locked under braking, automatically releasing the brakes to stop the lock and reapplying to maintain braking effect, enabling the driver to maintain control of the car.

Bluetooth provides a way to exchange information between devices such as mobile phones, laptops, printers, digital cameras and video game consoles over a short-range radio frequency bandwidth.

Brake assist occurs when the brakes detect an emergency stop, computers control the brakes to effect the perfect stop.

Collision mitigation braking systems are in-built radar systems that detect a possible collision and apply the brakes if required.

Electronic Brake Distribution (EBD) uses brake technology to automatically apply more or less braking pressure to individual wheels based on road conditions and speed etc, whilst maintaining vehicular control.

Electronic Stability Programme (ESP) uses sensors to detect when wheels are not turning at the same speed e.g. when a car is skidding and controls the accelerator and/or applies the brakes either individually or together to bring the car under control.

Head up displays project vital information e.g. speed into a special display on the windscreen.

Lane departure warning occurs when the car detects that it is drifting out of lane and sounds a warning signal.

Light Emitting Diode (LED) LEDs are often used as 'pilot' lights in electronic appliances to indicate whether the circuit is closed or not. LEDs are widely used on electronic devices such as car indicators.

Liquid Crystal Display (LCD) is the technology used for displays which can be seen on car dashboards and other smaller computer technologies.

Night vision infrared is specially adapted lights and camera that enables the driver via an in-car TV to see much further into the distance than normal car lights at night.

Sign recognition system reads speed restriction signs and displays the current speed limit in the car.

Thatcham Category 1 Immobiliser is a security system with electronic alarm and immobiliser combined.

Universal Serial Bus (USB) is a port that allows the 'hot-plugging' of multiple external plug-and-play devices. A USB connection port can be found on computer technology that is universally compatible with many types of devices such as iPods, MP3s and printers.

Company overview

RAC

With around seven million members, RAC is one of the UK's most progressive motoring organisations, providing services for both private and business motorists. Whether it's roadside assistance, car insurance or up-to-the-minute traffic and travel information – RAC provides the motorist with peace of mind.

Aviva bought RAC in May 2005. The acquisition brings together RAC's powerful brand and customer base with the expertise and leading position in motor insurance of Norwich Union Insurance (part of Aviva).

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