



On the road to sustainability

Sustainability Report of the Car
Manufacturing and Auto Parts Industries

February 2012



Contents

Sustainable automotive manufacturers and suppliers	5
Industry trends and sustainability issues	7
Key issue: Green technologies	9
Appendix	
Industry structure	13
Sustainability criteria	14
Contacts	15
Publications	16

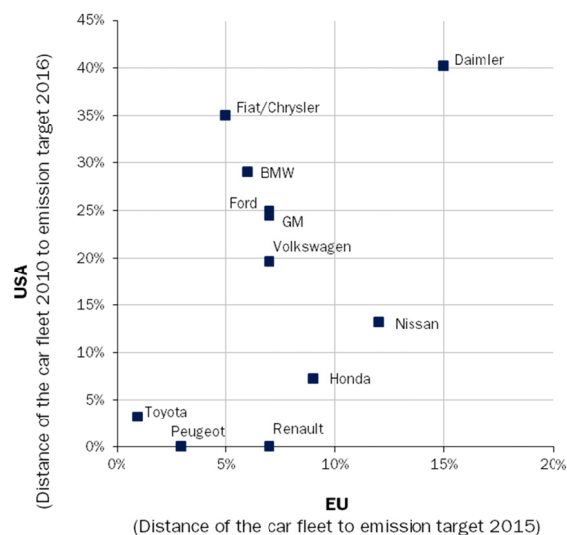
Sustainable car manufacturers and suppliers

The automotive industry carries major environmental and social risks compared with other sectors. Our sustainability criteria for these companies are accordingly strict. Among the leading automotive manufacturers, only Peugeot qualifies for our sustainability fund. Eligible suppliers are Bosch, Denso, Johnson Controls, Faurecia and Valeo, as well as the tyre manufacturers Michelin and Pirelli.

Leading automotive manufacturers

For many years Toyota led the ranking of sustainability ratings for automotive manufacturers, but last year Peugeot ousted the Japanese car-maker from the top position. In our current assessment, Peugeot is the only stock to qualify for inclusion in the sustainable investment universe. The French manufacturer scores well on important criteria such as the greenhouse-gas efficiency of the vehicle fleet in relation to forthcoming legal targets – areas where Toyota also remains a leader (see Fig. 1).

Fig. 1: Shortfall of manufacturers' fleet average from greenhouse gas targets (ln %)

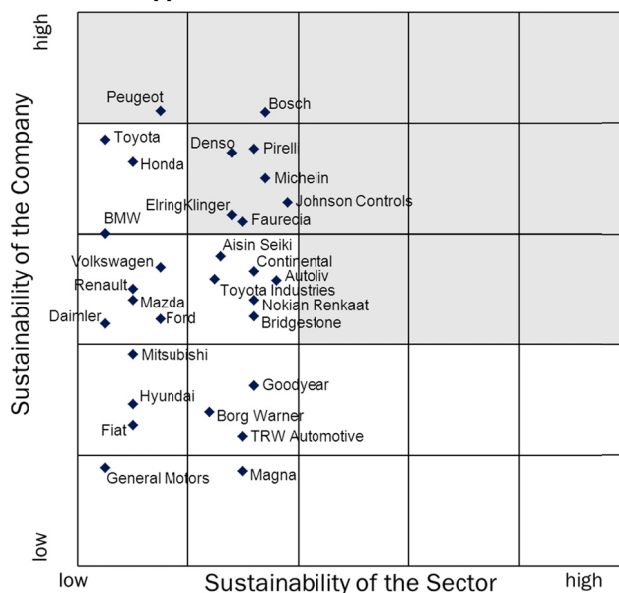


Sources: EPA/DOT Dec. 2011; Transport & Environment, Sept. 2011

Viewed over the longer term, though, the greenhouse-gas efficiency of the current fleet is a static assessment. Therefore, in our appraisal we also consider the technological strength of the manufacturers in the development of low-emission vehicles. Besides Peugeot,

we also consider Volkswagen, BMW and Toyota to be well-placed with regard to the optimisation of existing technology – that is to say, the combustion engine. In the longer term, when new technologies come to the fore, we think Peugeot, Toyota, the two German companies and Honda have good chances. Against the background of the transfer of core skills from OEMs to suppliers, we have also assessed the quality of supplier relations. The Japanese manufactures Toyota and Honda continue to score very well in this respect.

Fig. 2: Sustainability ratings of major automotive manufacturers and suppliers



Source: Sarasin

Leading automotive suppliers

The industry leader Bosch is the front-runner in terms of sustainability. The company has a broadly based range of technologies, focusing mainly on combustion engine technology (injection systems), but with various R&D

activities relating to hybrid and electric drive systems. The company traditionally seeks constructive cooperation with trade unions, with a staff policy that aims for stability and relatively few redundancies. The same is true of Denso, a supplier that traditionally works closely with Toyota. Denso is one of the companies in the second rank of the sustainability rating. In the area of green technologies, Denso produces fuel injection systems and energy-efficient air-conditioning units. The company has begun systematically to incorporate environmental targets into its product development. Another company in the second rank is Johnson Controls, whose business activities focus on seats, other interior fittings and batteries. In terms of leading-edge technologies, the company has decided to concentrate on weight reduction and electric drive units. Johnson Controls is a leader as regards the introduction and monitoring of environmental and social criteria for suppliers.

The automotive sector has a substantial impact on the environment

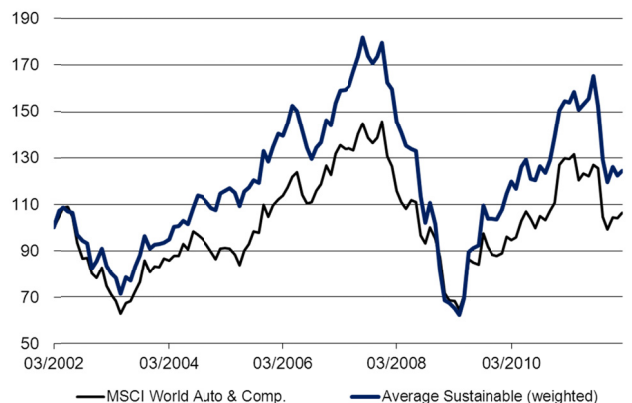
Compared with other sectors, the automotive industry has a large environmental impact: Road transport is one of the biggest consumers of petroleum and emitters of air pollutants, with an increasing tendency. Other aspects include road traffic accidents, which cause numerous deaths and injuries, and the social implications of relocating production to low-wage countries. Automotive manufacturers therefore have a low rating and automotive suppliers a below-average sector rating in the Sarasin Sustainability Matrix.¹ This means that individual companies have to achieve high sustainability ratings to qualify for inclusion in our sustainability funds (grey shaded area of the matrix in Fig. 2). Key criteria, apart from the energy-efficiency of the current vehicle or product range, include minimal emissions of CO₂ and other air pollutants and positioning in new, greener vehicle technologies. In recent years, technological development has increasingly shifted away from the automotive manufacturers and towards the suppliers. To a growing extent, therefore, the two sectors need to be considered jointly.

Influence of sustainability on performance

Environmentally and socially responsible governance, especially the positioning in leading-edge technologies, has a direct influence on the future prospects of automotive companies. Companies that lead the field in this respect will have better market opportunities in the long term and are in a better position to avoid or reduce the risks arising from future environmental and energy-policy restrictions than less proactive companies.

A rough performance comparison confirms this (Fig. 3): Over a period of 10 years the shareholder return of the stocks currently rated as sustainable (according to the eligible universe in Fig. 2) was approximately 35%, compared with a market return (MSCI World Automobiles & Components) of only about 20%. There was however a larger-than-average, temporary dip during the financial crisis of 2008.

Fig. 3: Performance of sustainable companies compared with the market



Total return indices in euros; weighted by market capitalisation;
Source: Datastream, Sarasin

¹ In view of their indirect influence along the supply chain, in contrast to the direct influence of the manufacturers

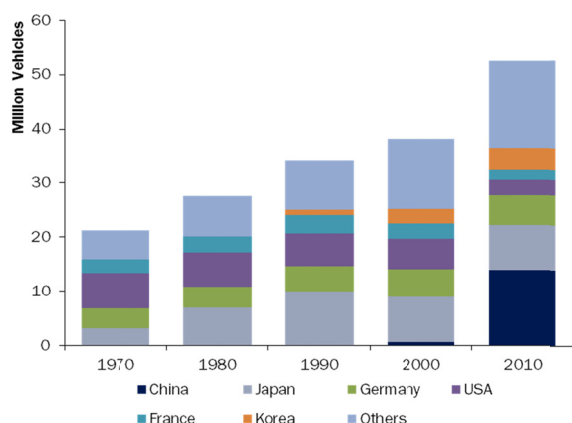
Industry trends and sustainability issues

Key issues for the sustainable development of the automotive sector include product innovations to reduce pollutant emissions and fuel consumption, improvements in traffic safety, assurance of the quality and reliability of vehicles and socially responsible ways of dealing with the growing offshoring of production to emerging-market countries (redundancies and observance of minimum social standards in the supply chains).

Growth taking place in emerging markets

In recent years, global automotive production has increased by an average of 2.4% per annum. The traditional manufacturers from the USA, Europe and Japan have lost market share, while China has risen within the space of only 10 years to become the world's largest producer.

Fig. 4: Global growth of car production



Source: OICA

The ascendancy of emerging-market countries as manufacturing locations is due primarily to the development of those countries' sales markets. The suppliers follow the manufacturers in order to serve the local markets, but also to take advantage of low costs. In the last 20 years, automotive manufacturers have outsourced aspects of their production to suppliers, in some cases by spinning off parts of their businesses to separate companies (e.g. Delphi and Visteon spun off by General Motors and Ford). This was an attempt to offload flexibility problems and cost pressures to suppliers. Some of these outsourcing suppliers were obliged to file for bankruptcy after only a few years, while others find themselves under constant margin pressure.

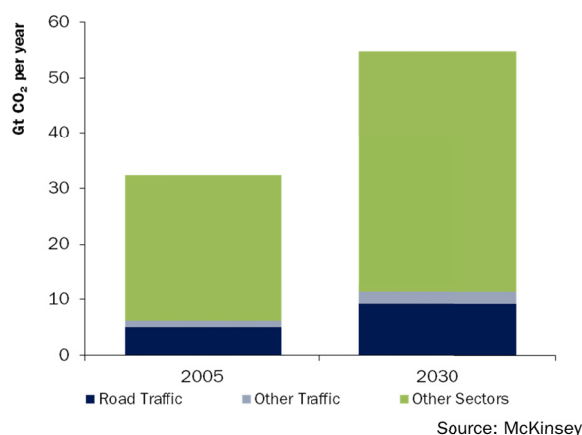
Outsourcing carries social risks

From a sustainability perspective, the outsourcing trend entails social risks: On the one hand, jobs are lost in the industrialised countries; on the other hand, the observance of minimum social standards (pay, industrial safety, freedom of association, etc.) is often not guaranteed in emerging market countries. Both are potential sources of conflict, often leading to labour disputes in view of the relatively high degree of unionisation of this sector. Companies can avoid this by paying attention to social impacts in the management of their supply chains and implementing redundancies in industrialised countries in a socially responsible manner.

Greenhouse gases to rise by 80% by 2030

Road transport is one of the biggest energy consumers and greenhouse gas emitters, accounting for around 15% of the total².

Fig. 5: Forecast of global man-made greenhouse gas emissions up to 2030



Source: McKinsey

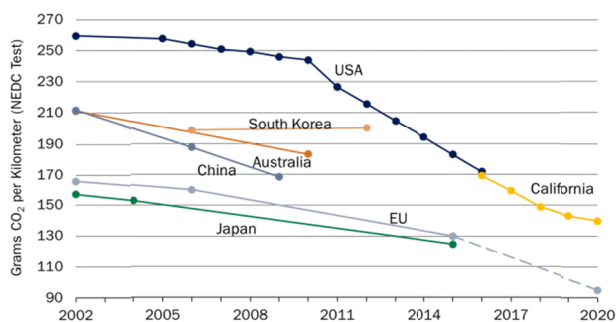
² Related to greenhouse gas emissions from anthropogenic sources, i.e. excluding agriculture and forestry

Just over 60% comes from cars and light duty vehicles, 40% from medium and heavy duty vehicles. The trend points upwards and emissions from road traffic are expected to rise by a further 80% by 2030 (Fig. 5). Road traffic accounts for an even larger proportion of air pollutant emissions: nitrogen oxides (in Europe approx. 40%, USA approx. 50%), particulates (in Europe approx. 15%) and volatile organic compounds (in Europe approx. 20%).

Stricter laws and scarce oil

Environmental policy-makers have therefore introduced extensive requirements and limits aimed at reducing energy consumption and emissions. In the EU, relatively strict limits apply to CO₂ emissions from vehicle fleets (Fig. 6), and stricter rules will also apply to nitrogen oxides and particulates in the future.³

Fig. 6: CO₂ and efficiency limits for cars



Source: International Council on Clean Transportation, May 2009

Regardless of the environmental policy requirements, the sector is one of the largest consumers of mineral oil and thus faces the prospect of resource depletion and associated rises in fuel prices.

Pressure to innovate

Automotive manufacturers and suppliers are therefore under increasing pressure to develop energy-saving product innovations. Firms at the cutting edge of technology can thus benefit from growing market opportunities. Because automotive manufacturers have increasingly outsourced not only production but also R&D activities to suppliers in recent years, the pressure to

innovate increases the dependence of manufacturers on suppliers, so that the balance of power is shifting in the suppliers' favour.

Vehicle quality and reliability also a priority

A major challenge for the industry is quality assurance. Defects of product quality and reliability lead increasingly to lawsuits or loss of reputation with consumers. High-profile recall campaigns, such as that of US Toyota in 2010 due to faulty brake pedals, tell their own story. Companies therefore need an effective quality management system, which also covers their complex supply chains. Since road traffic accidents are among the top ten causes of death worldwide, legal safety requirements are constantly being tightened up. This opens up growing market opportunities for suppliers of safety technology.

Key issues of the sustainability analysis

The above-mentioned sector trends are reflected by the three key issues of our sustainability analysis (Fig. 7). Environmentally friendly product innovations are especially significant. This is further explained in the next section. The rating of the companies on these key issues is incorporated into the more detailed evaluation matrix of our sustainability analysis (see appendix).

Fig. 7: Key issues of the sustainability analysis

Subject	Contents	Financial relevance
Green technologies	Increasing fuel efficiency, reducing emissions: new technologies, optimisation of existing technologies	Legal requirements concerning emissions and consumption
Product quality & safety	Reliability (tests, vehicle recalls); safety features	Compensation claims; legal requirements; reputation risks
Offshoring of production	Environmental & social standards in the supply chain in emerging markets; redundancies	Security of supply and quality assurance; restructuring costs and labour disputes

Source: Sarasin

³ In 2014 the sixth reduction phase (Euro 6 standard) will come into effect, primarily affecting diesel engines and, for example, requiring a further cut in NO_x emissions from 180 mg/km to 80 mg/km.

Key issue: Green technologies

In the last few years, firstly biofuels and later electric vehicles have been celebrated as the future of automotive engineering. In both cases the euphoria has abated. In the medium term, optimisation of existing combustion engine technology will continue to play the biggest role in improving the environmental impact of automobiles. Companies which can offer technologies in this area and at the same time have a broadly based research and development programme devoted to the new technologies will be the best positioned.

Due to environmental policy and the prospect of oil shortages, the industry is under pressure to improve the energy efficiency of existing technologies and develop new, energy-efficient and low-emission technologies or alternatives to oil as a fuel. Automotive manufacturers and suppliers have adopted different approaches. The spectrum ranges from engine and vehicle technology solutions, to optimisation of existing combustion engine technology, through biofuels, to new drive concepts.

Combustion engine technology has the potential to reduce greenhouse gas emissions by up to 50%

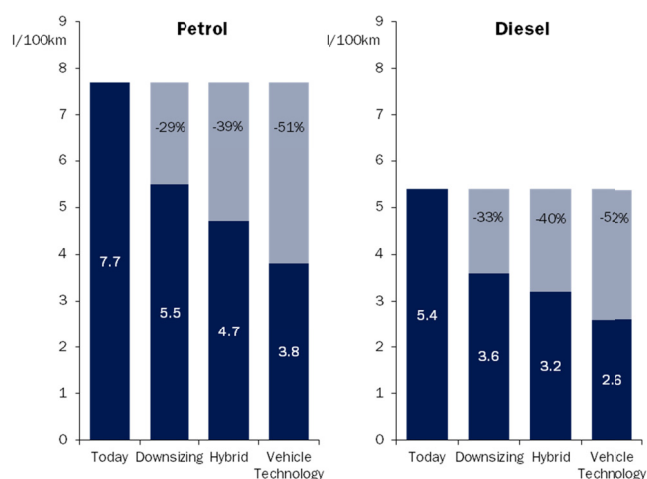
There is still significant potential for optimisation of existing technologies based on the internal combustion engine (petrol and diesel); CO₂ could be reduced by around 30% (see Fig. 8). This includes measures relating to engine technology, above all increasing the performance and efficiency of combustion processes through direct injection combined with turbo-charging, variable valve control and thermo-management, thereby making it possible to design smaller engines ("downsizing"). Leading automotive suppliers concerned with fuel injection technology include Bosch, Denso and Borg Warner.

Further improvements can be achieved through start/stop systems (engine switches off automatically when car comes to a halt) and more efficient transmission systems (multi-stage automatic transmission, continuous belt drive). The French company Valeo is a specialist in start/stop systems, while the Japanese firm Aisin Seiki is a leader in the field of transmission technology.

Vehicle technology solutions such as lightweight construction (e.g. use of new materials such as carbon fibre composites), aerodynamic body design and low rolling resistance tyres round out the range of optimisation options. Among the automotive suppliers,

Magna is a leader in bodywork design. All the large tyre manufacturers offer low rolling resistance tyres. Sumitomo Rubber, Yokohama Rubber and Bridgestone have the largest shares of the market.

Fig. 8: CO₂ reduction potential for combustion engines



Source: Bosch/Institut für Automobilwirtschaft (IFA)

Engine technology solutions such as exhaust gas recirculation are no longer sufficient to ensure compliance with stricter limits for air pollutants, particularly NO_x. Exhaust gas purification systems are needed, such as the exhaust catalysts already used on petrol engines or particulate filters for diesel engines. Diesel engines will also require exhaust catalysts in future, based on selective catalytic reduction (SCR) technology. Faurecia and Denso are among the automotive suppliers offering exhaust gas systems.

Hybrid and electric drive systems overrated

Further reductions in CO₂ emissions can be achieved with composite drive systems comprising a combustion engine

and an electric motor (hybrid drive) or electric motors used on their own. Until recently these were regarded as *the technologies of the future*. However, the euphoria has abated for both environmental and economic reasons. The achievable reduction in CO₂ emissions is limited and depends on the drive mode and the source of the electricity used to charge the electric motor's batteries. Hybrid engines are only advantageous in CO₂ terms over short distances, where the electric drive system can be used. Pure electric motors only make sense from an environmental point of view if the batteries are charged mainly with CO₂-free electricity (e.g. from solar or wind power plants). Where purely coal-generated electricity is used, the electric motor scores little better or even worse than the combustion engine.

Electric drive train technology is not yet mature and remains uncompetitive. Above all, the battery technology needs to be improved in view of the high costs and weight of batteries. Most of the automotive manufacturers have developed commercial models or prototypes with hybrid engines and electric motors. We regard Toyota, Honda and, to an increasing extent, BMW and Peugeot as leaders in the field of hybrid drive systems. In the case of electric drive systems, Renault/Nissan and Mitsubishi (not assessed) are the most advanced. Among the suppliers, as well as market leaders such as Bosch (which plans to offer complete electric and hybrid drive trains), Johnson Controls (batteries) and GS Yuasa (batteries), many newcomers and companies from outside the sector are also active in the market. These include the Chinese company BYD (batteries), Panasonic (batteries), LG Chem (batteries) and most recently Siemens (electric motors), as well as small specialist suppliers of electric drive systems such as A123 or Azure Dynamics.

Biofuels: Waiting for the next generation

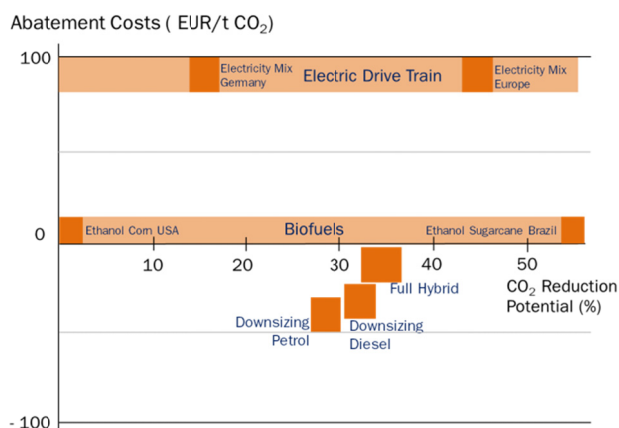
The euphoria surrounding biofuels has also given way to a more sober mood. Although the EU now requires a certain amount of bioethanol and biodiesel to be added to conventional fuels derived from mineral oil, in general the political support for biofuels has waned sharply. This is mainly because growers of the agricultural raw materials needed for biofuel production compete with food producers for scarce arable land, thus helping to drive up the prices of agricultural produce. Furthermore, biofuels only have a limited impact in terms of reducing greenhouse gases: According to a life cycle assessment

study carried out by the Swiss EMPA institute in 2007, bioethanol made from corn grown in the USA offers no advantage over petrol, unlike bioethanol made from Brazilian sugar cane. Taking all environmental impacts into account (e.g. over-fertilisation in agriculture), the advantages claimed for biofuel are almost entirely cancelled out. Research is currently ongoing into second and third generation biofuels, that is to say, biofuels produced from plants that can be grown on fallow land (e.g. Jatropha), from agricultural waste or from algae. It remains to be seen whether these processes can be commercially developed.

Optimisation measures and hybrid solutions are cost-efficient

According to studies by McKinsey, the macroeconomic net costs (in EUR per tonne of CO₂ avoided) for the optimisation of combustion engine technology and for hybrid technology are all in negative territory. That is to say, the higher vehicle purchase costs are offset by fuel savings (Fig. 9).

Fig. 9: CO₂ abatement costs of technologies



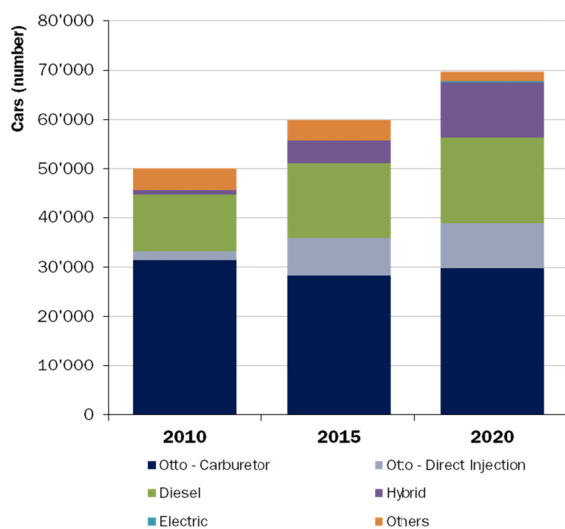
Source: Own chart based on McKinsey, BMW, EMPA

The introduction of biofuels generates relatively small additional costs, but the environmental benefit is questionable (see above). On the other hand, pure electric drive systems are relatively expensive at the present time and only make sense from an economic perspective if the CO₂ reductions are very large, i.e. if CO₂-free electricity is used (mainly from renewable sources).

Existing technologies will continue to dominate in the medium term

Which will be the technology of the future remains to be seen. In the medium term we expect commercial applications to focus primarily on the optimisation of existing technologies, before new drive technologies come to the fore. Until 2020 the combustion engine will predominate worldwide, with direct injection systems and hybrid drive units gaining significant market share. Electric drive systems are unlikely to achieve any great significance in the next 10 years (Fig. 10).

Fig. 10: Car production by drive technologies (forecast)



Source: UBS

Successful companies should therefore be able to offer technologies for optimising the combustion engine, and their research and development efforts should be as broadly based as possible (electric and hybrid drive systems, new biofuels). The positioning of companies in relation to these new technologies is therefore a key valuation criterion within our sustainability analysis.

Industry structure

The international automotive manufacturing industry is relatively heavily concentrated on a small number of companies. According to our definition it includes manufacturers of cars and light goods vehicles. This means that manufacturers of utility vehicles are not included, though certain automotive manufacturers such as Daimler or Volkswagen have substantial HGV operations. The sector of automotive suppliers is more fragmented. It is divided into tyre manufacturers and suppliers of other vehicle parts (drive systems, bodywork, electrics, electronics, etc.).

Large automotive manufacturers

Company	Divisions (% of sales)	Sales (€ bn)	Work- force
Toyota	Cars & LDVs 91%, financing 6%, sonstiges 3%	161	318,000
Volkswagen ^{a)}	Cars & LDVs 83%, HDVs 6%, Financing 11%	127	399,000
General Motors	Cars & LDVs 92%, financing 8%	114	210,000
Daimler	Cars 52%, HDVs 24%, vans 7%, buses 5%, financing 12%	107	271,000
Ford	Cars & LDVs 94%, financing 6%	104	164,000
Honda	Cars 76%, motor cycles 14%, financing 6%, other 4%	76	179,000
Nissan	Cars 93%, financing 7%	75	155,000
Hyundai	Cars 95%, financing 5%	70	80,000
Peugeot	Cars 71%, vehicle components 27%, other 2%	60	198,000
Fiat Chrysler	Cars 80%, components and production systems 20%	60	138,000
BMW ^{a)}	Cars 75%, financing 23%, motor cycles 2%	60	95,000
Renault	Cars 96%, financing 4%	43	126,000

a) Financial year 2010

Source: Company data

Large automotive suppliers

Company	Divisions (% of sales)	Sales (€ bn)	Work- force
Supplier:			
Bosch	Automotive (59%), industrial technology, consumer goods	51	303,000
Denso	Automotive (thermal systems, powertrain, electrical & electronics)	28	123,000
Continental ^{a)}	Automotive engineering (61%), tyres	26	148,000
Bridgestone	Tyres (83%), other	26	140,000
Johnson Controls	Automotive (63%: interiors, batteries), building management	31	162,000
Aisin Seiki	Automotive (drivetrain, brakes & chassis, bodywork)	20	75,000
Michelin	Tyres (86%), other	20	115,000
Magna Intl. ^{a)}	Automotive (bodywork, interiors, powertrain, complete vehicle assembly, other)	18	96,000
Faurecia	Automotive (interiors, exhaust filters, bodywork)	16	84,000

a) Financial year 2010

Source: Company data

Sustainability criteria

Sustainability criteria – automotive manufacturers

Criteria	Weighting	Key indicators
Environmental criteria:		
Strategy and management	12%	- Exposure to high weight classes - Strength in low-emission, leading-edge technologies
Pre-production	3%	Environmental protection requirements for suppliers
Production	3%	Environmental improvement generally
Products and services	42%	- Climate-efficiency of current vehicle fleet - Strength in low-emission, leading-edge technologies
Social criteria:		
Strategy and management	8%	Sustainability management
General public	4%	Fighting corruption
Investors	4%	Formal Corporate Governance standards
Suppliers	10%	Quality of supplier relations
Employees	6%	- Occupational safety - Training and development - Cooperation with unions
Customers	8%	Vehicle quality and customer satisfaction
Competitors	1%	Competitive behaviour

Source: Bank Sarasin

Sustainability criteria - automotive suppliers

Criteria	Weighting	Key indicators
Environmental criteria:		
Strategy and management	10%	- Environmentally friendly products as a business strategy - ISO 14001 certification
Pre-production	15%	- Environmental protection requirements for suppliers - Hazardous materials in products
Production	10%	- Solvent emissions - Waste
Products and services	15%	- Environmental targets for product development - Energy-efficient and light-weight product innovations
Social criteria:		
Strategy and management	10%	Sustainability management
Government and general public	5%	- R&D activities - Production sites in low-cost countries
Investors	3%	Formal Corporate Governance standards
Suppliers	7%	Social standards suppliers and their monitoring
Employees	15%	- Occupational safety - Training and development - Cooperation with unions
Customers	7%	- Product safety / liability cases - Safety products
Competitors	3%	Competitive behaviour

Source: Bank Sarasin

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