

RESEARCH SUMMARY

✓ Yano Research Institute Ltd.
2-46-2 Honcho, Nakano-ku,
Tokyo 164-8620, Japan

Research Findings on the Car Electronics Market in Japan 2009

- Steadily growing car electronics: key issues are “low price eco-car”, “X-by-Wire” and “attractive design & HMI (Human Machine Interface)” -

➤ **Research Outline**

Yano Research Institute has conducted a study on the domestic car electronics market as described below.

1. Research period: October 2008 to March 2009
2. Research targets: Automakers, car electronic equipment manufacturers (50 firms in total)
3. Research methodologies:
Face-to-face interviews with relevant personnel, supplemented by interviews via telephone and e-mail, and literature researches.

<What is car electronics market?>

In this research, 35 major car electronics products (Table 2) are divided into 5 major sectors consisting of powertrain, chassis, body, passive safety and active safety for review and analysis.

➤ **Key Findings**

- ◆ **Required will be the car electronics suitable for low price eco-cars designed for emerging countries.**
The world automobile market has been shrinking, and will not recover to the volume achieved in 2007 until 2011 or 2012. Further, majority of the sales volume increase from now on will be achieved in the newly emerging countries. Passenger cars for those countries will be required to be fuel efficient and low priced. The car electronics, therefore, shall develop in the same direction, aiming for the installation on such low priced eco-cars.
- ◆ **Car electronics will grow steadily, with strong demand for active safety systems even on the smaller size, compact cars as well**
Among the 5 major application sectors, car electronics in the active safety showed the highest average annual growth rate of 14.0% for the 5 years from 2009 to 2014. This may indicate the fact that car electronics for achieving the active safety systems will be required continually as a demand of the age, even if the passenger cars marketed in the world will become smaller in size.
- ◆ **Car electronics in 2012 will be focused on “low price eco-car”, “X-by-Wire” and “attractive design & HMI (Human Machine Interface)”**
When the passenger car market revitalize in 2011 or 2012, the cars must be low priced, compact yet attractive, and suitable for the emerging countries. Low priced eco-cars (hybrid, electric vehicle) will be realized, and the installation of electronic control CVT on the gasoline engine cars will be further advanced. In the future ahead, X-by-Wire technology for EV application will further increase its importance.
As smart phone has rapidly expanded the market with its outstanding user interface, car electronics technologies for making the car interior design and HMI (Human Machine Interface) more attractive will be strongly demanded.

➤ **Report format:**

Published report: “Car Electronics Market 2009-2010”

Issued in: April 2009

Language: Japanese

Format: 305 pages in A4 format

Price: 165,000 yen (8,250 yen of consumption tax shall be charged for the sales in Japan.)

Contacts: Public Relations

Yano Research Institute Ltd. (URL: <http://www.yanoresearch.com>)

Phone: +81-3-5371-6912

E-mail: press@yano.co.jp

➔ Research Summary

1. World passenger car market and the design of future vehicles

World passenger car market in 2009 will experience the market shrinkage in the US, Japan and European countries, by 30% in the first half and 10% in the latter half consecutively compared to the preceding year, which however, is expected to bottom out in/around June 2009. In the meantime, the passenger car market in 2009 for the emerging countries led by China and India is expected to be better than preceding year, if not more. Thus, the total world passenger car market in 2009 is estimated to be 80 to 90% of the preceding year.

However, it is expected to take until 2011 or 2012 for the passenger car market to recover to the sales volume equivalent to 2007, with the majority of future increase in the emerging countries. Under the market situation as described, passenger cars marketed in 2011-2012 will be low priced and highly fuel efficient in consideration of sales in the emerging countries, in addition to the compatibility with environmental regulations of each countries in the world.

As a general trend in the world, passenger cars are shifting from gasoline engine vehicle to hybrid vehicle, and to electric vehicles - from large size premium vehicles with high price and low fuel economy to low price, highly fuel efficient compact cars. Car electronics technologies are expected to develop along with those movements.

2. Overview of the car electronics (domestic production volume base) market

The average annual growth rate for the car electronics market (domestic production volume base) turned out to be 5.3% from 2003 to 2014, and 4.4% from 2009 to 2014 in this research. Although the market will shrink in the 2 years, 2008 and 2009 which are considered to be the bottom of the world passenger car market, the car electronics market in total is expected to grow steadily during the period from 2009 to 2014. As the number of electronics components per vehicle will increase in the future, the car electronics market (domestic production volume base) will not shrink in proportion with the decrease of vehicle sales in volume.

The average annual growth rate from 2009 to 2014 by sector turned out to be 4.4% for powertrain, 8.9% for chassis, 7.3% for body, 7.7% for passive safety, and 14.0% for active safety. The highest growth rate for the active safety may indicate the fact that car electronics for achieving the active safety systems will be required continually as a demand of the age, even if the passenger cars marketed in the world will become smaller in size.

3. Future perspectives

The world passenger car market, currently in a contraction tendency, expected to start showing some signs of growth in 2011 or 2012. Toward the revitalization of the passenger car market in the future, it will be vitally important to develop the car electronics technologies suitable for the vehicles which will become dominant at that time. Electronic systems, such as keyless entry, automatic headlamp control and ABS/ESC currently available only on premium vehicles, or even the pre-crash safety system, may be installed on the compact cars in the future to make them attractive to the potential users.

Further, it is necessary to comply with the environmental regulations in the world for the reduction of emissions, and to achieve the fuel economy improvement. In addition, in order to sell these passenger cars in the emerging countries, further price reduction must be achieved and sustained. Thus, low price hybrid cars and electric vehicles will be developed, while the installation of electronic control CVT on the gasoline engine cars will be further advanced.

It will also become important to design the HMI (Human Machine Interface) in the cabin more attractive, through which the driver and passengers communicate with the vehicle. As smart phone has expanded the market rapidly with its attractive UI (User Interface), it will be very important to design the cabin interior and HMI more attractive, easier to use with higher user-friendliness. Car electronics technologies for achieving those objectives will be strongly demanded.

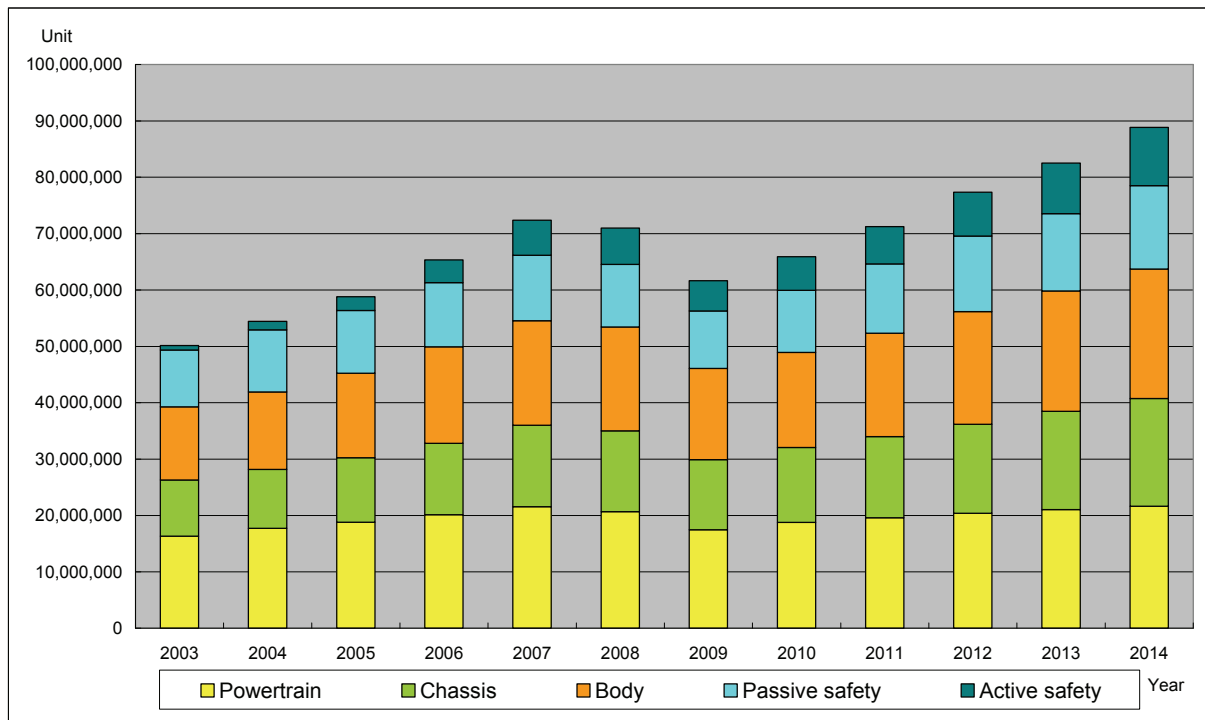
* X-by-Wire is the group of technologies for replacing the mechanical vehicle control systems by electronic control systems, such as brake by wire, shift by wire, steering by wire, etc.

Table/Graph 1: Car electronics production by sector: historical transition and forecast

(Unit: 1000 sets)

Sector	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Average growth (Y/y)
Powertrain (engine control)	16,350	17,700	18,800	20,150	21,550	20,690	17,450	18,770	19,600	20,410	21,020	21,630	-
	-	-	-	-	-	-	84.3%	107.6%	104.4%	104.1%	103.0%	102.9%	104.4%
Chassis (drive, suspension control)	9,950	10,470	11,450	12,650	14,450	14,331	12,451	13,281	14,400	15,750	17,470	19,100	-
	-	-	-	-	-	-	86.9%	106.7%	108.4%	109.4%	110.9%	109.3%	108.9%
Body (vehicle, cabin control)	12,970	13,751	14,991	17,140	18,545	18,439	16,181	16,881	18,335	20,000	21,330	22,980	-
	-	-	-	-	-	-	87.8%	104.3%	108.6%	109.1%	106.7%	107.7%	107.3%
Passive safety (collision mitigation)	10,100	11,001	11,130	11,360	11,600	11,100	10,200	11,000	12,300	13,400	13,700	14,800	-
	-	-	-	-	-	-	91.9%	107.8%	111.8%	108.9%	102.2%	108.0%	107.7%
Active safety (collision avoidance)	800	1,488	2,429	4,025	6,227	6,426	5,351	5,972	6,606	7,779	9,012	10,317	-
	-	-	-	-	-	-	83.3%	111.6%	110.6%	117.8%	115.8%	114.5%	114.0%
Total 5 sectors	50,171	54,409	58,799	65,325	72,372	70,985	61,632	65,903	71,241	77,339	82,532	88,827	-
2003~14 Growth rate (Y/y)	-	108.4%	108.1%	111.1%	110.8%	98.1%	86.8%	106.9%	108.1%	108.6%	106.7%	107.6%	105.3%
2009~14 Growth rate (Y/y)	-	-	-	-	-	-	-	86.8%	106.9%	108.1%	108.6%	106.7%	104.4%

←-----Result-----→ ←-----Forecast-----→ (Estimated by Yano Research Institute)



Note 1: Domestic production base (Domestic sales + Export)
 Note 2: Figures on and after 2009 are estimated values.

(Estimated by Yano Research Institute)

Table 2: Major car electronics products divided into 5 sectors

Sector	Electronics Product
Powertrain	Electronic fuel injection system, diesel engine control (common rail), electronic control AT, electronic control CVT
Chassis	Electronic control suspension, electronic control power steering, cruise control, ABS, ESC (electronic stability control)
Body	Automatic air conditioner, separately controlled air conditioner, keyless entry system, smart entry system, drive recorder, PC control power seat system, automatic door lock release by shock detection, digital LCD meter, head-up display, rain detection wiper system, automatic headlamp system
Passive safety	Air bag system, side airbag system, smart airbag with passenger detection
Active safety	ACC/pre-crash system, rear view monitor system, intelligent parking assist, rear end sonar system, lane keeping system, drowsy driving alert system, blind spot alert system, night vision system, adaptive headlamp, tire pressure drop warning system, automatic parking brake system

(Prepared by Yano Research Institute)