

# Current Status of Korea's Automobile Industry and its Green & Smart Car Strategy

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**Korea Institute for Industrial Economics & Trade**  
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**Current Status of Korea's Automobile Industry**

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**Korea's Green & Smart Car Strategy**

## Status and Challenges of the Global Auto Industry

- The global paradigm is changing rapidly in terms of technology, market and competition.
- Vehicle energy is changing from fossil fuels to electric power.
- New players are developing new business areas and models.
- The center of the automobile industry is moving from the United States to East Asia.
- Developing countries are leading automobile demand.
- Every country has reinforced its regulations on the environment, fuel efficiency and safety.
- Policies also lead to a paradigm shift in the global automobile industry.

- The automobile industry has begun a metamorphosis and newcomers are replacing the traditional automobile and parts companies.

## Trade & Investment Liberalization

- Unity of Regional Trade Agreement
- New Roadmap for trade
- Support for the exporting of automobile and parts companies

## Globalization of OEM and Parts Companies

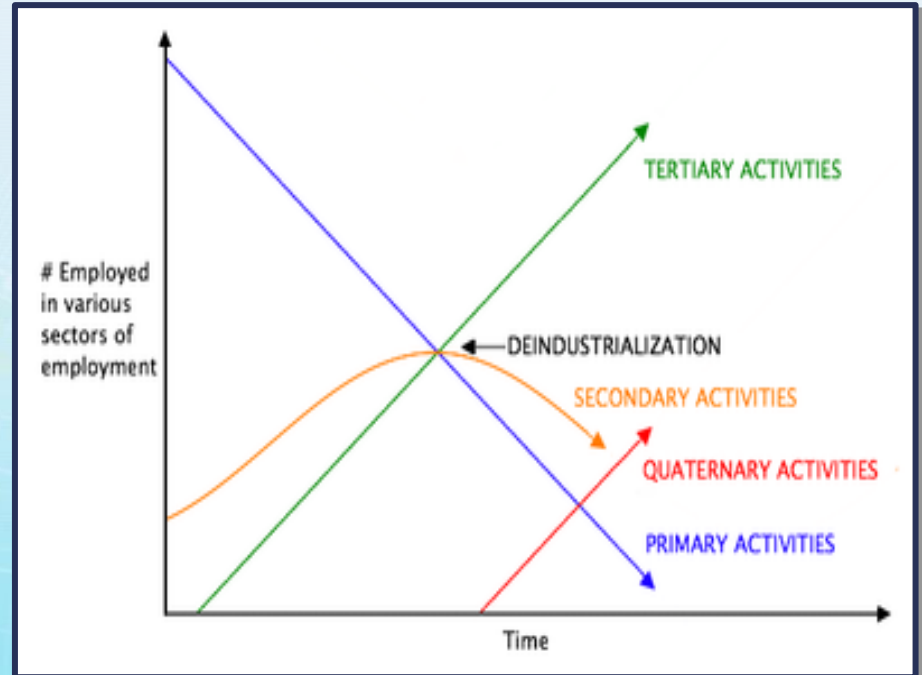
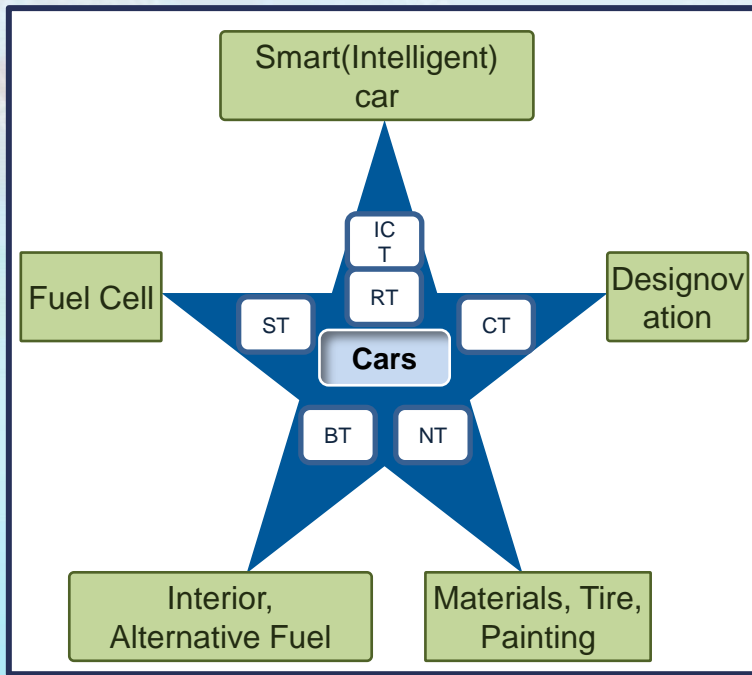
- Increased international fragmentation of production
- Direct investment in developing countries and producing local models
- Discovering New Suppliers based on technology capability

## The Beginning of the Era of Electric-powered Autonomous Vehicles

- Convergence of 'Knowledge and Manufacturing' such as Design and Finger Scanning
  - New Industries related to Safety, Convenience, and Emotionality
- Changes in manufacturing process : Additive - Cutting and Glueing

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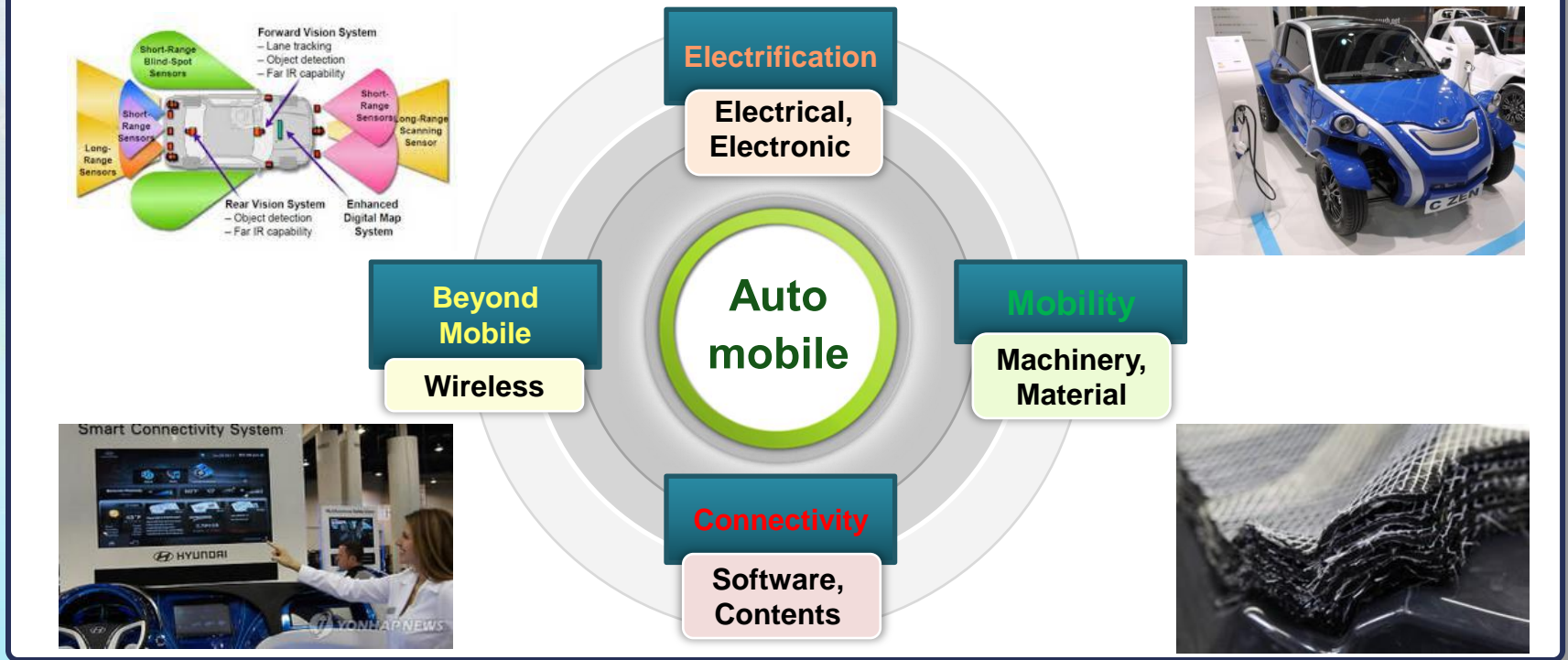
- The technology paradigm shift and governmental regulations promote innovation in products, processes and services.
  - OEMs and suppliers are jointly developing new parts, components and materials.
  - Universities have educated interdisciplinary students and retrained existing workers.
  - Extensive inter-industry relationships and creation of collaborative ecosystem are important for creating new growth engines and employment.



# I. Current Status of Korea's Automobile Industry Korea Institute for Industrial Economics & Trade

- The technology paradigm shift is changing the rules of the game of the automobile industry.
  - Product, process and service innovations will be accelerated by 2030.
  - New players are entering the automobile market and developing countries' governments are watching for new opportunities to develop their own automobile industries.

< Figure > Changing Environment of the Automobile Industry



- **Korea's automobile sales decreased in 2012 and 2013 consecutively.**
  - **Domestic brand market share decreased, but import brand increased.**
    - \* Foreign brands' market share increased to 13.8% in the first half of 2014.
  - **European brands, especially German brands dominated the imported vehicle market**
    - \* European brand market share : 53.1%(2008) ⇒ 81.3%(2014)
    - \* German brand market share : 42.1%(2008) ⇒ 71.2%(2014)
    - \* Japanese brand market share : 35.5%(2008) ⇒ 11.7%(2014)

**< Table > Sales statistics of passenger cars**

Unit : thousand vehicle

	2008	2009	2010	2011	2012	2013	2014 1H
Domestic	1,155	1,394	1,465	1,475	1,411	1,383	713
Imported	62	61	91	105	131	157	112

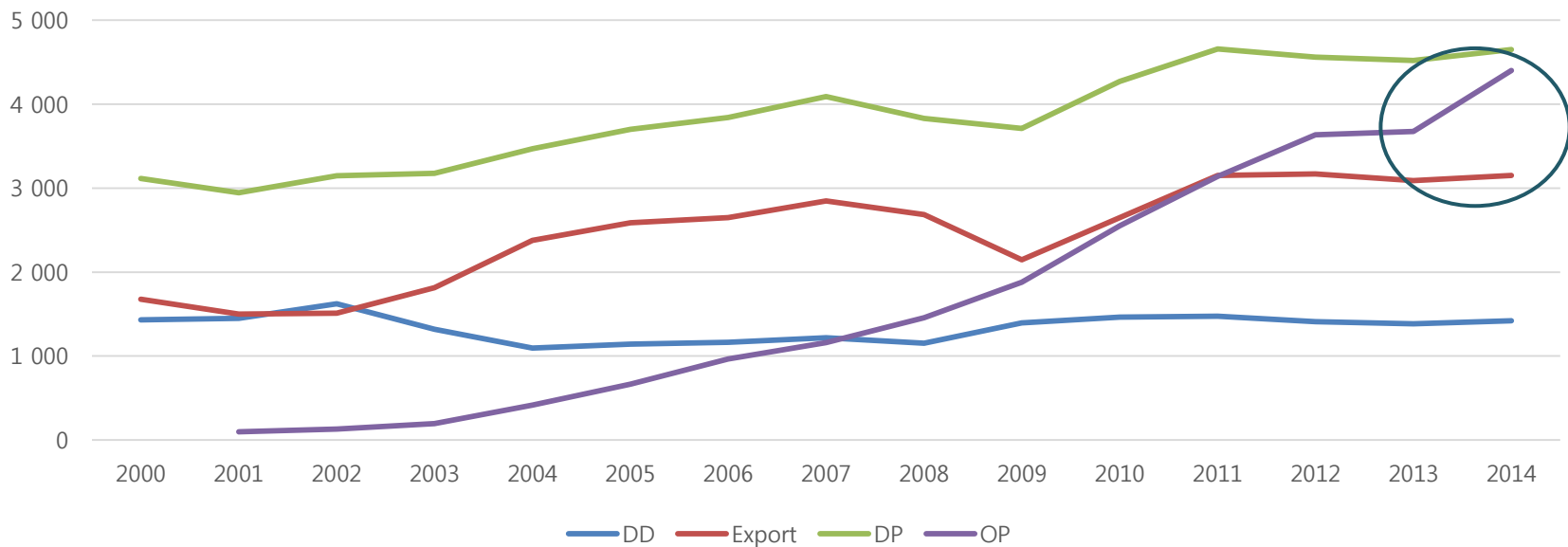
Source : KAMA, KAIDA

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● Saturation of domestic demand, overseas production substitutes exports, and record high domestic and foreign production

- (Weak Won) Continuous increase of imports, 17% of market share
- (Regulation) Diversification of imported Eco-friendly Models (2015)

< Figure > Current status of Korea's automobile industry(000)



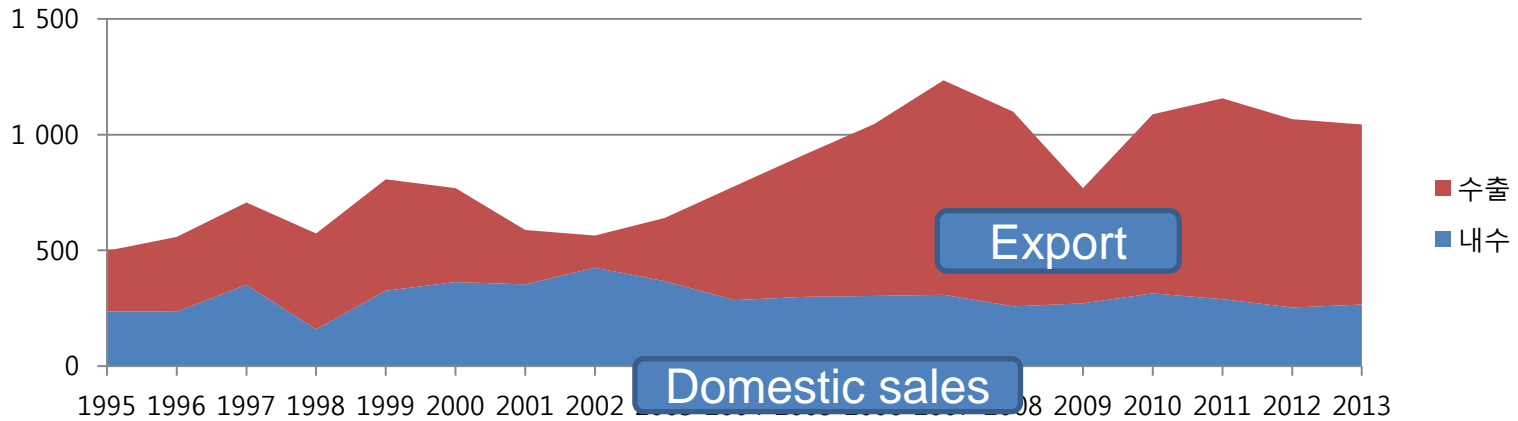
Source : KAMA

Note : 2014 is estimated



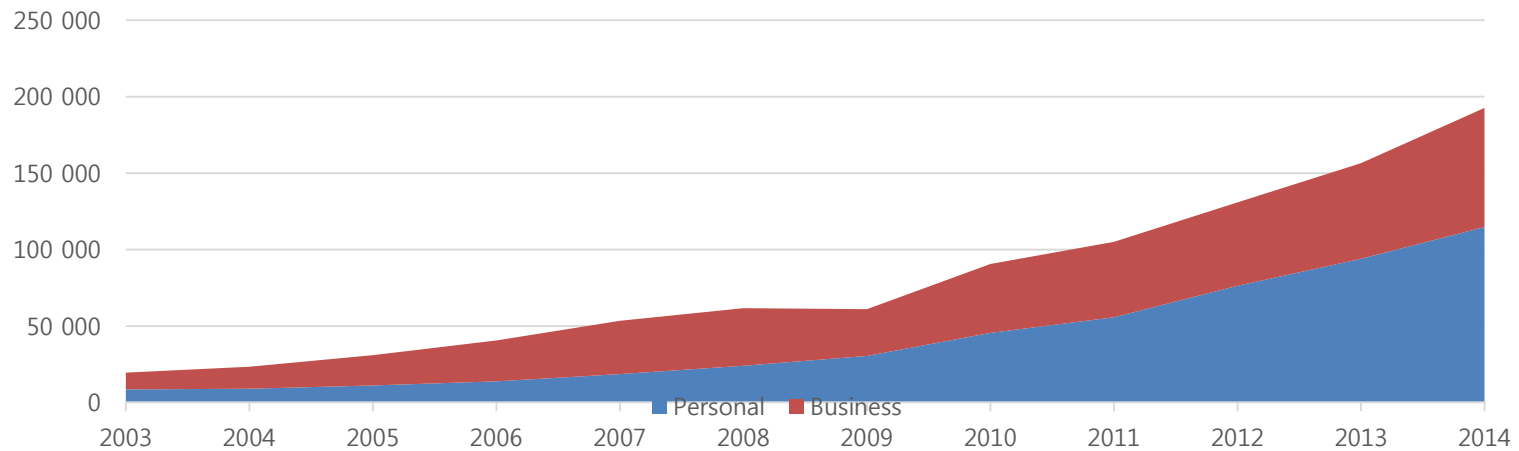
# I. Current Status of Korea's Automobile Industry

< Figure > Performance of Foreign OEM (000)



Source : KAMA

< Figure > Current status of Imported Cars

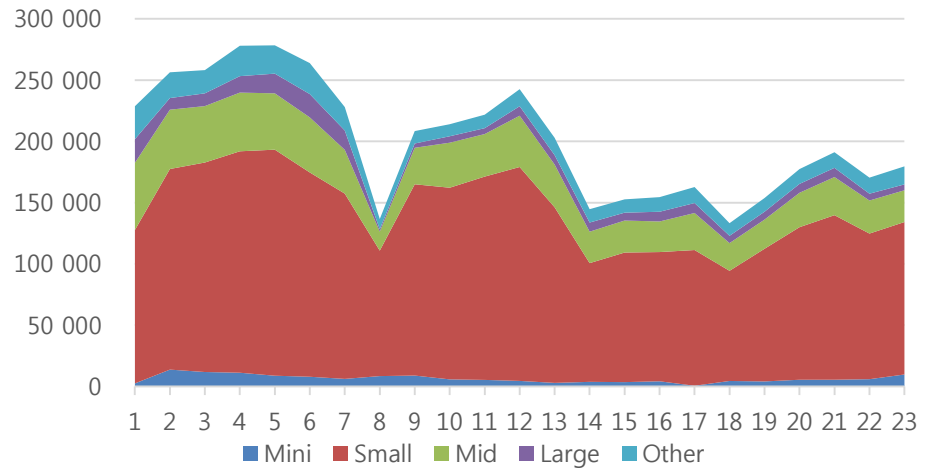


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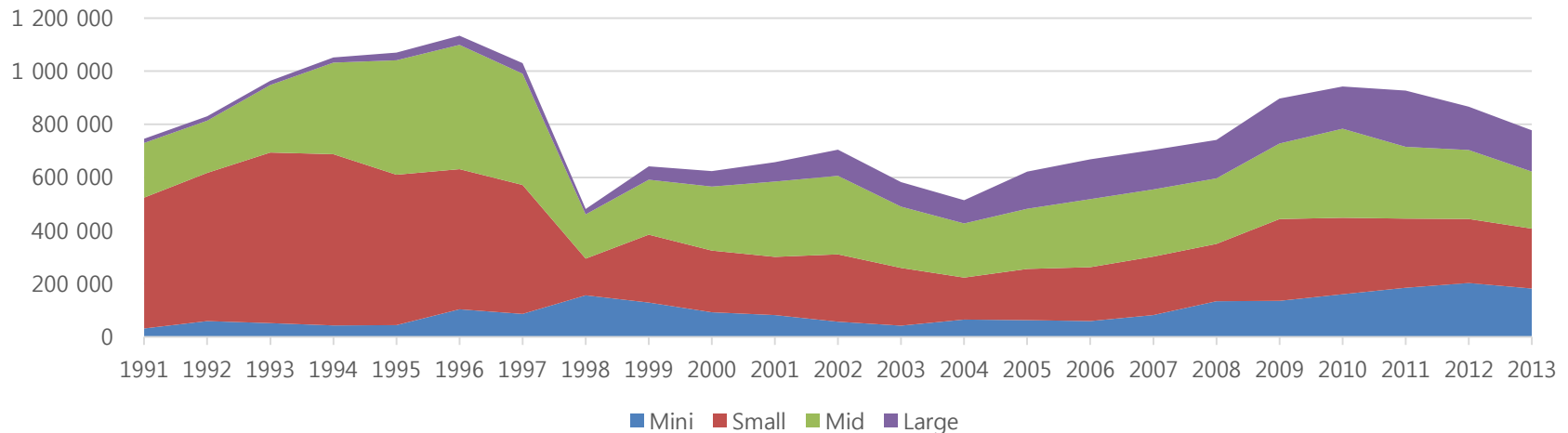
## ● Bipolarization of domestic demand

- Increase of imported vehicles
- \* Younger generation's demand for low-price, and fuel-efficient small models
- Increasing demand of domestically produced large and mini cars
- Overall increasing demand of SUV and MPV

< Figure > Trend of commercial truck sales



< Figure > Trend of Sedan sales



- **Clean diesel demand is increasing in the Green car market.**
  - Clean Diesel, especially imported clean diesel, dominates in the green car (environment-friendly car) market.
  - The share of diesel in imported vehicles increased from 16.4% in 2007 to 68.2% in 2014.
  - SUVs and MPVs are leading sales of domestically produced diesel.
  - Sedans are popular but SUV demand is increasing in the imported diesel market.
- **Imported hybrid car sales are sluggish.**

**< Table > Sales structure of diesel**

	2008	2013	2014 1H
Diesel(Domestic)	144,941	265,997	145,328
Diesel(Imported)	10,094	97,185	64,427
Alternative Fuel	155,646	179,141	87,434

Source : KAMA

Note : Alternative fuel includes LPG, Hybrid and Electric Vehicles

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- ☞ Imported diesel sales promote diversification of diesel models of Korean auto makers.
- Hyundai will launch the Sonata diesel in 2016.
- Ssangyong is developing a diesel hybrid vehicle.
- Toyota is introducing various hybrid models to compete with European diesel in the Korean market.

< Table > New Registration of Imported Cars by Fuel Type

Unit : number of vehicles, %

Fuel Type	2014	Share	2013	Share	Change(a/b)
Diesel	64,427	68.3	44,601	59.9	44.5
Hybrid	3,335	3.5	3,002	4.0	11.1
Electric	33		0	0	-
Gasoline	26,468	28.1	26,884	36.1	-1.5
Total	94,263	100.0	74,487	100.0	26.5

## Hybrid vehicle sales

- Sales of hybrid vehicles have increased continuously but slowed in 2013.
- Hybrid vehicles are competing with clean diesel vehicles in the domestic market.

< Table > Sales Statistics of Hybrid Vehicles

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Hyundai	-	-	-	-	5,069	4,253	9,346	18,004	14,025	9,627
Kia	121	145	355	360	1,162	2,053	6,821	11,713	8,029	4,837
GMK	-	-	-	-	-	-	-	971	203	70
RS	-	-	-	-	-	-	-	-	-	-
SY	-	-	-	-	-	-	-	-	-	-
Total	121	145	355	360	6,231	6,306	16,167	30,688	22,257	14,534

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< Table > Sales trend of Hybrid Vehicles

	2008	2009	2010	2011	2012	2013
Production	332	6,745	5,942	25,000	53,570	70,343
Sales	360	6,231	6,306	16,167	30,688	22,257

< Table > Sales comparison amongst major hybrid models

Model		2013	2014 1H
Korean	Avante	582	-
	Forte	287	-
	Sonata	12,984	2,576
	K5	7,452	2,158
	Grandeur	504	7,051
	K7	180	2,158
Imported	Prius	1,032	681
	Civic	36	3
	CT200h	120	128
	Lincoln MKZ	24	21
	Camry	960	301
	ES300h	2,736	2,002

● **Hybrid vehicle production is increasing continuously.**

- Hyundai dominated the hybrid market in Korea and increased exports.

- Korean consumers prefer large models of hybrid vehicles.

- Production of Hyundai and Kia in 2014:

\* Kia produced almost 72,678 hybrid vehicles and exported 71,546 hybrid vehicles in 2011. Recently, Kia produces hybrid models in the foreign market.

**< Table > Production statistics of hybrid vehicles**

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Hyundai	-	-	-	-	5,459	3,771	25,870	40,108	43,390	26,115
Kia	156	177	344	332	1,286	2,171	72,678	12,482	26,780	15,020
GMK	-	-	-	-	-	-	-	980	173	78
RS	-	-	-	-	-	-	-	-	-	-
SY	-	-	-	-	-	-	-	-	-	-
Total	156	177	344	332	6,745	5,942	98,548	53,570	70,343	41,213

Source : KAMA ; Note : 1st half of 2014

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**Current Status of Korea's Automobile Industry**

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**Korea's Green & Smart Car Strategy**







# II. Korea's Green & Smart Car Strategy

## ● EV prices are falling and government subsidies are increasing

- Kia cut the Ray EV price from 45 mil. Won to 35 mil. Won.
- The local government provides subsidies to EV buyers.

\* Jeju special self-governing province subsidizes 8 mil. Won.

< Table > Comparison of Electric Vehicles

	Change (AD Motors)	Ray EV (Kia)	SM3 ZE (Renault Samsung)	Spark EV (GMKorea)
Models				
Size	Mini	Mini	Small	Mini
Maximum speed	60km/h	130km/h	135km/h	150km/h
One-time charge mileage	77.9km	91km	135km	135km
Price(ten thousand Won)	2,100	3,500	4,250	3,990

## II. Korea's Green & Smart Car Strategy

- The demand for SM3 ZE was three times greater than the supply in Jeju in 2013.

\* The actual purchasing price was 19.5 mil. Won before tax.

cf : average selling price of IC model of SM3 is 17.6 mil. Won.

● **The lack of government purchasing subsidy has hindered sales.**

- OEMs also supply EVs in accordance with government subsidies.

● **Introducing new mid-size EV models will promote EV sales.**

- The sales of imported electric vehicles began in 2014.

< Table > Government goal for BEV sales

	2011	2012	2013	2014	2015
Goal	1,000	2,500	13,200	60,000	86,700
Actual Sales	372	714	715	434	-

## II. Korea's Green & Smart Car Strategy

- Hyundai will launch the Sonata PHEV in 2015 and Avante EV/Hybrid in 2016.
- Kia will introduce the K3 EV in 2016.

### ● Improvement in performance is expected in 2017.

\* Electric Cars glide to 200-Mile Range (WSJ. Aug)

- LG Chem. Power Inc. is improving performance of the lithium-ion battery.

< Table > Comparison between Soul and SM3 ZE

	Soul	SM3
Specification(mm)	4,140	4,750
Generator capacity(kW)	81.4	70.0
Battery capacity(kWh)	27.0	22.0
Mileage(km)	148	135
Charging time(Slow/Fast)(hrs/ms)	4/0.5	4/0.5
Max. Speed (km/h)	145	135
Price	4,250	4,250

# II. Korea's Green & Smart Car Strategy

## ● Construction of Charging Infrastructure

- Limited support for construction

\* Fast and Slow charging Infrastructure until 2015

- Registered EV charging station : 177 at the end of June 2014

\* 50 more stations in the second half of this year

- Installing Dual charger : DC ChaDemo and AC3

- Constructing public fast charging station : 600 by 2017

< Table > Charger deployment plan

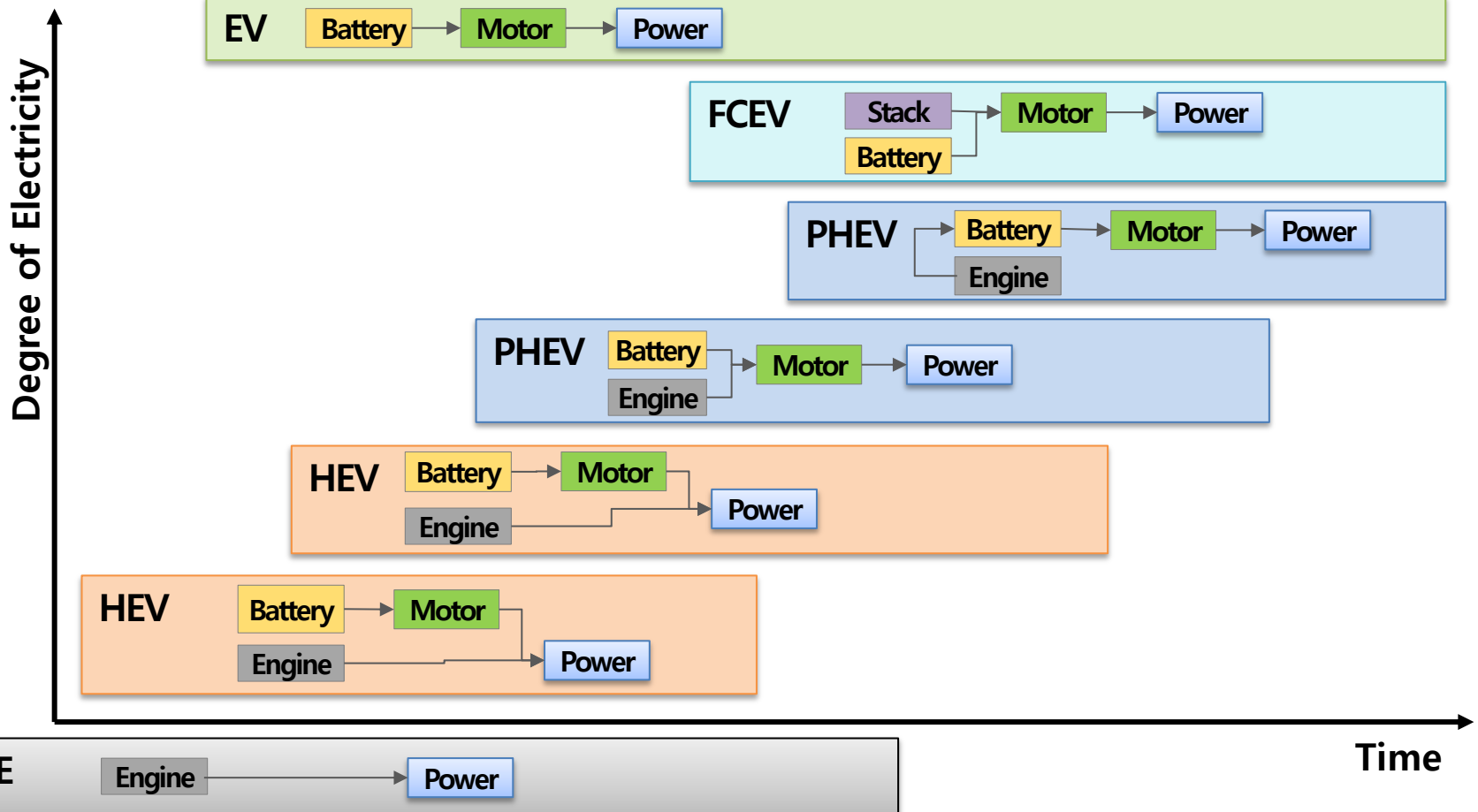
unit : thousand

			2011	2013	2015	2020
Electric Charger	Public	Slow	0.17	3.1	4.5	8
		Fast	0.07	0.12	0.6	2.6
	Private	Slow	-	2.5	11.4	137.8
		Fast	-	1.0	3.0	19.6
	Total			0.24	7.1	20

# II. Korea's Green & Smart Car Strategy

- (Policy) Establishment of Long-term Green Car Technology Road-map ⇒ Entice Variety of Participants ⇒ Formation of Cross-industry Ecosystem

< Figure > Gradual shift from ICE vehicle to electric powered vehicles

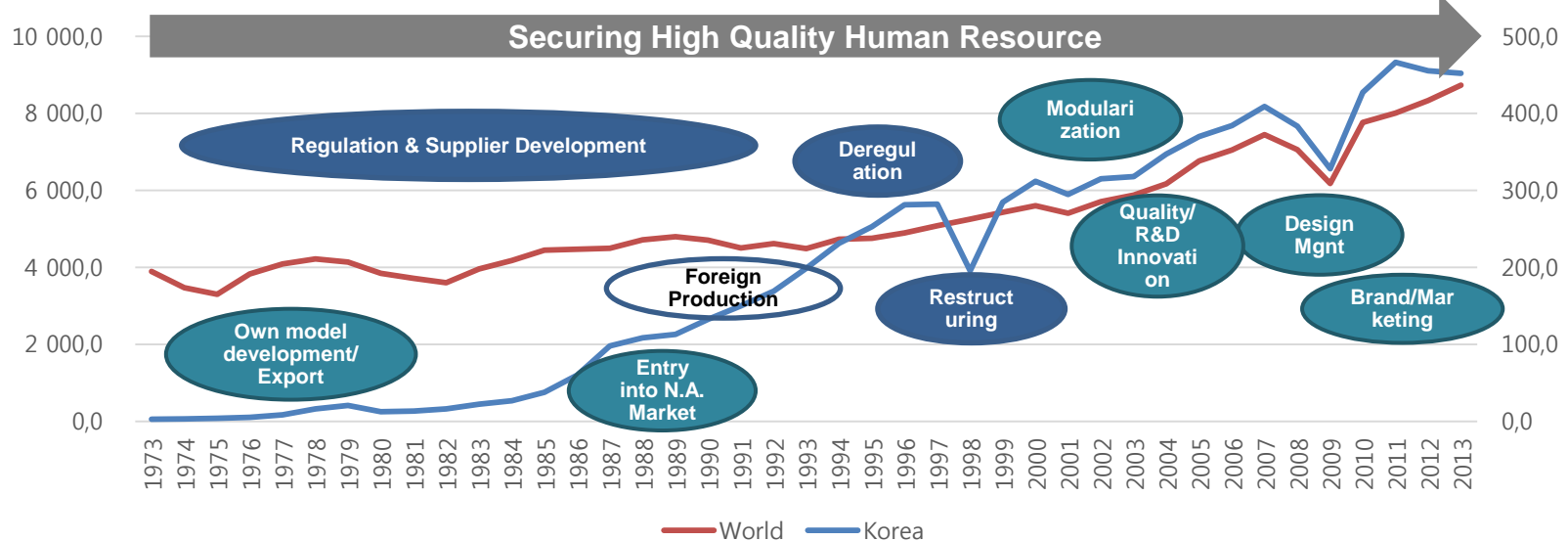


# II. Korea's Green & Smart Car Strategy

## Building innovation capability

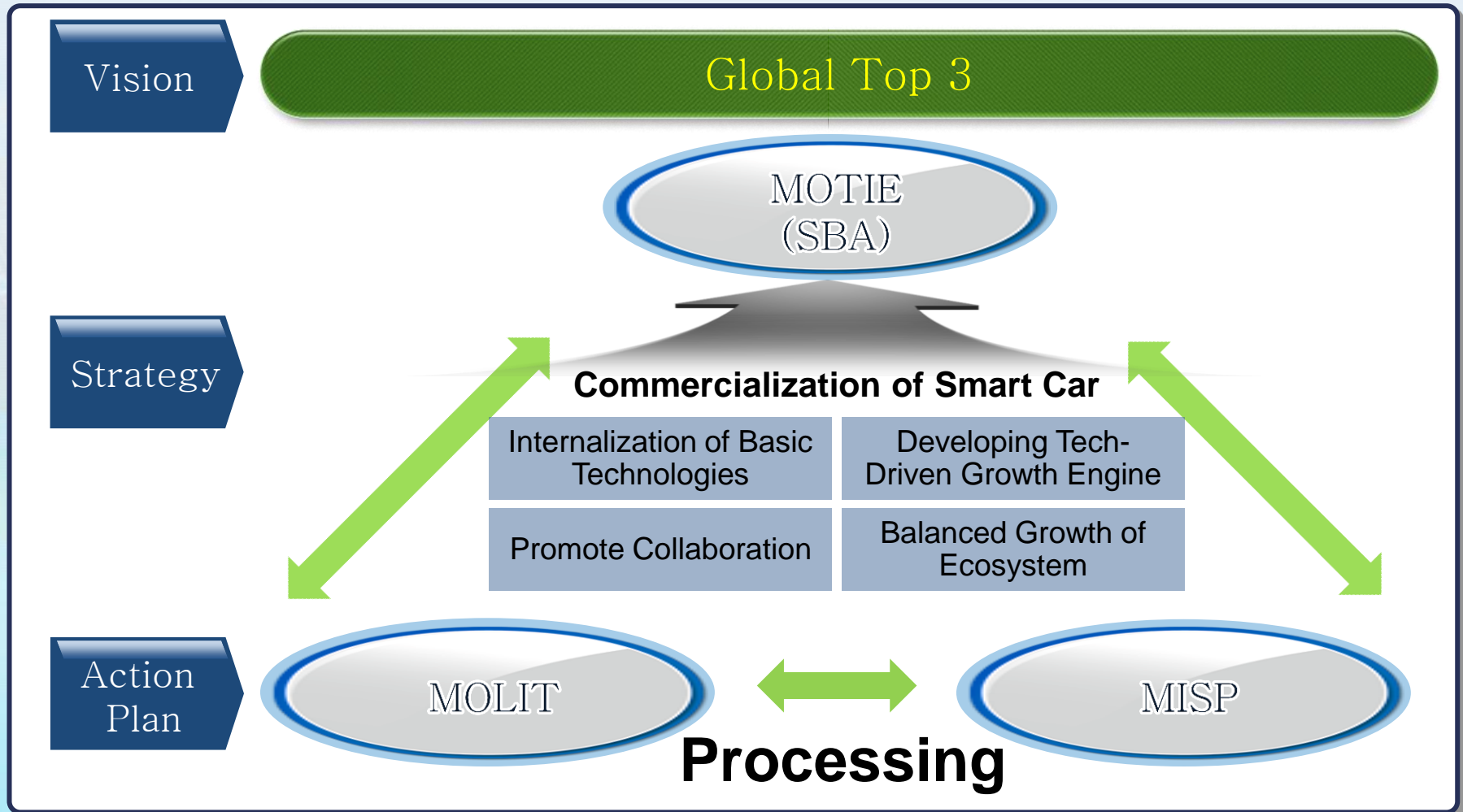
- The role of the government is key for green and smart car development and commercialization. The government should continue to partner with the auto industry on research to reduce oil dependency and increase safety.
- In this regard, the Korean government supports the development of a technology roadmap with related industry and provides R&D incentives to facilitate green and smart car development and stimulate demand.

< Figure > Development History of Korea's Automobile Industry : Production



# II. Korea's Green & Smart Car Strategy

- Regulations can promote innovation.
- Inter-ministry collaboration for developing smart(connection) cars in Korea:



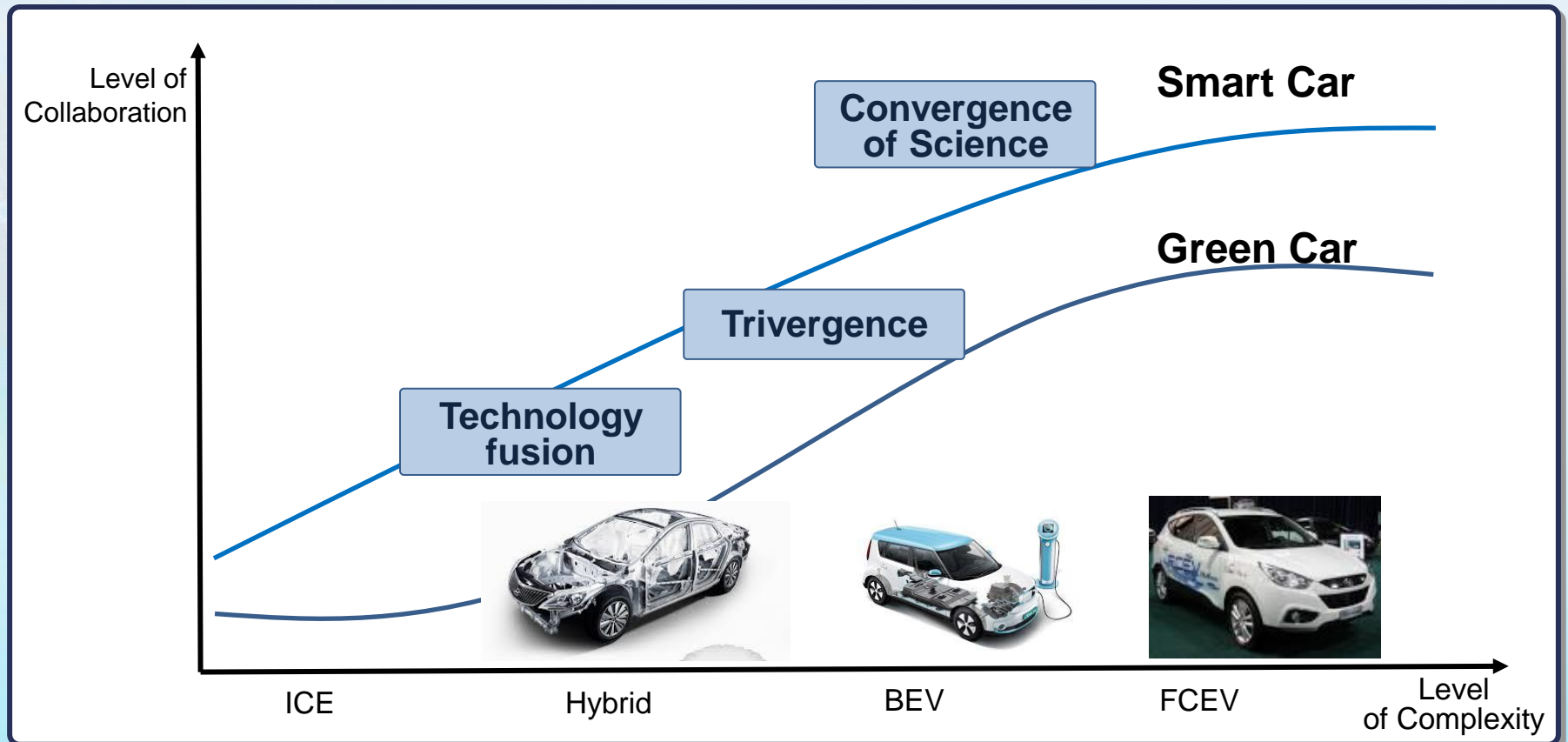
# II. Korea's Green & Smart Car Strategy

## ● Promoting Technology Fusion ⇒ Convergence of Science

- (Industry) Computer, Communication and Cars.....

(Firm) Combination Innovation Strategy

⇒ Communication, Collaboration, Coordination



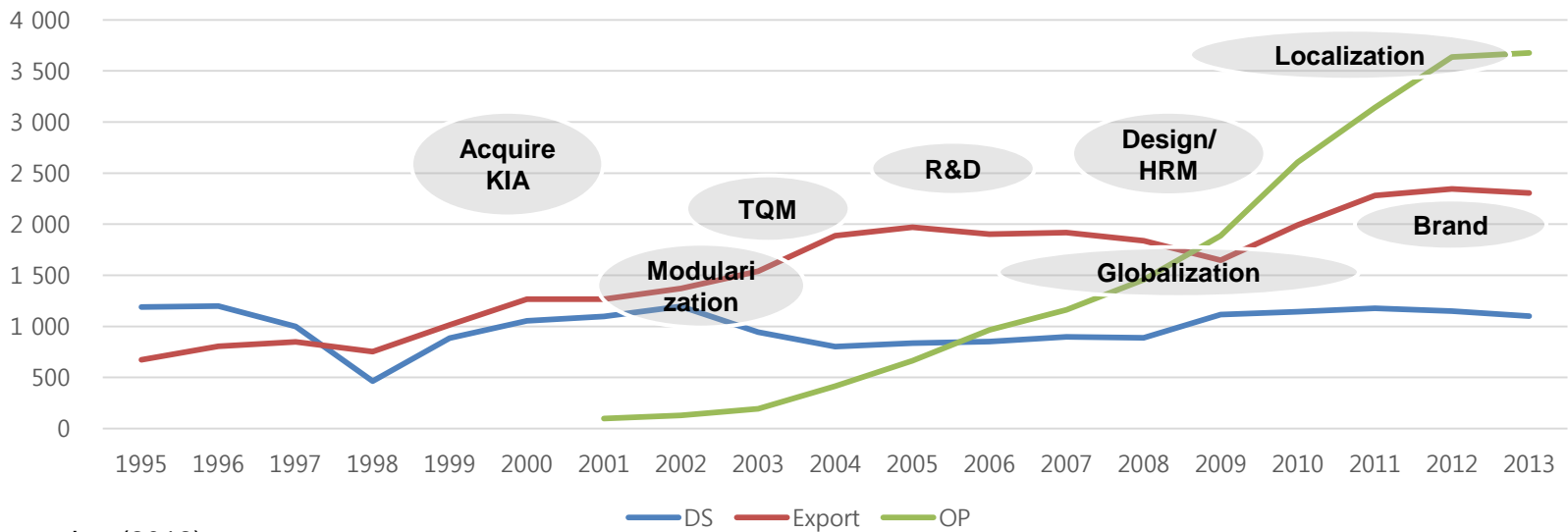


## II. Korea's Green & Smart Car Strategy

### Convergence of Automobile and ICT Industries.

- Korea has been developing a green and smart car ecosystem by using comparative advantages in ICT and automobile industries.
- Recently, ICT companies are pouring into R&D expenditures and Korea's leading ICT companies are entering the auto business competitively.
- Strategic alliances between auto companies and ICT companies are increasing in Korea.

### Growth factors of Hyundai(KIA) Motors Company

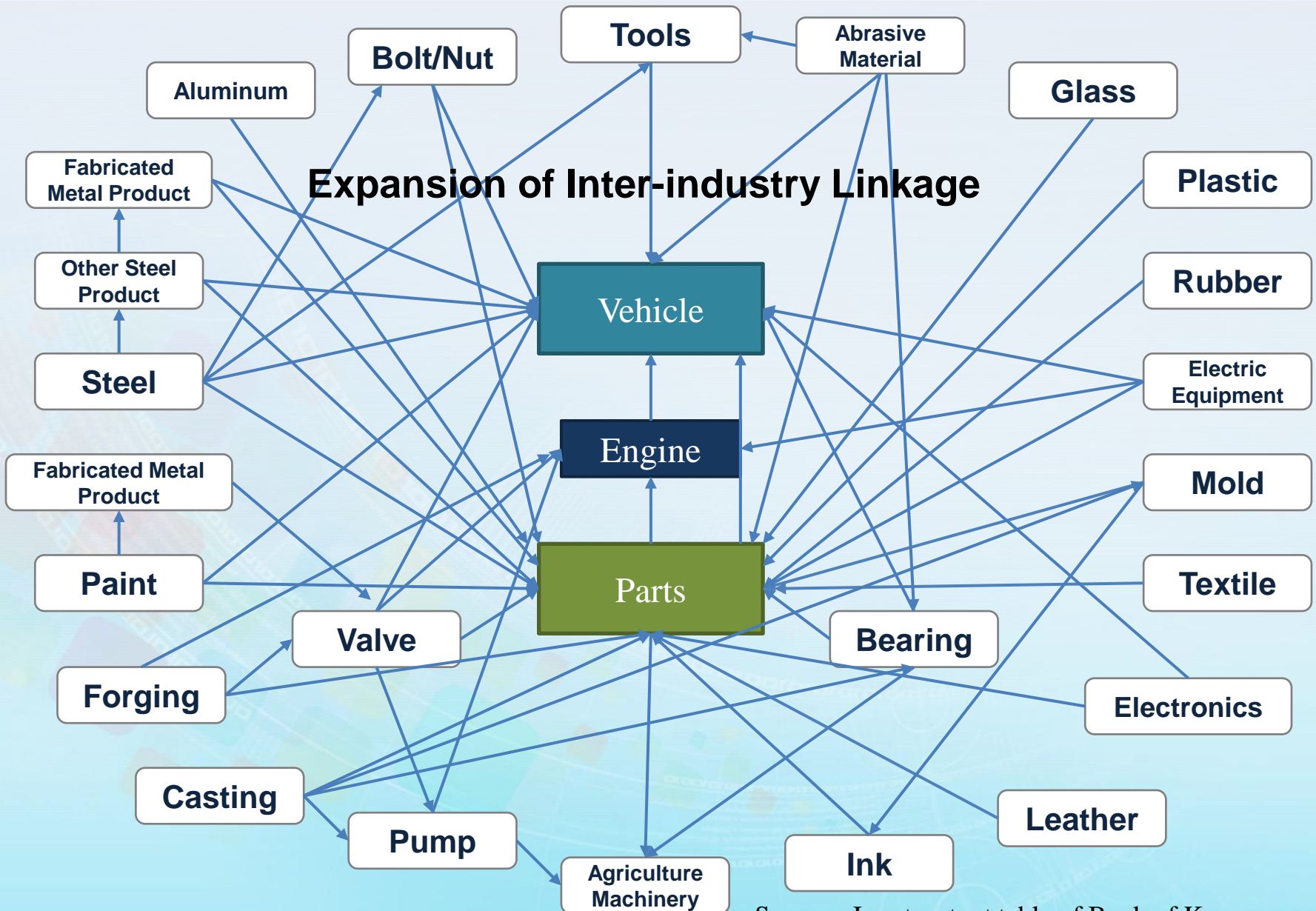


Source : Lee(2012)

## ● Formation of collaborative innovation ecosystem

- **OEM assistance for developing technology of suppliers**
  - HMC has already formed a green innovation ecosystem with more than 300 suppliers and supports their technology and parts development.
- **R&D collaboration required between OEMs and suppliers**
  - R&D costs are increasing for developing green and smart car related technology.
  - To facilitate green car sales, prices should be lowered with the help of suppliers including battery makers.
- **Growing responsibilities of suppliers for sharing R&D investment and cost reduction**
  - Strategic alliances and network competition among auto companies are intensifying.

# < Figure > Inter-industry linkage



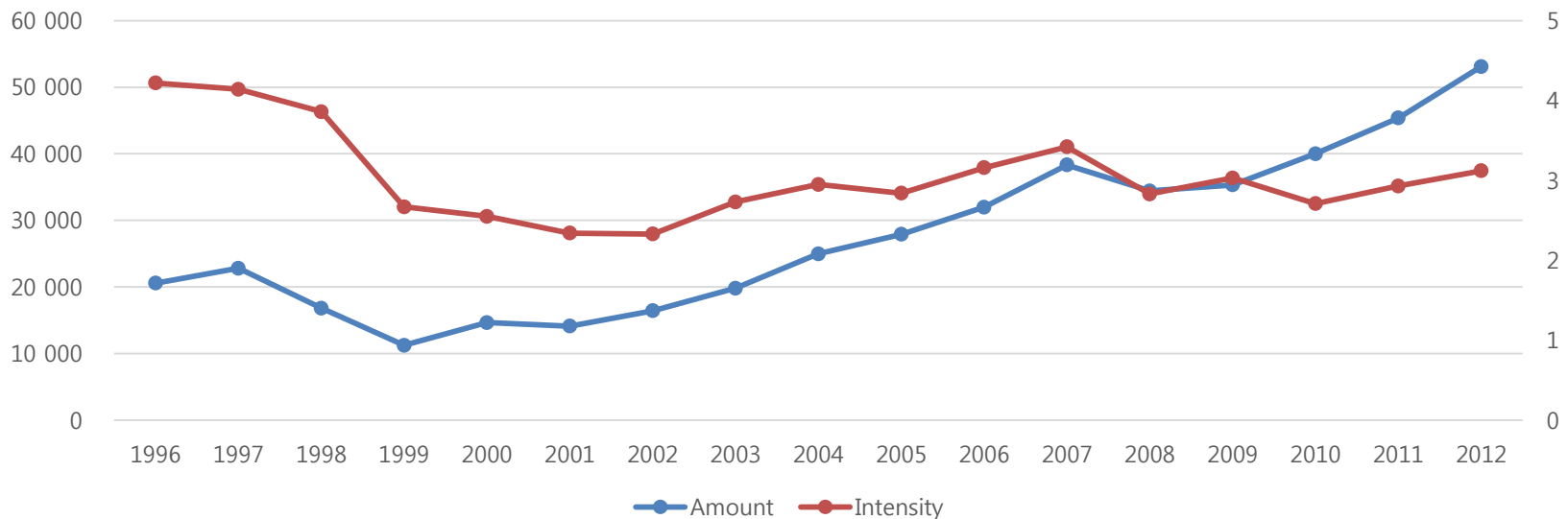
Source : Input-output table of Bank of Korea

# II. Korea's Green & Smart Car Strategy

## Strengthened industry and government R&D collaboration

- The Korean government and automobile companies are closely collaborating to develop next generation vehicles including green and smart cars as new growth engines.
- Overall R&D investment of automobile companies increased rapidly over the last decade.
- Auto makers invested more than 5 billion dollars in R&D in 2013.

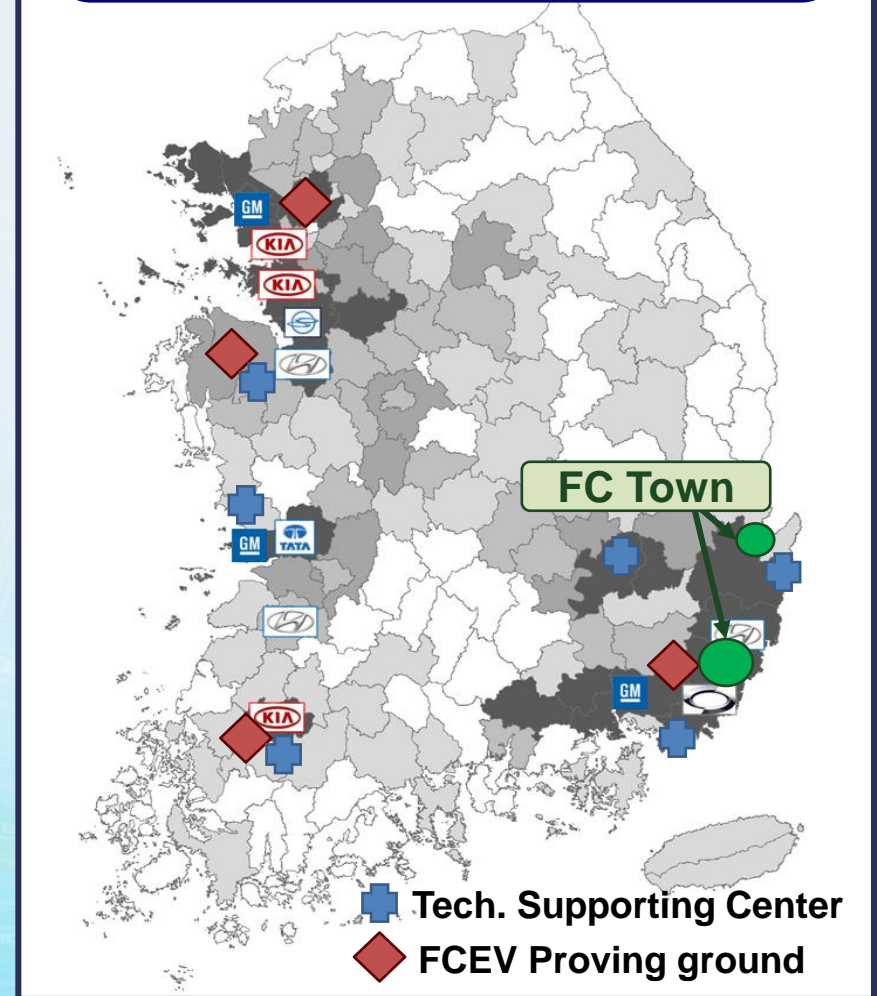
< Figure > R&D Investment of Korean Automobile Industry



## II. Korea's Green & Smart Car Strategy

- Building infrastructure for successful commercialization of green and smart cars
  - Test beds & proving grounds
  - SME supporting center
- The Korean government established technology supporting centers in universities and auto parts clusters.
  - EV and FCEV proving ground
  - EV and FCEV town
- The automobile industry has contributed to regional economic development.

< Figure > Infrastructure

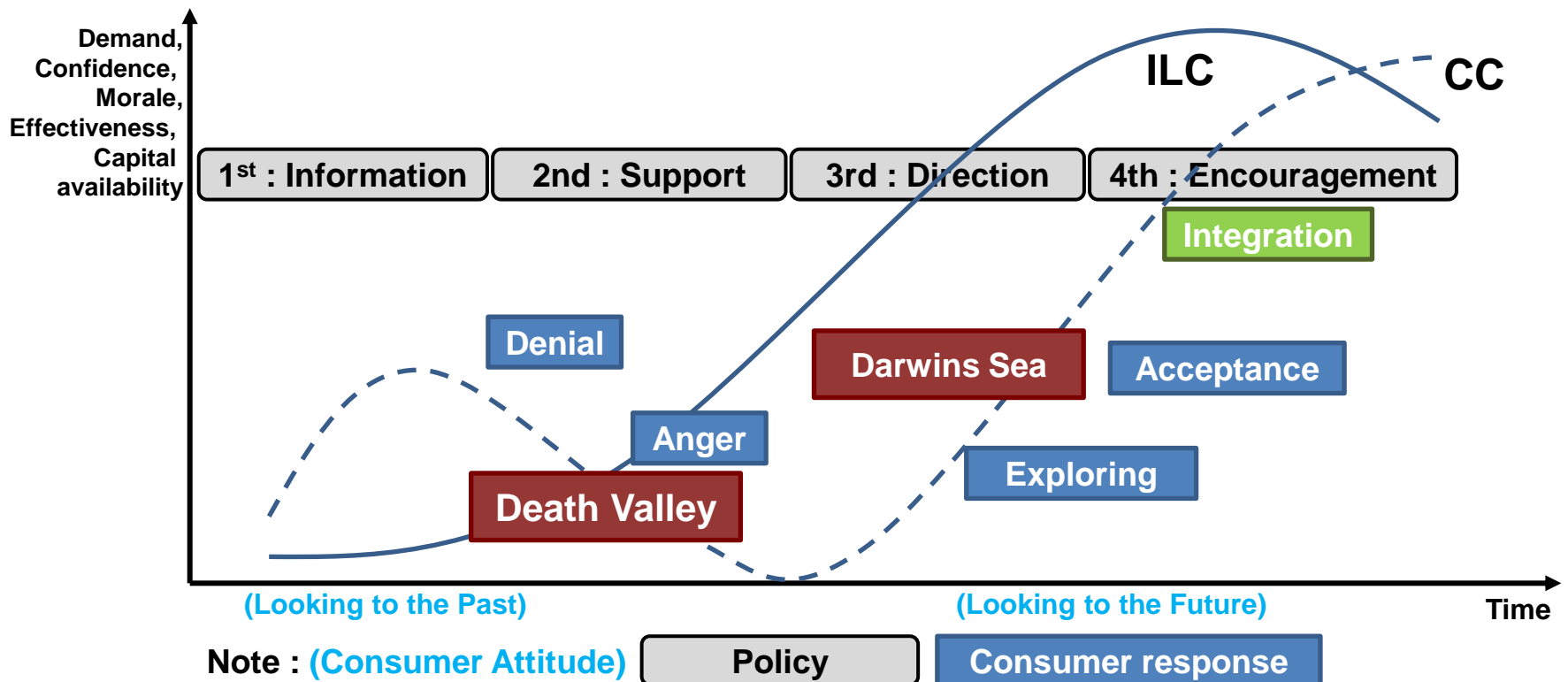


# II. Korea's Green & Smart Car Strategy

As with almost all new types of technologies, it will take time.

- Promoting competition and alliance : Copetition
- Connecting innovation and strategy
- Developing human capital in STEAM

## Change Curve & Industry Life Cycle



**Thank you for listening**