

When it comes to **smart cars**,  
Who will come out a **winner**?



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This is the abridgement of the report "When it comes to smart car, Who will come out a winner?".

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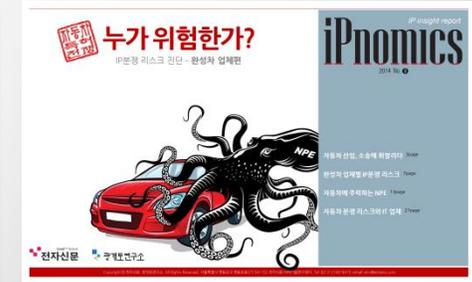
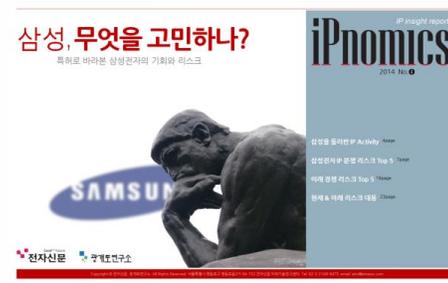
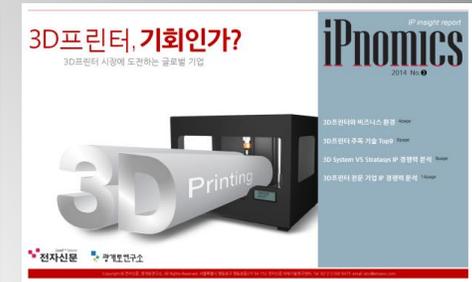
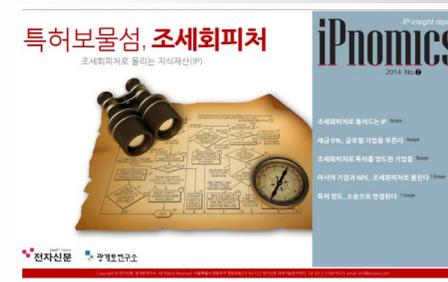
# IP + Economics

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**SAMPLE**

In the automotive industry where there is a paradigm shift taking place towards incorporating smart car technologies and intensifying technological competition at the same time, **patents have become, perhaps, the most important variable.**

- ① Vehicle Control
- ② Land Vehicle Alarms and Indicators
- ③ Navigation
- ④ Applications
- ⑤ External Condition Vehicle-Mounted Indicator
- ⑥ Relative Location
- ⑦ Vehicle Position Indication
- ⑧ Directive
- ⑨ Special Applications

# TOP 9



In the automotive industry where there is a paradigm shift taking place towards incorporating smart car technologies and intensifying technological competition at the same time, patents have become, perhaps, the most important variable. Patent litigation involving smart cars is increasing. Intellectual property (IP) is becoming an increasingly important factor in the competitive advantage of smart car manufacturers. To summarize, the top 9 core smart car technologies that have been deemed to be the most noteworthy of the year are: Vehicle Control, Land Vehicle Alarms and Indicators, Navigation, Applications, External Condition Vehicle-Mounted Indicator, Relative Location, Vehicle Position Indication, Directive, and Special Applications.

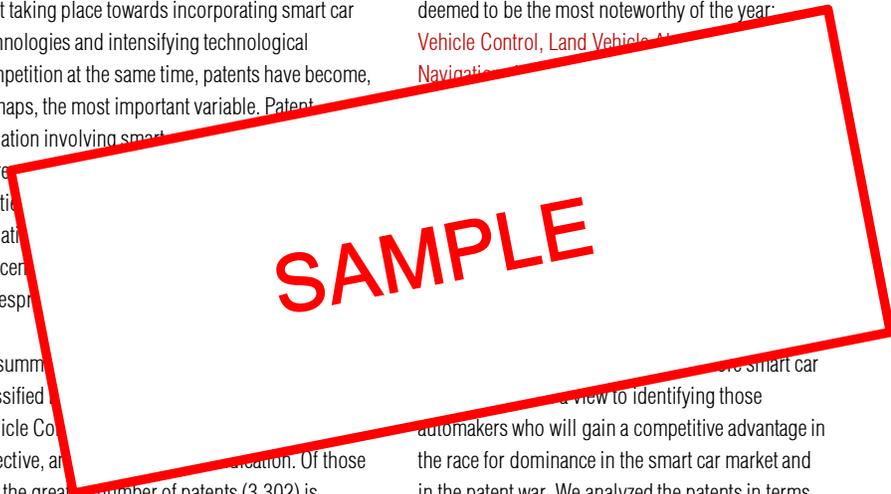
To summarize, the top 9 core smart car technologies that have been deemed to be the most noteworthy of the year are: Vehicle Control, Land Vehicle Alarms and Indicators, Navigation, Applications, External Condition Vehicle-Mounted Indicator, Relative Location, Vehicle Position Indication, Directive, and Special Applications. Of those five the greatest number of patents (3,302) is concentrated in the Vehicle Control segment which accounts for about 30% of all such patents.

For the purposes of this study we analyzed various technologies in terms of (1) influence of patent IP, (2) IP activity and (3) IP risk, and then selected the

top 9 core smart car technologies that have been deemed to be the most noteworthy of the year: Vehicle Control, Land Vehicle Alarms and Indicators, Navigation, Applications, External Condition Vehicle-Mounted Indicator, Relative Location, Vehicle Position Indication, Directive, and Special Applications. We analyzed the patents in terms of quantity and quality and, as a result, Toyota came out on top in both areas. Especially, Toyota's patent portfolio related to External Condition Vehicle-Mounted Indicator and Special Applications was very powerful.

With their total of 454, Honda is the second most powerful company in the smart car patent space. Hyundai was quite successful in the smart car business with a significant amount of patent activity. Hyundai was quite successful in the smart car business with a significant amount of patent activity. Hyundai was quite successful in the smart car business with a significant amount of patent activity.

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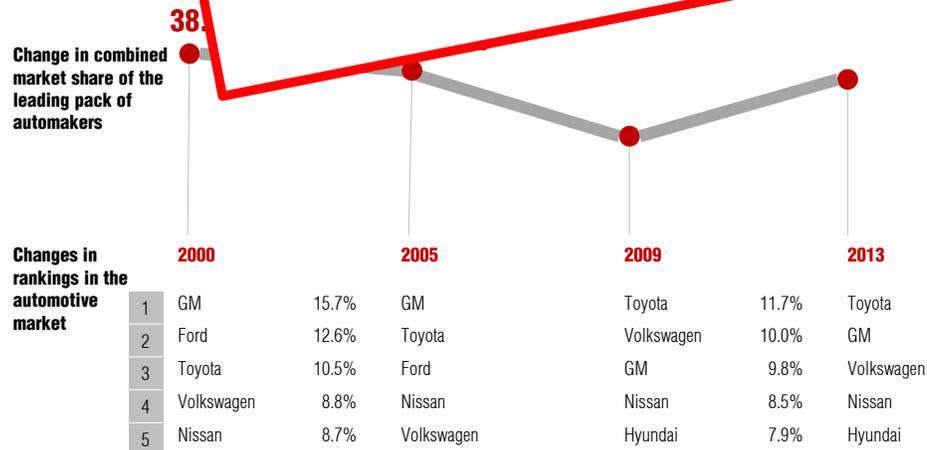


## **Smart cars and the business environment**

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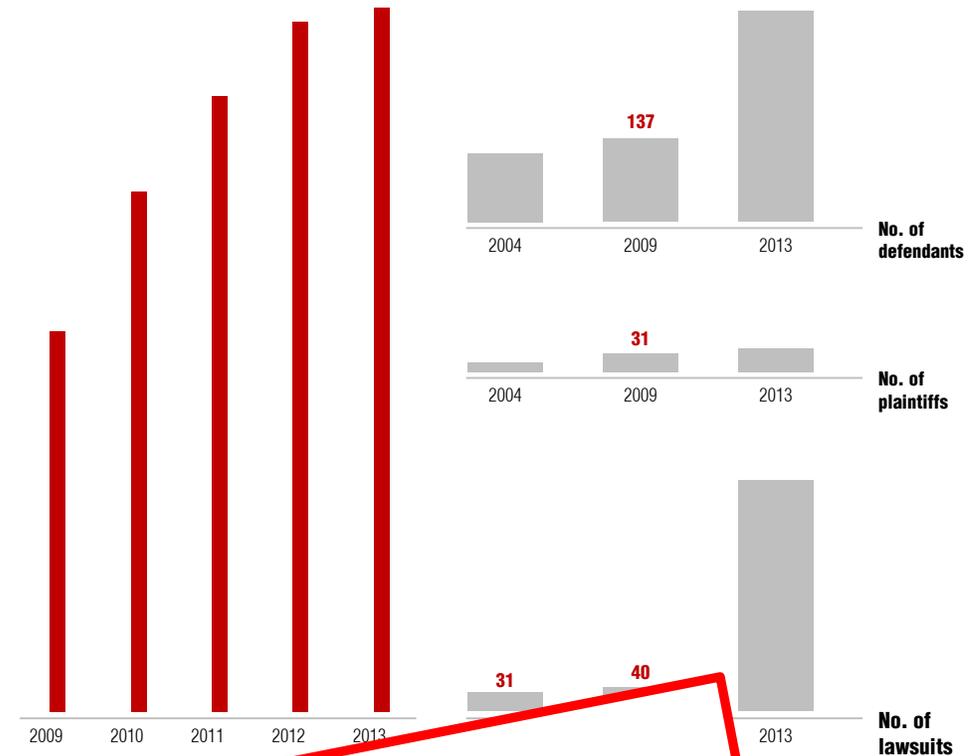
As competition in the automotive industry intensifies, top-tier automakers have chosen smart car technologies as their strategy for differentiating themselves from their competitors.

Competition in the automotive market is intensifying and as a result the gap between the leading pack and the followers has grown wider. The combined market share of the top 3 automakers – Toyota, GM and Volkswagen – was 31.5% in 2009 and by 2013 this had increased to 38.1% (2009). The market share of the 4th ~5th place automakers – Nissan and Hyundai – was 16.2% in 2009. The market share of the 4th ~5th place automakers – Nissan and Hyundai – was 16.2% in 2009.



● Proportion of patent lawsuits filed by NPEs (NPEs/ Total)

● Rapidly increasing smart car technology patent litigation



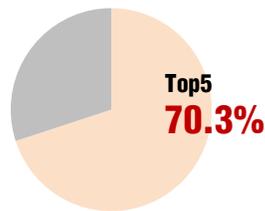
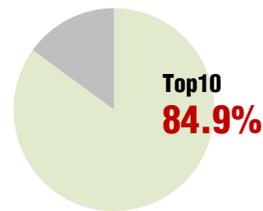
The leading pack of automakers are using themselves from advanced technologies to differentiate themselves from their competitors. Smart car technologies are being developed separately by automakers and NPEs (aka "patent trolls") instigating lawsuits sharply increased. And significantly, litigation has not been concentrated on only a few leading companies but has been filed across the entire automotive industry.

Change in the automotive market is intensifying and as a result the gap between the leading pack and the followers has grown wider. Smart car technology also appeared strongly in the intelligent transportation system (ITS) market. Smart car technology patent litigation involving smart cars began to increase rapidly in 2010 with the number of lawsuits filed by NPEs (aka "patent trolls") instigating lawsuits sharply increased. And significantly, litigation has not been concentrated on only a few leading companies but has been filed across the entire automotive industry.

Honda and BMW were involved in the greatest number of smart car technology patent lawsuits. The number of lawsuits launched against Hyundai+Kia began to increase in 2011. More than 90% of these smart car technology patent lawsuits were filed by NPEs.

Smart car technology patents are concentrated mostly in the Vehicle Control segment where 200 or so patents are registered each year.

The term “smart car” is defined differently in different countries. When smart car related technologies are registered in this segment, they are concentrated mostly in the Vehicle Control segment. The Trademark and Patent Office (USPTO) has registered 1,342 patents in this segment. The number of patents in these top 5 technologies account for about 70% of all smart car technology patents.



### Patent registration by smart car technology

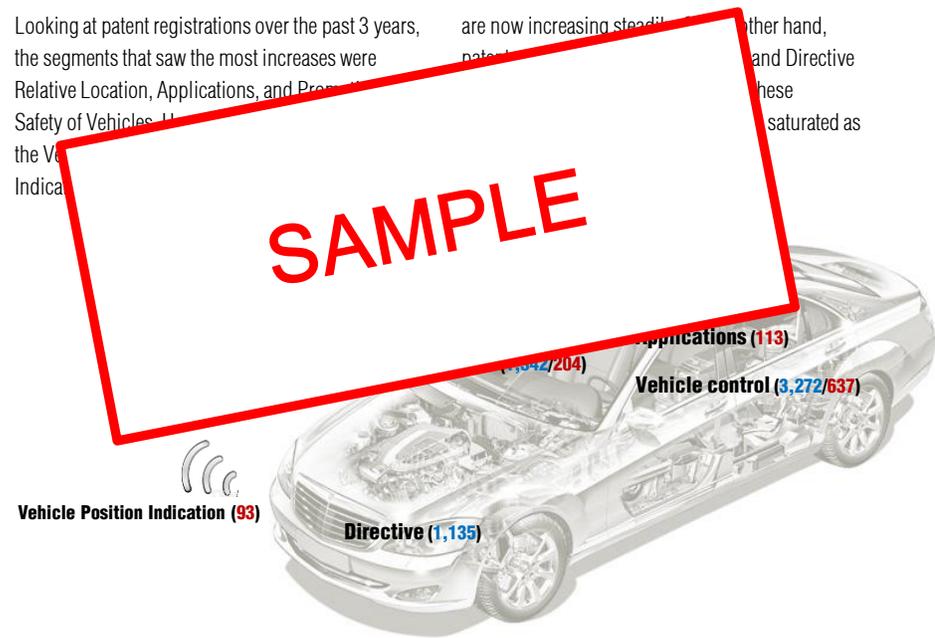
Name of technology

■ No. of patents (03-13)  
■ No. of patents in the past 3 years

Vehicle Control	
Navigation	
Land Vehicle Alarms or Indicators	
Directive	
Vehicle Position Indication	
Relative Location	
Applications	
External Condition Vehicle-Mounted Indicator	
Transmission Control	
Vehicle Mounted Systems	
Promoting Safety of Vehicle	
Special Applications	
Single Channel Simultaneously	
Return Signal Controls External Device	
Controlling Operation Responsive	
Vehicle Detectors	
Image Superposition by Optical Means	
Positional Servo Systems	
Transmitter & Receiver	
Plural Engines	

The Relative Location, Applications and Special Applications segment saw patent registrations increase the most in the past three years.

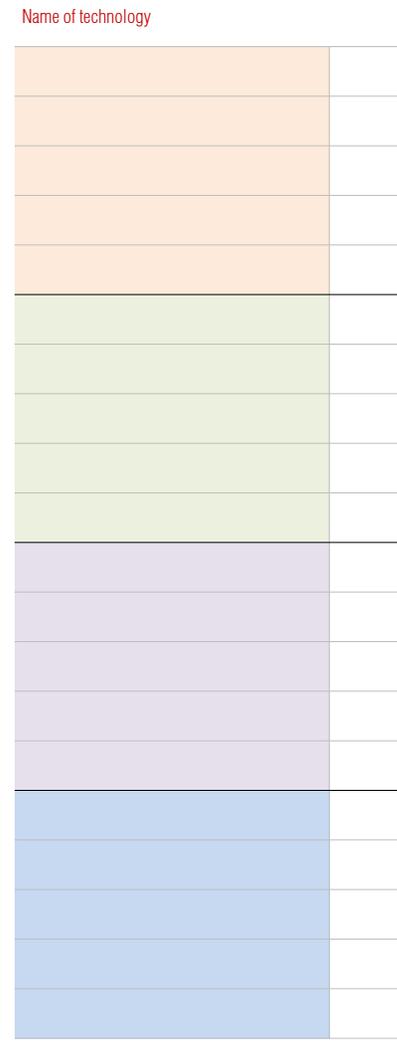
Looking at patent registrations over the past 3 years, the segments that saw the most increases were Relative Location, Applications, and Promotional Safety of Vehicles. However, these segments are now increasing steadily. On the other hand, the segments that saw the most patent registrations in the past three years were Vehicle Position Indication and Directive. These segments are now saturated as



- Focus on the smart car field of patents (2003–2013)
- Focus on the smart car field of new patent (2011–2013)

**Changes in smart car priorities**

Segments where smart car patents are concentrated (2003–2013)



Segments where smart car patents are concentrated (2011–2013)





## Top 9 Smart car Technologies 2014

Patent influence, IP activity and sharp rise in IP risk were taken into consideration, and top 9 core technologies that will change the dynamics of the smart car market were selected.

● **Technologies with greater patent influence**

Patent influence means the number of patents registered in the past 3 years are considered in the technology's R&D priority and proportion. The top 10 technologies with the top 10 transactions, in terms of IP activity, among smart car technologies are listed below.



Technology name	R&D priority		Proportion	
	All	Past 3 years	All	Past 3 years
Vehicle Control	1	1	29.0%	40.3%

● **Technologies whose IP activity sharply increased**

Patents with not only frequent registrations but also frequent transactions associated with the top 10 technologies with the top 10 transactions, in terms of IP activity, among smart car technologies are listed below.



technology	Technologies regarding which patent registrations sharply increased			Technologies regarding which patent transactions sharply increased		
	Past 3 years	Past 1 year	Proportion	Past 3 years	Past 1 year	Proportion
Relative Location	78	20	25.60%	18	8	44.40%



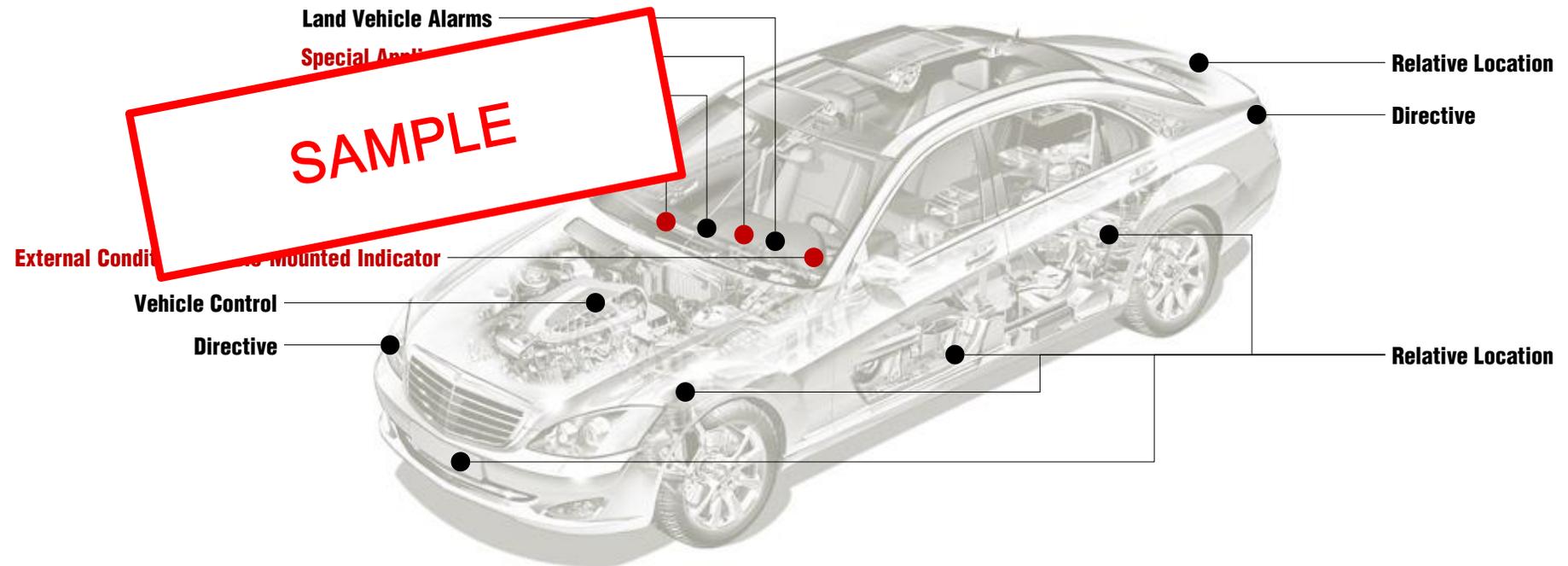
Top 9 technologies picked from the viewpoint of IP are thought to be the core technologies that will change the dynamics of the smart car market this year.

● Top 9 core smart car technologies of 2014

Technology	Description
Land Vehicle Alarms	
External Condition Vehicle-Mounted Indicator	
Vehicle Position Indicator	
Directive	
Special Applications	
Applications	
Vehicle Control	
Navigation	
Relative Location	

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 top 9 tec...  
 this year.

...igation risk. These  
 smart car market





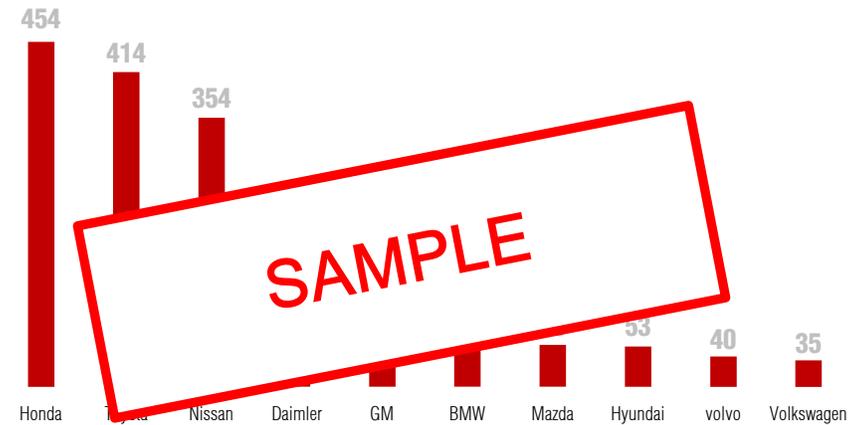
## **Evaluation of the smart car competitiveness of automakers**

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Honda has the most smart car patents and Toyota has been the most active recently.

To date, Honda has the most smart car patents, but Toyota has secured 94 smart car patents over the past 3 years.

● Number of smart car patents owned by automakers



● Number of smart car patents owned by automakers

Ranking	Vidor	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total	Post 3 years
1	<b>Honda</b>													
2	<b>Toyota</b>													
3	<b>Nissan</b>													
4	<b>Daimler</b>													
5	<b>GM</b>													
6	<b>BMW</b>													
7	<b>Mazda</b>													
8	<b>Hyundai</b>													
9	<b>Volvo</b>													
10	<b>Volkswagen</b>													

These Figures apply to the USPC(US Patent and Trade Office) index.

IP quantity based on the number of patents, and IP quality based on the number of citations and patent activity were evaluated at the same time.

The competitiveness of automakers' smart car patents was evaluated using both a quantitative index and a qualitative index. IP quantity was measured based on the number of patents owned by automakers, while IP quality was evaluated in consideration of

- △ number of top 10% cited patents,
- △ top 10% citations, and
- △ patent activity during the past 3 years.

**IP Quantity** No. of patent registrations

**IP Quality**  
IP power + IP influence + IP improvement

- IP power: number of patents registered in the past 3 years / total patents owned
- IP influence: number of citations of patents registered in the past 3 years
- IP improvement: number of top 10% cited patents / total patents registered in the past 3 years

SAMPLE

● Evaluation of the competitiveness of the smart car patents of the Top 10 automakers





## **Analysis of the smart car competitiveness of automakers**

Honda was rated as the automaker that has built the largest portfolio in terms of quantity.



With 454 smart car patents Honda holds the largest such portfolio, so at first glance it is the most powerful. But a deeper average Honda technology according to Honda's patents are relatively and Vehicle-Applications, the qualitative Control and in which the company has the most patents, was low.



● Analysis of the competitiveness of Honda's smart car patents

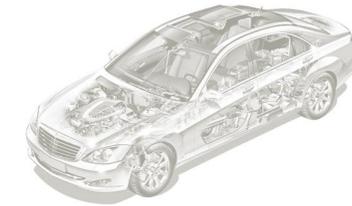
	IP Quantity	IP Quality				Total
	No. of patent registrations	IP power	IP influence	Activity of recent patents	Qualitative improvement of recent patents	
<b>Honda</b>						
Avg. of top 10 vendors	180.7	0.065	0.425	0.164	0.021	0.674

● Analysis of the competitiveness of Honda's top 9 core smart car technologies

Smart car core technology	IP Quantity		IP Quality					
	No. of patent registrations	Avg.	IP power	IP influence	Activity of recent patents	Qualitative improvement of recent patents	Total	Avg.
		140.2						0.649
Land Vehicle Alarms		21						0.665
External Condition Vehicle-Mounted Indicator		4.9						0.610
Vehicle Position Indication		9.6						0.624
Directive		15.2						0.537
Special Applications		4.3						0.784
Applications		5.8						0.617
Vehicle Control		47.2						0.631
Navigation		26.5						0.672
Relative Location		5.7						0.695



Toyota's patents in the top 9 core smart car technologies are very competitive in general.



Toyota's smart car patents were rated as competitive in general but most both quantitatively and qualitatively. In particular, External Condition Vehicle-Mounted Indicator, and Vehicle Position Indication are their core technologies. Toyota's patents in these technologies are very competitive and have a high quality. The average quality of Toyota's patents is 0.649, which is higher than the industry average.



● Analysis of the competitiveness of Toyota's smart car patents

	IP Quantity	IP Quality				Total
	No. of patent registrations	IP power	IP influence	Activity of recent patents	Qualitative improvement of recent patents	
<b>Toyota</b>						
Avg. of top 10 vendors	180.7	0.065	0.425	0.164	0.021	0.674

● Analysis of the competitiveness of Toyota's top 9 core smart car technologies

	IP Quantity		IP Quality					
	No. of patent registrations	Avg.	IP power	IP influence	Activity of recent patents	Qualitative improvement of recent patents	Total	Avg.
Smart car core technology		140.2						0.649
	Land Vehicle Alarms	21						0.665
	External Condition Vehicle-Mounted Indicator	4.9						0.610
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	Applications	5.8						0.617
	Vehicle Control	47.2						0.631
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	Relative Location	5.7						0.695

Nissan's patents in the top 9 core smart car technologies grew faster quantitatively than qualitatively.



As Nissan has 354 smart car patents, the company scores very well quantitatively, but its relative IP quality is lower than its competitors. Nissan's smart car technologies are competitive but their IP quality is weak.



● Analysis of the competitiveness of Nissan's smart car patents

	IP Quantity	IP Quality				
	No. of patent registrations	IP power	IP influence	Activity of recent patents	Qualitative improvement of recent patents	Total
<b>Nissan</b>						
Avg. of top 10 vendors	180.7	0.065	0.425	0.164	0.021	0.674

● Analysis of the competitiveness of Nissan's top 9 core smart car technologies

	IP Quantity		IP Quality					
	No. of patent registrations	Avg.	IP power	IP influence	Activity of recent patents	Qualitative improvement of recent patents	Total	Avg.
Smart car core technology		140.2						0.649
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Daimler has not been so active recently but still has a strong smart car patent portfolio due to its previous accomplishments. Their efforts are seen as being quite distant from the core technologies.



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**SAMPLE**

the External Condition Vehicle-Mounted Indicator, and Vehicle Position Indication, Special Applications and Applications segments.

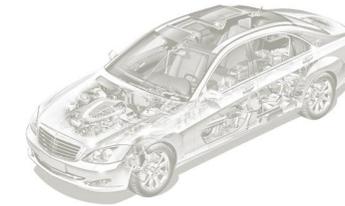
● Analysis of the competitiveness of Daimler's smart car patents

	IP Quantity	IP Quality				Total
	No. of patent registrations	IP power	IP influence	Activity of recent patents	Qualitative improvement of recent patents	
<b>Daimler</b>						
Avg. of top 10 vendors	180.7	0.065	0.425	0.164	0.021	0.674

● Analysis of the competitiveness of Daimler's top 9 core smart car technologies

	IP Quantity		IP Quality					
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	Applications		5.8					0.617
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	Navigation		26.5					0.672
	Relative Location		5.7					0.695

GM is the most active with regard to smart car patents and their qualitative level has been improving during the past 3 years as well.



GM is one of those companies which have been the most active with regard to smart car patents in recent years. Significant improvement in its patent registrations has been observed in the Land Vehicle Alarms segments. The company's qualitative level is higher than its competitors.



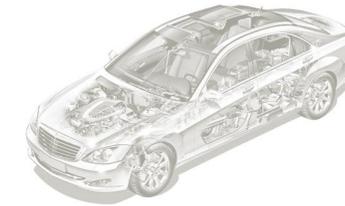
● Analysis of the competitiveness of GM's smart car patents

	IP Quantity	IP Quality				Total
	No. of patent registrations	IP power	IP influence	Activity of recent patents	Qualitative improvement of recent patents	
<b>GM</b>						
Avg. of top 10 vendors	180.7	0.065	0.425	0.164	0.021	0.674

● Analysis of the competitiveness of GM's top 9 core smart car technologies

	IP Quantity		IP Quality					
	No. of patent registrations	Avg.	IP power	IP influence	Activity of recent patents	Qualitative improvement of recent patents	Total	Avg.
Smart car core technology		140.2						0.649
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BMW has a relatively small number of patents but received a high qualitative evaluation score. However, their patents are concentrated in certain technology segments.



BMW has a relatively small number of smart car patents but received a high qualitative evaluation score. However, their patents are concentrated in certain technology segments. In order to get a high qualitative score, BMW has a high IP power and IP influence.



● Analysis of the competitiveness of BMW's smart car patents

	IP Quantity	IP Quality				Total
	No. of patent registrations	IP power	IP influence	Activity of recent patents	Qualitative improvement of recent patents	
<b>BMW</b>						
Avg. of top 10 vendors	180.7	0.065	0.425	0.164	0.021	0.674

● Analysis of the competitiveness of BMW's top 9 core smart car technologies

	IP Quantity		IP Quality					
	No. of patent registrations	Avg.	IP power	IP influence	Activity of recent patents	Qualitative improvement of recent patents	Total	Avg.
Smart car core technology		140.2						0.649
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Mazda has too few core smart car technologies to say that it has a portfolio.



Mazda is ranked No. 7 in IP quantity, but No. 9 in IP quality. Mazda has a small number of smart car technologies. In fact, its patent portfolio is far above the industry average. It is active in many areas, but the number of patents in its smart car patent portfolio is small. The number of patents in its smart car portfolio is small, but the quality is high.



● Analysis of the competitiveness of Mazda's smart car patents

	IP Quantity	IP Quality				Total
	No. of patent registrations	IP power	IP influence	Activity of recent patents	Qualitative improvement of recent patents	
<b>Mazda</b>						
Avg. of top 10 vendors						

● Analysis of the competitiveness of Mazda's top 9 core smart car technologies

	IP Quantity		IP Quality					
	No. of patent registrations	Avg.	IP power	IP influence	Activity of recent patents	Qualitative improvement of recent patents	Total	Avg.
Smart car core technology		140.2						0.649
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	Relative Location	5.7						0.695

Recently Hyundai has been very actively trying to gain competitiveness with regard to smart car patents. In particular, their patent strategy is focused on qualitative growth.



Hyundai has recently been very active in gaining competitiveness with regard to smart car patents. In particular, their patent strategy is focused on qualitative growth. Hyundai's portfolio is very high. The level of Hyundai's patents in navigation segments was high, and recently they have been active in getting patents in the Land Vehicle Alarms segment.



● Analysis of the competitiveness of Hyundai's smart car patents

	IP Quantity		IP Quality			
	No. of patent registrations	IP power	IP influence	Activity of recent patents	Qualitative improvement of recent patents	Total
<b>Hyundai</b>						
Avg. of top 10 vendors	180.7	0.065	0.425	0.164	0.021	0.674

● Analysis of the competitiveness of Hyundai's top 9 core smart car technologies

	IP Quantity		IP Quality					
	No. of patent registrations	Avg.	IP power	IP influence	Activity of recent patents	Qualitative improvement of recent patents	Total	Avg.
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	Navigation	26.5						0.672
	Relative Location	5.7						0.695

Volvo's smart car patents were not competitive both quantitatively and qualitatively.



Volvo's smart car patents were not competitive both quantitatively and qualitatively, but recently quantitative and qualitative performance patents in the smart car segments. Volvo's smart car patents were short of their competitors'.



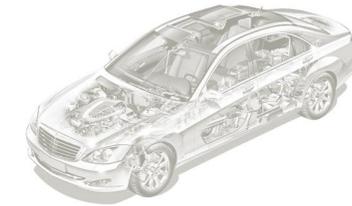
● Analysis of the competitiveness of Volvo's smart car patents

	IP Quantity	IP Quality				Total
	No. of patent registrations	IP power	IP influence	Activity of recent patents	Qualitative improvement of recent patents	
<b>Volvo</b>						
Avg. of top 10 vendors	180.7	0.065	0.425	0.164	0.021	0.674

● Analysis of the competitiveness of Volvo's top 9 core smart car technologies

	IP Quantity		IP Quality					
	No. of patent registrations	Avg.	IP power	IP influence	Activity of recent patents	Qualitative improvement of recent patents	Total	Avg.
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	Navigation	26.5						0.672
	Relative Location	5.7						0.695

Volkswagen has the smallest number of smart car patents, but their qualitative level is quite high.



Volkswagen has only 35 smart car patents but the qualitative level of those 35 patents is quite high. Volkswagen's smart car patents are quite weak.

**SAMPLE**

● Analysis of the competitiveness of Volkswagen's smart car patents

	IP Quantity	IP Quality				Total
	No. of patent registrations	IP power	IP influence	Activity of recent patents	Qualitative improvement of recent patents	
<b>Volkswagen</b>						
Avg. of top 10 vendors	180.7	0.065	0.425	0.164	0.021	0.674

● Analysis of the competitiveness of Volkswagen's top 9 core smart car technologies

	IP Quantity		IP Quality					
	No. of patent registrations	Avg.	IP power	IP influence	Activity of recent patents	Qualitative improvement of recent patents	Total	Avg.
Smart car core technology		140.2						0.649
	Land Vehicle Alarms	21.0						0.665
	External Condition Vehicle-Mounted Indicator	4.9						0.610
	Vehicle Position Indication	9.6						0.624
	Directive	15.2						0.537
	Special Applications	4.3						0.784
	Applications	5.8						0.617
	Vehicle Control	47.2						0.631
	Navigation	26.5						0.672
	Relative Location	5.7						0.695



**The Winner of 10 automaker in Smart car**

The evaluation of the competitiveness of the core smart car technologies of the top 10 automakers shows that Japanese automakers (namely Honda, Toyota and Nissan) received relatively higher scores.

● Comparison of the core smart car technologies of the top 10 automakers

Comprehensive evaluation	 HONDA	 TOYOTA	 NISSAN					 VOLVO	 VOLKSWAGEN
	Honda	Toyota	Nissan	Mazda	Subaru	Ford	Volkswagen	Volvo	Volkswagen
Land Vehicle Alarms									
External Condition Vehicle-Mounted Indicator									
Vehicle Position Indication									
Directive									
Special Applications									
Applications									
Vehicle Control									
Navigation									
Relative Location									



# About Us



**The Electronic Times is the most traditional and respected provider of information technology news and analysis in Korea.**

Since 1982, The Electronic Times has grown to become the nation's largest and most extensive IT related newspaper and every technical expert and business man including top-level executives and policy makers have relied on The Electronic Times for acquiring speedy and accurate information they need.

As a leading newspaper in IT industry coverage, The Electronic Times has played a very important role in growth and development of Korean information technology by delivering the latest domestic and international IT business news and policy strategies. With more distribution to the public, The Electronic Times has approached to the common people more closely and stabilized its position as an essential daily mass media



**KGT Lab Co., Ltd. is a patent database, assessment and solutions company specializing in patent informatics.**

Since its establishment in 2002, it has been the leading patent intelligence solutions provider in the market. The company launched Patent Rank (<http://rank.patentpia.com/about/outline.kgt>) in 2012, a total patent assessment service that provides recommendations for patent purchases, licensing targets and possible cooperative partnerships with other patent holders. In 2013, the lab released a comprehensive, global-standard patent database, the KGT Database (<http://patentpia.com/db/data.kgt>), fully utilizing its extensive research and development over the past ten years. The database achieved "Database Quality Certification-Value" issued by Korea Database Agency. The company also provides KGT Report, a service created for producing tailor-made reports for inquiring customers.



## Appendix

**\* Patent Registration by smart car technology**

Name of Technology	1985	1994	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total	Past 3 Years		
Vehicle Control, Guidance, Operation, Or Indication																								
Navigation																								
Land Vehicle Alarms or Indicator																								
Directive																								
Vehicle Position Indication																								
Relative Location																								
Application																								
External Condition Vehicle-Mounted Indicator																								
Transmission Control																								
Vehicle Mounted System																								
Promoti																								
Spee																								
Singl																								
Return																								
Control																								
Vehicle C																								
Image Sup by Optical Means																								
Positional Servo System																								
Transmitter & Receiver																								
Plural Engines																								
With Means Responsive To Speed Of Vehicle For Maintaining Speed At, Or Preventing It From Exceeding, A Particular Value																								
Condition Responsive Indicating System																								
Radiotelephone System																								
Selective																								
Vehicle Parking Indicators																								
Receiver Or Analog Modulated Signal Frequency Converter																								
Electric Engine																								
Speech Signal Processing																								



**\* Patent litigation by smart car technology**

Name of Technology	Total	Past 3 Years	Past 1 Year
Navigation			
Vehicle Position Indication			
Directive			
Radiotelephone System			
Land Vehicle Alarms Or Indicators			
Vehicle Control, Guidance, Operation, Or Indication			
Relative Location			
Visual Indication			
Transmitter And Receiver At Same Station			
Condition Responsive Indicating System			
With Means For Promoting Safety Of Vehicle, Its Occupant Or Load, Or An External Device			
Vehicle Mounted Systems			
Special Applications			
Support			
Sele			
Spec			
Vehicle			
External			
Image S			
Applicati			
Crash Se			
Positional Servo Systems (E.G., Servomechanisms)			
Speech Signal Processing			
Automated Electrical Financial Or Business Practice Or Management Arrangement			
Video Display Screen Support			
Display Peripheral Interface Input Device			
Image Transformation Or Preprocessing			
Photocells; Circuits And Apparatus			
Power			
Receiver Or Analog Modulated Signal Frequency Converter			
Return Signal Controls External Device			
Special Application			
Traffic Control Indicator			
Transmission Control			
Vehicle Parking Indicators			
With Means For Controlling Operation Responsive To Electromagnetic Radiation, Magnetic Force, Or Sound Waves Received From Source, Or Reflected From Object Or Surface, Located Apart From Vehicle			





SAMPLE

**\*Analysis of the competitiveness of Honda's smart car patents**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>Honda</b>											

**\*Analysis of the competitiveness of Honda's top 9 core smart car technologies**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>Top 9 core smart car technology</b>											
Land Vehicle Alarms											
External Condition Vehicle-Mounted Indicator											
Vehicle Position Indication											
Directive											
Special Applications											
Application											
Vehicle Control											
Navigation											
Relative Location											



SAMPLE

**\*Analysis of the competitiveness of Toyota's smart car patents**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>Toyota</b>											

**\*Analysis of the competitiveness of Toyota's top 9 core smart car technologies**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>Top 9 core smart car technology</b>											
Land Vehicle Alarms											
External Condition Vehicle-Mounted Indicator											
Vehicle Position Indication											
Directive											
Special Applications											
Application											
Vehicle Control											
Navigation											
Relative Location											



SAMPLE

**\*Analysis of the competitiveness of Nissan's smart car patents**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>Nissan</b>											

**\*Analysis of the competitiveness of Nissan's top 9 core smart car technologies**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>Top 9 core smart car technology</b>											
Land Vehicle Alarms											
External Condition Vehicle-Mounted Indicator											
Vehicle Position Indication											
Directive											
Special Applications											
Application											
Vehicle Control											
Navigation											
Relative Location											



SAMPLE

**\*Analysis of the competitiveness of Daimler’s smart car patents**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>Daimler</b>											

**\*Analysis of the competitiveness of Daimler’s top 9 core smart car technologies**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>Top 9 core smart car technology</b>											
Land Vehicle Alarms											
External Condition Vehicle-Mounted Indicator											
Vehicle Position Indication											
Directive											
Special Applications											
Application											
Vehicle Control											
Navigation											
Relative Location											



**\*Analysis of the competitiveness of GM's smart car patents**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>GM</b>											

**\*Analysis of the competitiveness of GM's top 9 core smart car technologies**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>Top 9 core smart car technology</b>											
Land Vehicle Alarms											
External Condition Vehicle-Mounted Indicator											
Vehicle Position Indication											
Directive											
Special Applications											
Application											
Vehicle Control											
Navigation											
Relative Location											



SAMPLE

**\*Analysis of the competitiveness of BMW's smart car patents**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>BMW</b>											

**\*Analysis of the competitiveness of BMW's top 9 core smart car technologies**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>Top 9 core smart car technology</b>											
Land Vehicle Alarms											
External Condition Vehicle-Mounted Indicator											
Vehicle Position Indication											
Directive											
Special Applications											
Application											
Vehicle Control											
Navigation											
Relative Location											



SAMPLE

**\*Analysis of the competitiveness of Mazda's smart car patents**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>Mazda</b>											

**\*Analysis of the competitiveness of Mazda's top 9 core smart car technologies**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>Top 9 core smart car technology</b>											
Land Vehicle Alarms											
External Condition Vehicle-Mounted Indicator											
Vehicle Position Indication											
Directive											
Special Applications											
Application											
Vehicle Control											
Navigation											
Relative Location											



SAMPLE

**\*Analysis of the competitiveness of Hyundai's smart car patents**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>Hyundai</b>											

**\*Analysis of the competitiveness of Hyundai's top 9 core smart car technologies**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>Top 9 core smart car technology</b>											
Land Vehicle Alarms											
External Condition Vehicle-Mounted Indicator											
Vehicle Position Indication											
Directive											
Special Applications											
Application											
Vehicle Control											
Navigation											
Relative Location											



**\*Analysis of the competitiveness of Volvo's smart car patents**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>Volvo</b>											

**\*Analysis of the competitiveness of Volvo's top 9 core smart car technologies**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>Top 9 core smart car technology</b>											
Land Vehicle Alarms											
External Condition Vehicle-Mounted Indicator											
Vehicle Position Indication											
Directive											
Special Applications											
Application											
Vehicle Control											
Navigation											
Relative Location											



SAMPLE

**\*Analysis of the competitiveness of Volkswagen's smart car patents**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>Volkswagen</b>											

**\*Analysis of the competitiveness of Volkswagen's top 9 core smart car technologies**

	No. of patent registrations	No. of registered patents in the past 3years	Total citations	No. of citations of patents registered in the past 3 years	No. of top 10% cited patents	Top 10% citations	IP Power	IP Influence	Activity of recent patents	Qualitative improvement of recent patents	IP Quality
<b>Top 9 core smart car technology</b>											
Land Vehicle Alarms											
External Condition Vehicle-Mounted Indicator											
Vehicle Position Indication											
Directive											
Special Applications											
Application											
Vehicle Control											
Navigation											
Relative Location											