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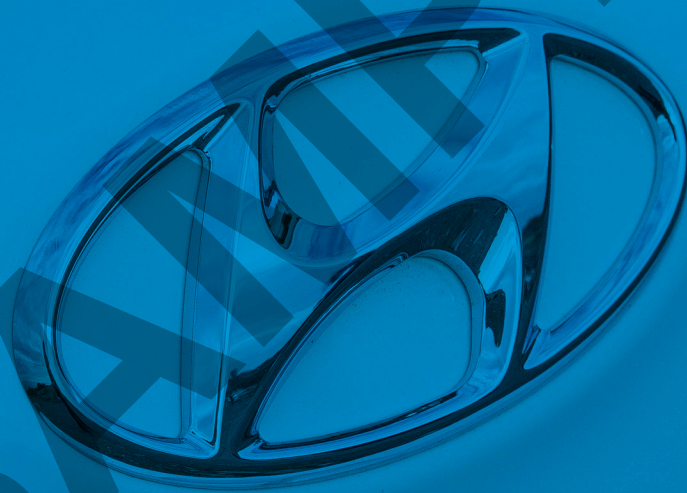
Supplying the OEMs

SupplierBusiness

Supplying Hyundai-Kia

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Vehicle platforms

Platform strategy

Like all other major OEMs, Hyundai Kia has been looking at ways to consolidate platforms across both group brands and like model ranges to increase finished vehicle volumes in relation to initial development investment, which in turn leads to improved economies of scale and greater margins.

Within this range of shared platforms Hyundai Kia has been looking to achieve greater levels of flexibility, a goal designed to support not just like model ranges but individual model types within those ranges, all with only minimal alterations. This is particularly important due to the continuing popularity of crossover models, both in the C- and B-segments, while the same can also support development of niche models unique to an individual brand. Based on the standard platform layout, where front, middle and rear sections are joined before the body sides are offered up to this assembly, such changes would focus on the middle section and the use of different pressings to alter the wheelbase length to suit the vehicle type being manufactured. This leaves the suspension hard points and engine bay bulkhead as fixed points of reference.

Further, the two brands have retained distinct design groups. Although they are required to use the same powertrains and platforms – and standardized parts which are designed to work within those architectures – almost everything else about the individual Hyundai and Kia models is different. This is not just limited to the exterior designs but also the interior, where the IP within a Hyundai is based around the centre stack, and in a Kia the general layout of controls is spread across the dashboard. Within this, equipment is unique to the brand, as are materials and even onboard infotainment and telematics systems.

As steel technologies have advanced, so stronger, more rigid platform structures have been possible and this has also helped to differentiate the brands. These improved materials mean that there is a reduced amount of appreciable flex in the platform structure when suspension impacts occur, which means that engineers can be far more precise in tuning an otherwise shared suspension set-up. This ultimately means that these engineers can tune a vehicle's suspension to reflect the character of the brand, rather than to off-set the unwanted chassis flex. This results in each brand having a set of characteristics which are applied to each vehicle, where Hyundai is largely oriented towards ride comfort and Kia applies a less forgiving set-up for improved driver feedback and road handling.

Overall, there are some key differences between how Hyundai Kia and competing manufacturers have gone about achieving the current depth of platform shares. As operations across the two South Korean OEMs have moved forward since 1999, they have managed to share platforms across all major vehicle segments; this, without a dedicated modular system, such as the Volkswagen Group's MQB. In most cases, the basic platform sharing system employed by Hyundai and Kia is more commonly across production of low-volume, high-cost premium models, largely due to the increased cost being able to produce a clearly different vehicle. Yet Hyundai and Kia have devised a system which not only cuts costs but delivers volume models that, while using the same underlying engineering, have sufficient differentiating factors that the two brands do not wantonly cannibalize sales off each other.

As of 2013, Hyundai claimed that it was building 40 distinct vehicles based on just six integrated platforms – using the same number of platforms, the OEM was producing 36 and 32 models in 2011 and 2009 respectively, while in 2002 there were no integrated platforms in use. Considering the number of vehicle types, models and versions, this 2013 figure calls into question what criteria are being used to define an 'individual' platform. Where an extended wheelbase alone does not result in an all-new structure, changes to fixed points, such as A-pillar location, should be sufficient to warrant a new structure type. No matter what the actual figure, it is clear that Hyundai has managed to streamline the total number of platforms it shares across the two group carmakers, which will help reduce production costs (tooling, storage, development, etc.) and also development time – Hyundai claims that shared platforms have reduced average vehicle development times from 40 months to just 19 months.

Supplier selection

Supply base development

The majority of OEMs based in the western hemisphere each rely on a mature network of independent supply companies, acting either globally or regionally, for delivery of parts, components and modules. In some cases, parts delivered from the supplier network comprise up to 80% of each finished vehicle. These networks have been further developed over an extended period of managed out-sourcing, where the OEMs have used tier one suppliers and the upstream supply chain as both a route to reducing internal costs and as a ready-made R&D network.

These OEM-supplier relationships have taken considerable time to develop – some date back (with differences in arrangement and operation) to when the automotive industry was in its infancy. This has led to these relationships becoming a vital element of modern vehicle production and development. Examples of these extended partnerships include Mercedes-Benz and Bosch, General Motors and Delphi, Ford and Visteon – in Japan, this extends to Toyota and Denso.

Longevity and the open market have both played their part in shaping the development of these supplier/OEM relationships, but this natural evolution has not been available to Hyundai. As a relative newcomer to the world automotive stage, the carmaker has needed to rapidly grow a supplier network in a country where there was previously none. In its initial stages, this process was influenced by policies put in place by the Korean national government and by the preferred formation of family business empires, or chaebol. With the resulting vertical arrangement of companies, these corporate groups bear a greater similarity to the Japanese keiretsu, or groups of preferred suppliers, rather than the current Western arrangement of external suppliers, which consists of former group companies which have been spun off to become independent entities and wholly-independent suppliers.

Hyundai has created its own supplier network in South Korea through two routes, either by forming its own company or by purchasing companies to fulfil a specific role. Whichever way these operations were brought into the Hyundai Motor Group, they now act as the primary tier one companies delivering to both Hyundai and Kia. Although there are differences by company, each has been tailored to address a specific need within the total process of vehicle manufacturing, to the point where they have become the default players on both the national and international stage, as Hyundai Kia has grown in stature around the world.

Until recently, these suppliers could not match the level of quality delivered by most companies working with western OEMs, but over the past decade they have made considerable advances in both quality and R&D capability – these gains can largely be attributed to the push by Hyundai and Kia to improve finished vehicle quality so as to compete directly with established carmakers and brands. Such is the improved level of quality now delivered by the group tier suppliers that they have looked to diversify away from their traditional relationships with Hyundai and Kia and deliver parts to other global OEMs. Considering the cyclical nature of the automotive business, in the long-term this should prove beneficial for Hyundai, Kia and the individual suppliers.

Major and strategic suppliers

The companies within the Hyundai Motor Group are, by positioning and delivered part volumes, both major and strategic suppliers. Listed in the Internal Supply Network section (please see Production Strategy section), these companies (which include Hyundai Mobis, Hyundai Wia and Hyundai Dymos) produce specific parts and modules to support vehicle production. Beyond this, there are also companies within the group which operate beyond design and production of parts, such as Hyundai Steel, which delivers almost 50% of all steel used across Hyundai and Kia production, and Hyundai Glovis, which ships finished vehicles to their respective destinations.

Outside the Hyundai group of companies, there remain a series of high-profile suppliers delivering considerable portions of their respective annual output to the South Korean OEM. One such company is Mando, which is the largest South Korean tier one supplier, specializing in development and production of brake, steering and suspension modules. Formerly part of the South Korean Halla Group, Mando was sold to JP Morgan in 1999 at the height of the Asian financial crisis. Mando was almost bought by Hyundai in 2008, but a reformed Halla (which was bankrupted during the aforementioned crisis)

ultimately took back control of the supplier. (It is interesting to note that Halla was formed by Jeong In Yeong, brother of Jeong Ju Yeong, the founder of Hyundai Motor).

In 2000, it was estimated that Mando was delivering 83% of all company output to Hyundai, but by 2010 this figure had fallen to 57% as sales to other OEMs, including General Motors, increased. It is forecast that the portion of all Mando output sold to Hyundai will fall to 40% by 2015, as orders from Chinese OEMs are expected to increase. This, though, is still a considerable quantity of parts and Mando remains integral to vehicle assembly at Hyundai, particularly in the South Korean market.

Another supplier delivering to Hyundai from outside the group is LG Chem. The series battery technology developer and manufacturer is already delivering 1.4kWh lithium-polymer battery packs to Hyundai for production of the Sonata 'Blue Drive' hybrid saloon, and there is evidently more to come. According to reports, LG Chem has developed a 48V lithium-ion battery which will be used exclusively in future pure-electric versions of existing Hyundai SUV models. The higher voltage will help power the increasing number of onboard electrical systems, including stop-start, electric power steering and regenerative braking. These models are due for introduction in 2017.

Supplier companies from outside South Korea which play a key role in assembling Hyundai and Kia vehicles include PPG. Originally known as Pittsburgh Plate Glass, due to the production of hardened glass products, PPG has gone on to extend its product ranges, which now include a series of primers, basecoats and clearcoats used across a series of Hyundai and Kia assembly locations around the world.

Table 17: PPG products used across Hyundai and Kia production (from the SupplierBusiness Who Supplies Whom database)

Supplier's Component Description	Brand Name	Model Name (Year)	Country	Plant
Basecoat	HYUNDAI	SONATA	UNITED STATES	MONTGOMERY
Basecoat	KIA	CEE'D	SLOVAKIA	ZILINA
Basecoat (color) paint layer	KIA	SORENTO	UNITED STATES	WEST POINT
Clearcoat	HYUNDAI	SONATA	UNITED STATES	MONTGOMERY
Clearcoat	KIA	CEE'D	SLOVAKIA	ZILINA
Electrocoat	HYUNDAI	SONATA	UNITED STATES	MONTGOMERY
Electrocoat	KIA	CEE'D	SLOVAKIA	ZILINA
LASD - Liquid Applied Sound Damper	KIA	SORENTO	UNITED STATES	WEST POINT
LASD - Liquid Applied Sound Dampner	HYUNDAI	SONATA	UNITED STATES	MONTGOMERY
Primer	HYUNDAI	SONATA	UNITED STATES	MONTGOMERY

Source: IHS Automotive

Another company based outside South Korea which plays an integral role in production across Hyundai and Kia is BorgWarner. With the company headquarters in Auburn Hills, Michigan, BW is a global leader in powertrain solutions, including gearboxes, clutches and turbochargers. While Hyundai now assembles most of the gearboxes and engines used across production at its own plants, various components, including auto and CVT transmission friction plates and engine timing chain systems are still delivered from the global supplier to most major Hyundai and Kia plants, including Ulsan (for production of the Sonata, Santa Fe and i20) and at Gwangju (Soul and Sportage).

Table 18: BorgWarner parts used across Hyundai and Kia production (from the SupplierBusiness Who Supplies Whom database)

Supplier's Component Description	Brand Name	Model Name (Year)	Country	Plant
6-spd AT: cam assy	HYUNDAI	SANTA FE (2011)	UNITED STATES	MONTGOMERY
6-spd AT: Friction / separator plate packs	HYUNDAI	SANTA FE (2011)	UNITED STATES	MONTGOMERY
6-spd AT: roller one way clutch	HYUNDAI	SANTA FE (2011)	UNITED STATES	MONTGOMERY
6-spd AT: Friction clutch pack assemblies	HYUNDAI	SONATA (2009)	UNITED STATES	MONTGOMERY
6-spd AT: Roller one-way clutch assembly	HYUNDAI	SONATA (2009)	UNITED STATES	MONTGOMERY
Balance Shaft Drive Chain System	HYUNDAI	SANTA FE (2012)	UNITED STATES	WEST POINT
Chain Engine Timing System on 1.0/1.2L Kappa engine options	HYUNDAI	XCENT (2014)	INDIA	IRUNGATTUKKOTTAI
Chain Timing System on 1.0/1.2L Kappa I3/I4	HYUNDAI	i10 (2013)	INDIA	IRUNGATTUKKOTTAI
Chain Timing System on Gamma 1.6L and Theta 2.0L	KIA	CERATO (2013)	MALAYSIA	GURUN

Interview

Jürgen Grimm, head of Powertrain Engineering at the Hyundai Motor Europe Technical Center

Julian Buckley speaks with **Jürgen Grimm, head of Powertrain Engineering at the Hyundai Motor Europe Technical Center**, located in Frankfurt Germany, about issues related to powertrain development across Hyundai and Kia the new T-Hybrid system, launched at the 2014 Paris motor show. The interview took place in October 2014.

I'd like to talk about the powertrain strategy between Kia and Hyundai in Europe. Is it correct to say that one concentrates on engines and another on transmissions? Who decides what gets developed on vehicles?

Jürgen Grimm: We are doing this in two ways. Once the guys from each brand decide which kind of models they need, they have to decide what is the proper technology and how we can share it between both brands. Another route is like the T-Hybrid system, where we think about which technologies are important for development and what needs to be introduced. Then we look at both brands to understand which models can use the technology; basically we are developing the same tech for both brands, but the refinement in both brands is somewhat different. Sometimes the brands decide which technology they want to launch first because it fits their products better.

Can we look at that from a technical standpoint and say what the differences are and how that manifests itself?

With our 1.6-litre turbo engines, we first offered these to Hyundai in the US, for the Veloster. Then we decided to bring it to Europe in a different performance reach; in the US we focused more on maximum power, and for Europe we focused more on driveability, which means we cut a little bit of the maximum power and reinforced the low end torque. For Kia we introduced the 1.6 turbo at the sister plant [Zilina, Slovakia] for the Procee'd GT. From our perspective, the driveability of that car should be the most focused issue, so we came back to the original performance level and combined that with a very short and aggressive transmission ratio. We also tuned the turbo more aggressively. This is how we tune it for different applications.

So tuning the engine to the target customer is part of differentiating Kia and Hyundai?

Yes, and you can see this in our latest technology study, the 48V T-Hybrid concept. On the Kia side we made this a full package, adding the electric supercharger to get more power output, better driveability, better dynamics, combined with a longer gear ratio to gain further CO₂ reductions. This is the full package. But we are very flexible, and can launch technologies for both brands with different application factors.

What do you think about emissions in general? Do you think it's worth the possible investment to comply with 50% CO₂ reductions which could be outlined in Euro 7 guidelines? Is it feasible?

It's always feasible. For Euro IV, we introduced the diesel particulate filter. For Euro V we learned to reduce the amount of precious metals in the systems so they became cheaper. What is important for us in the automotive industry is to have a relevant and reliable planning rate. We can't have a situation where every two years the targets are being changed and every country has different variations. With enough time, processes can be optimized and cost increases controlled.

So as long as you have enough lead time, the development can incorporate changes and improvements. Can we talk about the T-Hybrid and the background of the system?

From our side, three years ago we had everything that was required for the big market breakthrough, we had fuel cell, we had hybrid, we had a few electric cars, everything was there. But then everybody realised the big market breakthrough had still not happened.

What do you mean exactly with the big market breakthrough?

In Germany, there is a market for one million turbodiesels, and we wanted to tap into that. We are an automotive