THE QUIET REVOLUTION: CONVERGENCE AND THE FUTURE AUTOMOTIVE SUPPLY CHAIN

DHL Supply Chain

By Lisa Harrington

President, lharrington group LLC and Senior Research Fellow, Supply Chain Management Center, Robert H. Smith School of Business, University of Maryland
Something is happening in the automotive sector. A new world order is emerging. It’s a quiet revolution, but one which will change the industry forever.

Vehicles are now technology on four wheels. Technology – not chassis design, braking systems or tires – has become preeminent. This upsets the status quo in the 100-plus-year-old automotive sector. A status quo where the big original equipment manufacturers (OEMs) held all the market power.

This quiet revolution upends the traditional hierarchy of players in the industry, forcing every participant to focus on what it will take to build the future automotive business model. Just what is that model? It is a converged industry that fuses high tech and automotive into a new super sector.

Much as Henry Ford’s revolution in mass-production manufacturing ushered in the industrial revolution, this convergence of the high tech and auto industries is spawning a similar, albeit quieter industrial revolution.

Make no mistake. This is big news.

And it carries significant implications for the automotive supply chain. It is driving OEMs to form closer relationships with their suppliers – relationships that extend far back into the supply chain. In this new reality, tier 4 suppliers are every bit as important as tier 1 suppliers.

This quiet revolution upends the traditional hierarchy of players in the industry, forcing every participant to focus on what it will take to build the future automotive business model.

So what does it take to deliver this new automotive supply chain? Imagination, technological innovation, collaboration and strategic partnerships. That’s precisely what we will explore in this white paper. We begin with a look at the current state of the automotive industry before discussing what the future holds.
The quiet revolution

The near-term outlook for the global automotive industry is mixed. Analysts expect global light vehicle production to grow over the next two years – but at a much slower pace than during the past five years. Europe will remain stable, but at a relatively flat and low level of growth; Japan will see a sales decline; and Canada and the United States will see only moderate growth. The BRI markets (Brazil, Russia and India) have the potential for growth following recent difficult years, but a risk of stagnation clearly exists given the state of these economies. And even though China is experiencing a downturn, and sales may come in a bit lower than the projection in Figure 1, most analysts are bullish about China’s long-term growth prospects.¹

Despite these cautionary notes, the outlook for automotive sales overall is positive. Statista Inc. predicts global car sales will hit about 73 million units this year, up more than one million units from 2014. And, while the automotive OEMs’ profit margins are down from the previous highs of the last five years, they remain robust, ranging from 8 to 14 percent. Figure 2 shows the earnings before interest, taxes, depreciation and amortization (EBITDA) of the industry as a whole, as well as that of six major OEMs.

---

PART 1:
THE QUIET REVOLUTION

In the context of this growth picture, two related trends are powering a major structural transformation of the global auto industry:
- The rise of the global mega supplier
- The convergence of the high tech and automotive industries into a potential single super sector.

These two trends feed upon and amplify one another.

THE RISE OF THE MEGA SUPPLIER

Vehicle production requires thousands of parts, and inputs from a large number of suppliers. Historically, the bargaining power of suppliers was very low, with the OEMs setting the rules, stipulating component designs and generally controlling the game.

Not so any more. Auto suppliers’ contribution to vehicle make-up has increased from 56 percent in 1985 to about 82 percent today (see Figure 3). “Automakers are becoming more like assemblers and less like manufacturers,” writes Henry Kallstrom of analyst firm Market Realist.4 “Apart from the engines that still distinguish the giants from the lesser-known automakers, most of the parts are now produced by suppliers. This has led to the formation of ‘mega suppliers’ – i.e. large suppliers that control an ever growing portion of the supply stream through acquisition and vertical integration.”

This rise of mega suppliers, and the resulting influence they wield in the supply paradigm, is a direct result of the OEM expansion into developing markets – e.g. Latin America, China and Asia-Pacific. “In order to have a reliable supplier base, OEMs encouraged the European and American suppliers to set up their own factories in these emerging markets” Kallstrom explains. “The mega suppliers grew and became global. Automakers, for their part, concentrated on building dealer networks, marketing, and sales functions.”5

In this new paradigm, suppliers spend more on research and development (R&D) than OEMs. For example, Bosch, the largest supplier globally, spent 9.9 percent of its sales on R&D in 2013. In contrast, General Motors spent 3.5 percent of its sales on R&D.6 Suppliers are also bringing upstream product capabilities into their fold by forming new partnerships with technology companies, to control more of the supply chain and, as a result, their business.

---

4 Henry Kallstrom, “Suppliers’ power is increasing in the automobile industry.” Market Realist, last modified, Henry Kallstrom • Feb 5, 2015 2:38 pm EDT, http://marketrealist.com/2015/02/suppliers-power-increasing-automobile-industry/
5 Ibid.
6 Ibid.
The implications of this rise in supplier power are significant. The health and profitability of OEMs is now inextricably tied to the stability and financial well-being of their burgeoning global supplier base.

**THE CONVERGENCE REVOLUTION**

The rise of themega supplier has an emerging consequential trend – one that carries even greater significance, and injects new levels of risk and complexity into the automotive supply chain. That trend is convergence – the melding of the automotive and high tech industries into a potential new super sector.

The high tech composition of vehicles today – the ‘connected’ car, self-driving and self-diagnosing vehicles – is propelling this multi-sector convergence. Today’s average midsize vehicle has approximately 40 to 50 microprocessor-driven systems, which require more than 20 million lines of code. A larger vehicle can have up to 100 million. A Boeing 787, in contrast, has fewer than 15 million lines of code.7

In fact, technology companies and other new supplier entrants are increasingly becoming the engine behind automotive innovation. In the United States, for instance, “it’s interesting to observe that most of the innovations surrounding future vehicles and mobility experiences are now premiered at the Consumer Electronics Show in Las Vegas, instead of at the North American International Auto Show in Detroit.”8

Conditioned by the electronics sector’s rapid and frequent product innovations in computing, gaming and communications devices, consumers now expect the same rate of innovation in the vehicles they drive. “Consumers are accustomed to new and enhanced user experiences on an annual basis,” points out consulting firm Booz Allen. “This expectation will make it increasingly difficult for automakers and suppliers to maintain the current multi-year product design and development process.”9

“This trend is a game changer,” stresses Frank Vorrath, Vice President Global Supply Chain at Johnson Controls, one of the world’s largest automotive suppliers. “Connectivity and technology in vehicles will drive our life going forward. While

---

7 Gary Silberg, “Me, my car, my life...in the ultraconnected age,” KPMG, 2014, pp. 22-23. (Source 10, 22-23).
The quiet revolution

The tech industry has been part of the auto sector for a long time, we see more and more tech-based companies coming into the business."

The two industries are now so intertwined that their business relationships have become truly symbiotic. Thus every supplier, regardless of what tier it falls into, becomes critical. Disruption at even the smallest tier 4 supplier may now have the power to bring down an assembly line because it may be the sole source for a vital component.

And in some cases the auto sector may find itself competing for supplier capacity with the tech industry, which may in fact be the larger customer. This competition naturally injects risk into the automotive supply chain, and is forcing automotive OEMs to forge closer partnerships with their supplier base, and hedge risk by securing multiple suppliers for the same component. In some cases OEMs may even step in and provide financial and technical support to smaller suppliers of critical technology.

In some cases the auto sector may find itself competing for supplier capacity with the tech industry, which may in fact be the larger customer.

Vorrath of Johnson Controls confirms this trend. “The constant pressure for technology innovation requires more investment in R&D up front,” he says. “This puts tremendous financial pressures on companies. To fund this innovation, we are seeing new kinds of strategic alliances and partnerships being formed, with a focus on closely integrating the entire value chain to deliver products and profit.” OEMs must nurture these strategic relationships, and become the buyer of choice to their suppliers.

This is the case with one global OEM, which went in and helped a small supplier redesign its supply chain to gain greater reliability.
PART 2:
THE NEW AUTOMOTIVE SUPPLY CHAIN

The combined impact of these two supplier-based trends is transforming the traditional automotive supply chain. And the pace of this transformation is accelerating. The stakes are high – profit margins, competitive advantage and potentially market share are all in play.

The tech world excels at agility. It has developed the ability to institute rapid change in product design and the supporting supply chain to meet consumer demand. “To compete,” notes Vorrath, “the Apples and Ciscos of the world had to learn how to move fast. Automotive companies are beginning to follow the tech model to realize rapid change.”

Realizing this agility, while still controlling costs, requires companies to re-think their supply chains. OEMs and suppliers are turning to smarter supply chain processes and information systems to move from a reactive to a proactive and, eventually, to a predictive supply chain operational model.

Constructing this future supply chain requires closer communication, coordination and collaboration across all tiers of the automotive ecosystem.

From a tier 1 supplier’s perspective, Michael Harsh, Executive Director, Global Supply Chain at Johnson Controls observes, “You don’t dare get stuck with inventory, so that means you need visibility. And you need to know where the OEMs are headed, so that means communication. These requirements are driving more backward integration in the supply chain.”

Moving toward greater supply chain integration and visibility is not easy. “Our biggest challenge”, acknowledges Harsh, “lies in the fact that not all companies are equal in their ability to provide this...
On a scale of one to 10, with 10 being excellent visibility, the automotive industry is at about a three.

level of visibility. If one company in the chain is behind, it may cause you to miss something that is critical further forward in the channel."

On a scale of one to 10, with 10 being excellent visibility, the automotive industry is at about a three, Harsh believes. “A lot of suppliers and OEMs are still trying to figure out what information they need and what kinds of information would be good to share,” he notes. “Companies will be doing a lot of work on these information infrastructures over the next five years. We as an industry need to get to the point where we have good signals at all levels in the supply chain.”

So what specifically are OEMs and their key suppliers doing to tackle these challenges and push supply chain performance – to achieve these “good signals” across the supply chain?

THE MOVE TO STANDARDIZATION

First, the industry is working to standardize the management of both the physical and the information supply chain. Standardization will allow OEMs and their suppliers to accelerate the supply chain, while at the same time reducing overall costs.

“Historically,” says Sean Bricknell, Global Logistics Strategic Planning at General Motors, “we’ve operated very regionally, meaning that in certain pockets of our organization, each region did things differently. But we are marching toward a point where we are developing a more consistent, common approach to our supply chain worldwide. For example, while transportation mode choice may vary by country, the way we contract for service, and measure performance in key performance indicators (KPIs), can be common and global.”

GM’s journey toward standardization is at the core of a five-year strategic plan to transform the company’s global supply chain. “Software tools, visibility and analytics are taking us down this path toward standardization,” Bricknell reports. “Once you have visibility of data, you can manage more effectively, with greater insight.”

“We are at about the mid-point in this journey,” notes Edgard Pezzo, Executive Director, Global Logistics, General Motors. “The heavy lifting was in defining the vision. Now we're in the implementation phase, and that's easier.”

From the perspective of a logistics services provider to the automotive sector, DHL Supply Chain sees this trend toward standardization first hand – across all
of its automotive OEM customers. “Above all else,” reports Michael Martin, Vice President Strategic Development, Global Automotive, DHL Supply Chain, “the OEMs expect consistency from their suppliers. They expect to receive the same type and level of service in emerging and mature markets alike.”

“That is where the challenge lies,” Martin observes. “Mature markets have the infrastructure in place to do this, and they have far greater access to people and skills. The OEMs take this as a given, so they expect suppliers to deliver to global standards and metrics regardless of geography.

“And from an information technology perspective, OEMs expect standard systems and standard access to information,” Martin adds. “They want global visibility – to know where their inbound freight is at all times – and they expect the supply chain to be resilient, to be able to bounce back from or avoid interruptions.”

HARNESSING VISIBILITY AND ANALYTICS

A key enabler of the new automotive supply chain is information technology – specifically visibility and analytics tools. Companies across the sector are investing heavily in enabling technology. GM serves as a case in point.

As part of its supply chain transformation strategy, GM “has identified this as a key initiative for us and for our tier 1 suppliers as well,” reports Bricknell. “Our goal in this investment is to be leaner and reduce our total logistics costs.”

GM is implementing a number of new IT systems, including a transportation management system, which will give the company greater visibility into what’s moving across its global network. It will also help GM standardize transportation management globally.

“One of the key outputs is that the system records every aspect of every transaction,” Bricknell explains. “We are developing various tools to analyze, slice and dice that data. We’ll be able to use that to identify opportunities for eliminating waste in our current operation, but also in making smarter decisions on future programs and product. Decisions
like where a manufacturing plant should be for a future program, where we should source, where we should export, and what mode of transport makes the most sense.”

In addition, GM is implementing smart sourcing tools that give it the ability to analyze sourcing options, so the company can identify cost drivers and evaluate different sourcing scenarios. Lastly, the company is implementing a software tool that will use analytics to help the supply chain group design a better supply chain network.

“Our goal is to take much stronger ownership of our future and the way we define it,” Bricknell says.

**MANAGING SUPPLY CHAIN RISK**

With the infusion of new suppliers into the automotive space, supplier risk management has taken on new urgency – and complexity. The large tier 1 suppliers are sophisticated in managing supply chain risk. Risk enters the production equation in tiers 2, 3 and 4, particularly with the high tech suppliers.

“The auto sector shares common components with other industries, and for those companies that serve dual industries, tech may be the far bigger customer,” Martin of DHL points out. “So if capacity is tight or reduced, naturally the bigger customers take priority. The Japanese earthquake-tsunami disaster brought this risk to the auto industry’s attention, when for lack of certain computer chips provided by a tier 3 supplier, vehicle assembly lines around the world ground to a halt.”

“We’re doing work to fully assess our risk in these supplier tiers,” reports Pezzo from GM. “We’re pretty good at knowing our risk in tier 1 and possibly 2, but beyond that, we have work to do.”
The quiet revolution

Slower-moving items are stored in a central warehouse. “This means you have to intelligently look at the supply chain, analyze the demand and velocity of your SKUs, and situate them in the network based on that analysis,” Martin explains.

This evolution to a data-driven aftermarket supply chain is facilitated by a vehicle’s growing ability to assess its state of health. Using self-diagnostic technology, ‘clever’ cars can assess their own maintenance needs and transmit that information to the dealer ahead of time. The dealer can then order the necessary parts, based on the car’s diagnosis, and have them waiting when the customer brings the vehicle in for service.

This self-diagnostic capability carries several benefits. The predictive information simplifies the supply chain and makes it smarter as well, taking the latency and guesswork out of the service chain. It allows the dealer to reduce system inventory and manage it more accurately, based on the actual demand signal generated by the vehicle. The customer experience improves, because the dealer can eliminate the wait time associated with having to order parts. And, because the vehicle books itself in for service with a diagnostic plan, the dealer can schedule its labor capacity more effectively – all of which streamlines the business, reduces costs and smoothes out the supply chain.

Vehicle production isn’t the only area in which the supply chain is undergoing intelligence-driven transformation. Because vehicles have become so personalized, servicing them after the point of sale is more complex. “The supply chain must handle a wider range of inventory,” explains Michael Martin of DHL Supply Chain. The challenge lies in optimizing aftermarket spare parts distribution, given this growing complexity.

“Traditionally, you had one big warehouse in a region,” Martin explains. “But customers want access to parts 24/7, so speed of replacement has become paramount.”

To deliver this speed, the aftermarket sector is restructuring its supply chain and moving to a local distribution center (LDC) network model. These LDCs carry shallower stocks, but the items are faster-moving.

PROOF POINT: DATA IN THE AFTERMARKET SUPPLY CHAIN
GM is looking for long-term partnerships as the means with which to address this risk issue. “It is impossible to do this alone,” Pezzo asserts. “We need strong partners and together we will develop second, third and fourth tier visibility.”

In fact, building stronger supplier relationships is a strategic priority at GM. “We have a very strong push to grow our relationships with our strategic suppliers,” Bricknell explains.

As part of this supplier strategy, OEMs are turning to supply localization in order to hedge their risk – sourcing locally or near-regionally. GM considers this an important component of its overall supply chain risk management strategy. “We want to be smart in how we structure our supply base from a risk management perspective,” says Pezzo. “So we are localizing supply where it makes sense and continuing to import components to many different countries where localization is not feasible.”

“We’ve learned to balance the risk equation,” the GM Executive Director continues. “We’re always looking for cost savings, but now we look at the total enterprise cost – including the cost of failure – not just the cost of the item.”

“That gets us back to the first point,” Pezzo stresses, “where data and information are so important.”
THE PATH FORWARD

As the automotive sector moves into the second half of this decade, one fact is now clear. The so-called quiet revolution isn’t really so quiet any more. In fact, as the convergence of the auto and tech sectors continues to develop, it will change the face of both industries – permanently. For the auto OEMs, competing for parts with other industries is the norm now. So the task is not just to create a more visible, agile global supply chain but also to orchestrate the entire supplier ecosystem in a way that ensures future growth.

Looking at our business and how we re-think our supply chain to support it, one thing is clear: nothing is sacred.

Achieving this new supply chain takes creativity and requires fresh thinking. As Bricknell from GM says, “Looking at our business and how we re-think our supply chain to support it, one thing is clear: nothing is sacred.”
ABOUT THE AUTHOR

Strategic consultant, academic and co-author of three books, Lisa Harrington offers a global supply chain perspective.

At the Robert H. Smith School of Business, University of Maryland, Lisa is Senior Research Fellow of the Supply Chain Management Center and Faculty Lecturer on Supply Chain Management. She is also President of the lharrington group LLC, a firm providing strategic consulting services across global supply chain strategy, operations and best practice.

Lisa’s articles have appeared in Fortune, Industry Week, The Economist, Inbound Logistics, The European Business Review and many other publications.

DHL – THE LOGISTICS COMPANY FOR THE WORLD

DHL is the leading global brand in the logistics industry. DHL’s family of divisions offers an unrivalled portfolio of logistics services ranging from national and international parcel delivery, and international express, road, air and ocean transport, to industrial supply chain management.

With more than 325,000 employees in over 220 countries and territories worldwide, they connect people and businesses securely and reliably, enabling global trade flows.

With specialized solutions for growth markets and industries including e-commerce, technology, life sciences and healthcare, energy, automotive and retail, a proven commitment to corporate responsibility and an unrivalled presence in developing markets, DHL is decisively positioned as “The logistics company for the world”.

DHL is part of Deutsche Post DHL Group. The Group generated revenues of more than 56 billion euros in 2014.

www.dhl.com

© 2015 | DHL Supply Chain Limited | All Rights Reserved
For further information
Contact our supply chain experts:
www.dhl.com
supplychain@dhl.com

For the latest automotive supply chain insight and resources, visit
www.dhl.com/automotive

valid: 10/2015