Commercial Truck Dealer
Future Landscape

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Executive Summary

Commercial truck dealers are managing through a quickening pace of change, and responding to its impact on every part of their business. From the trucks they bring to market, the customers they sell to and service, the manufacturers and suppliers that provide the critical products, and the ever-increasing "big data" they deal with daily, the business has never been more demanding. But competitive challenge also brings out the best for those willing and able to adapt to these challenges while remaining passionate about the business. And truck – or commercial vehicle – dealers demonstrate that passion every day.

Our engagement with the American Truck Dealers (ATD) community involved interviews with 50 industry leaders, drawn from the ranks of leading truck dealers, representatives of major manufacturers, and a sampling of fleet and vocational customers, suppliers, leasing companies and other industry stakeholders. During the course of our research, four key themes emerged that constitute the main findings of this study:

- **The dealer value proposition is as strong as ever, and is likely to remain so into the foreseeable future.** Complicated, costly and sophisticated technology requires a customized, consultative sales and service process. A first-rate truck dealership today – and in the future – is well-positioned to act as a value-added partner between manufacturer and vehicle purchaser.
- **Consolidation is occurring at all levels of the business, from customer to truck dealer up through vertically integrated manufacturer.** Driven by economies of scale, competitive pressures and regulatory stress, the business is seeing the exit of players suffering low market share, financial vulnerability and/or business models that are no longer viable. While it is possible for well-managed smaller operations that are laser-focused on niche regional markets and customer sets to survive and thrive, the playing field is tilting to larger-scale dealers as time progresses.
- **Challenges mean opportunities, and also barriers to entry; but it must all translate to profitability.** The truck dealers we surveyed pride themselves on the daily problem-solving skills they bring to their business – and indeed they seem to relish that part of the job. These problems have a subtle upside, in the sense that the complications and challenges faced by dealers actually offer protection. Considerable financial and business acumen is needed to run a successful dealership, and that creates a high threshold for lesser competitors to surmount. However, that must ultimately lead to superior profitability to preserve and enhance the dealership franchise.
- **While the products are trucks, and the emphasis is on providing customers with revenue-generating uptime through appropriate product specifications and sales, service and parts availability, a dealership is a people business.** Recruiting staff, developing managers, and enhancing customer relationships, employee loyalty and job satisfaction were cited by dealers as: (a) among the most difficult problems to solve; (b) a great pleasure of being in the dealership business; and (c) a management imperative that makes or breaks the business – all simultaneously. It's pretty clear that a truck dealership is a people business at its core. Success in managing the critical people dimension dictates the future success of the business.

Those are our main findings. We invite you to read on to explore in more detail the opportunities offered and the drawbacks to be avoided in the future landscape that commercial truck dealers will need to navigate.

Business Environment Key Characteristics Overview – 2017 to 2027

Economy

The good news is that the U.S. economy is in an extended period of positive, if slow, growth. An absence of bubbles, coupled with continued low inflation, suggests that the economy should grow into the end of this decade and, with good management and a little luck, well into the next decade. As Federal Reserve Board of Governors Chairwoman Janet Yellen noted in 2016, economic cycles do not tend to die of old age, but are most often killed by bad monetary policy (coupled with a shock or excess).

Since 1961, the U.S. economy's seven expansions lasted an average of 83 months. The current expansion is the third longest in history: At the end of Q2 2017 the current expansion will be eight years old and counting. With nothing to suggest a retrenchment into the medium term, this business upswing will likely surpass the current record duration of the 1990s cycle and become longest ever by July 2019.

The bad news is that the primary drivers of the slow-growth economic environment are structural: slower population growth and stagnant productivity growth. Since 2011, U.S. population growth has fallen to a 0.7 percent-per-year average, and productivity over that period has averaged just 0.3 percent. Ten years ago (2007), population growth was 1.0 percent and productivity growth was running at 2.8 percent. Population and productivity growth are often cited as the key factors determining an economy's noninflationary speed limit. As evidence, core inflation accelerated to a 2.2 percent rate in 2016 in a 1.6 percent GDP growth environment.

If tax and stimulus plans are enacted, GDP growth approaching 3 percent might be achievable, but it will come at a price. Stronger growth, in an already-tight labor market, is likely to push inflation higher in a period when the Fed is already planning to normalize interest rates to achieve a 2 percent inflation rate. While stronger economic growth is desirable, it also risks increased Federal Reserve intervention in the form of rising interest rates. As the Fed's own research shows, monetary policy is the leading cause of death for economic cycles.

Trucking Industry

Consolidation is playing out across the U.S. economy. Whether it is retail giants like Amazon crushing (or absorbing, as in the recent case of Whole Foods) brick-and-mortar retail chains, or giants like AT&T and Time Warner planning to merge in last year's biggest mergers and acquisitions deal, the big continue to get bigger. From that perspective it would be surprising if consolidations were not occurring in trucking. And it is not just incremental market share gains over time as ever-larger shippers look to find carriers with the scale to provide dependable service in today's high-velocity freight environment, but it is also M&A activity. Earlier in 2017, Knight Transportation announced that it would be taking control of Swift Transportation. A couple of years ago, Celadon was taking out small carriers on a seemingly monthly basis. Presently, Daseke Inc. is rolling up capacity in the fragmented open-deck flatbed market, taking its capacity from around 200 tractors in 2008 to more than 3,500 units (including owner-operators) by midyear 2017. Daseke has told investors a robust deal pipeline remains.

We heard from a number of dealers who pointed out that when smaller high-quality fleets get merged and the buying moves to the new parent, the loss of those new-vehicle sales sometimes represents a meaningful percentage of new-vehicle sales, which can "wipe out a smaller dealership location."

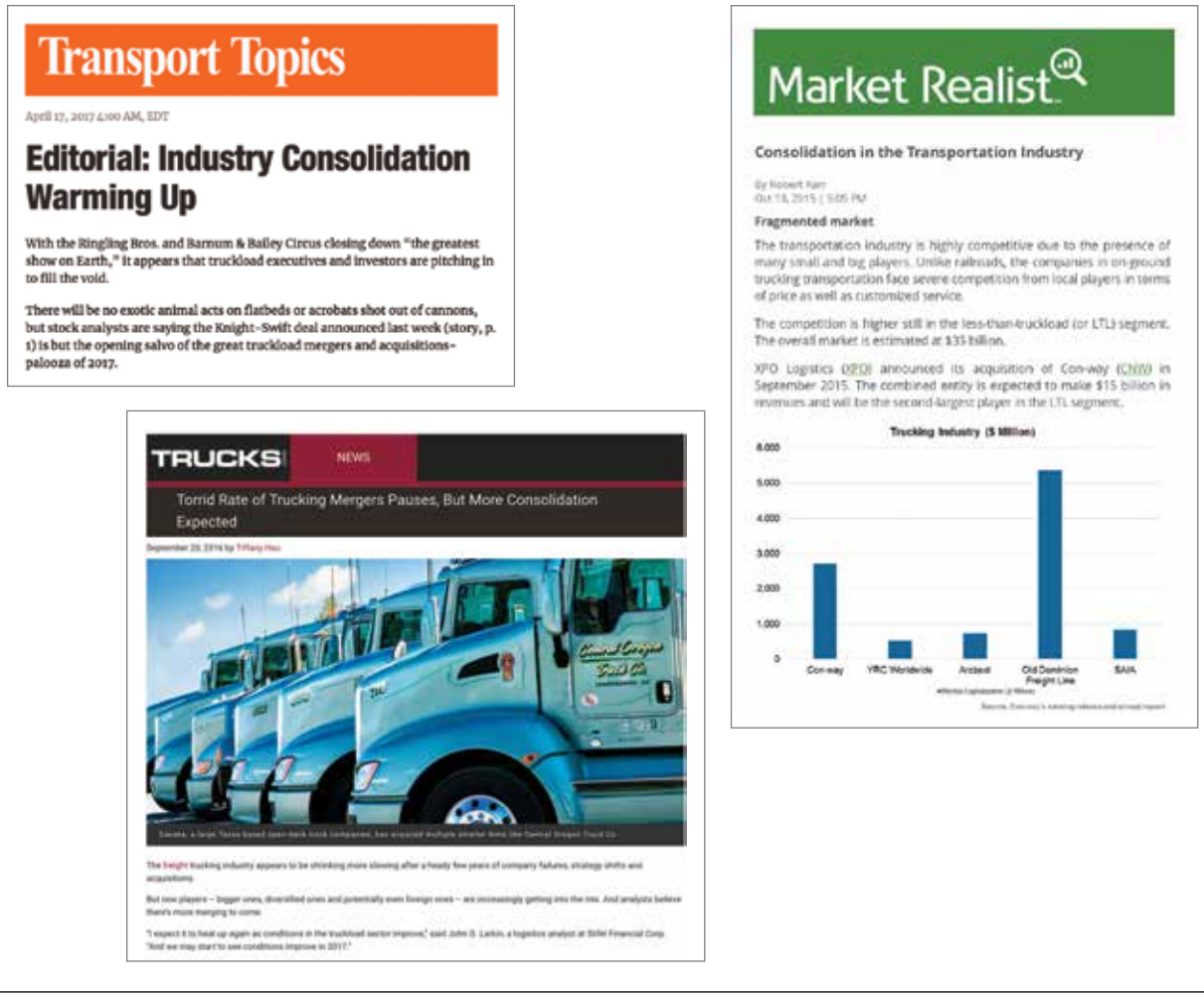
It is not just large truckers that are consolidating capacity. The non-asset-based brokers and third-party logistics (3PL) continue to get bigger. Additionally, because of their technological reach, the non-asset-based side of the logistics market has made all capacity visible at all times. While small carriers are being kept loaded by the 3PL's ability to triangulate capacity and loads, this situation had led to significant rate compression in the spot-freight market. At a recent conference, Dave Jackson, president and CEO of Knight Transportation, indicated that the current situation is ultimately unsustainable, as small carriers are effectively burning legacy capital to stay in business. If proliferation is a guide, the non-asset-based strategy is working for capacity amalgamators: Uber Freight is expected to start operations in 2017.

These comments were echoed by survey participants, helping to square the circle regarding non-asset-based capacity providers. One survey participant indicated that a greater percentage of small fleets are operating on shoestring budgets today. While chalked up to a general lack of business savvy, it was noted that because regulations have built up barriers to entry, there continue to be more owner-operators leaving the market than entering.

Whether consolidation of the industry by asset-based carriers or consolidation of capacity by non-asset-based players, the carrier-customer landscape is likely to look significantly different in a decade compared with today.

Figure 1

Recent Media Coverage of Truck Industry Consolidation



In addition to customer consolidation, there are other factors driving size and scale in commercial vehicle retail. Recruiting and retaining technicians in particular, with demands for a more extensive skill set than has been required in the past (electronics and software in addition to mechanical), can be a numbers game. It helps to have internal HR resources to commit to recruiting, not just for techs but for all dealership positions. A larger enterprise can offer a more diverse career path to ambitious recruits and current associates.

Access to capital is usually aided by size. The ability to call on bank lending and other financial services in this cyclical and increasingly capital-intensive business can be important. That is a factor that tilts the playing field to larger dealerships.

We heard from some dealers that their respective OE business partners have a subtle (and in a few cases, not so subtle) leaning towards large dealerships. Of course, what all OEs want is excellent dealership management first and foremost, no matter the size. But OEs can associate the ability to deliver on service aspects such as customer demands for round-the-clock repair and maintenance, and parts availability, with a scaled-up dealer operation.

Technology

Technology has become ubiquitous in today's dealerships, and it was a thread that touched nearly every interview. Many dealers indicated technology was a top concern on a go-forward basis and affected every facet of the business. Not surprisingly, the speed at which technology is entering the industry is viewed with both excitement and trepidation.

From a trepidation standpoint, the concerns primarily revolved around the speed of change and the anxiety triggered by the prospect at hand: Will we be left behind? Some comments from dealers on the concern side of the ledger include:

- "The speed at which technology is entering the market."
- "Technology changes and the implications for the business."
- "You run into human limits – sometimes scary."

Of course, not all of the implications are negative. First and foremost, technology should allow for increased ability to drive customer satisfaction. "You win by speed," one dealer said. "OEM is redoing parts distribution centers and supply chain to speed time and reliability." As an example, the dealer has an "exciting new young sales manager MBA doing 'big data'-driven marketing in real time." This dealer's goal is to drive "predictive analysis" that will lead to a "consultancy approach we are trying to bring to the customer." While excited by the future, he noted that the constant drumbeat of change "does make for stress and burn-out risk, which has to be managed to retain people."

Regulation

Across the dealer interviews, there was a collective sigh of relief that the regulatory drumbeat that was pounding so hard a decade ago has, if not gone silent, at least faded into the background. After the exhaustive experience that the commercial vehicle industry lived through from EPA 2004 (announced October 2002) through EPA 2010 (announced January 2010), this is a good thing. Unfortunately, the technologies that were put on vehicles in the last decade make for ongoing customer headaches and can lead to problems in valuing used trades: "With all the tech on trucks, it is easy to get burned on trades," as one [dealer] succinctly explained.

With the industry transitioning to reducing carbon emissions by improving fuel economy, there has not yet been a move to onerous technological solutions to meet the mandates. This was the case with the first round of greenhouse gas (GHG) regulation, and the first step in GHG phase 2, starting in 2021, appears to be more of the same: more aerodynamics, less parasitic drag and some existing engine tweaking. It is not until 2024 that we may see new parts-heavy systems brought to market.

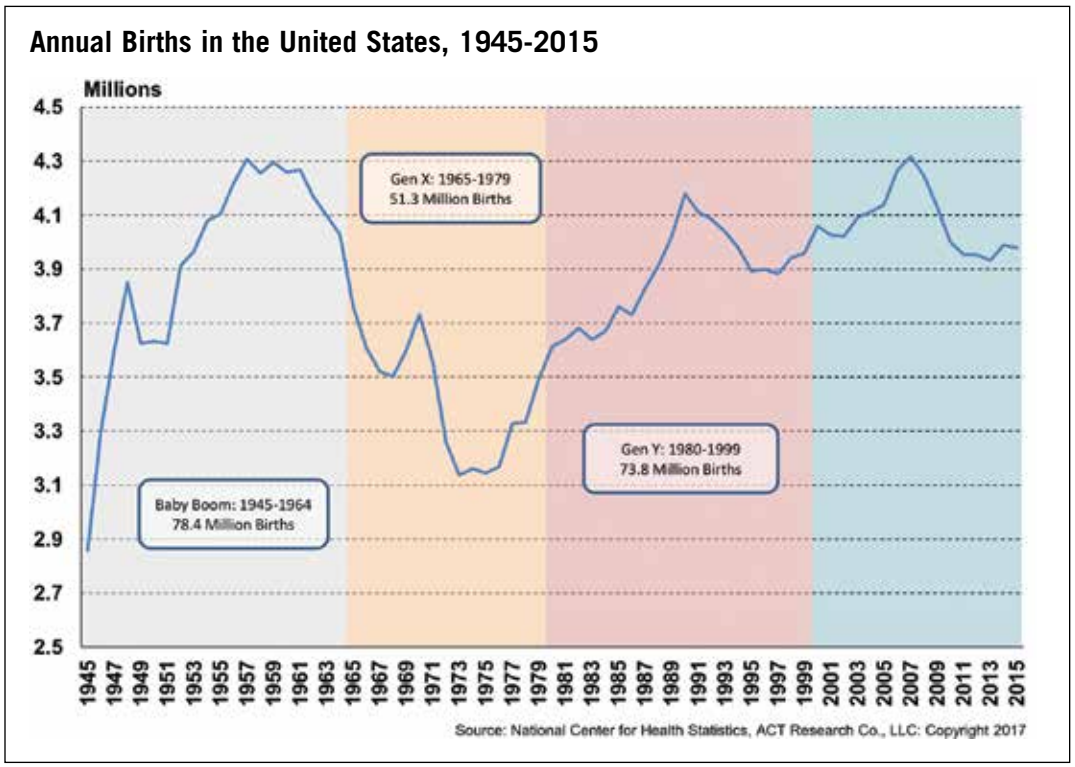
There is a growing recognition at the EPA that pushing the bounds of the possible from here on targets like NOx is akin to pushing on a string. While a 90 percent reduction from 0.2 grams to 0.02 might be desirable, the bigger pollution problem is all of the old trucks operating in short-haul applications that refuse to die. The challenge for the EPA is how to derive the most bang for the buck on a go-forward basis.

While not a regulation per se, creative solutions to facilitate new-vehicle purchases through the replacement of the federal excise tax (FET) with higher fuel taxes, or getting old trucks off the road with registrations that become more expensive with age, are options. ATD – in coordination with its members and state dealer associations – may be able to advance a strategy that rewards the new-truck buyer for doing the right thing environmentally. Levying additional expenses and fees on technologically obsolete vehicles, resulting in even higher operating costs, adds to the incentive to trade up. A plan could be developed that might take more of the oldest truck cohorts off the road, thereby supporting late-model vehicle pricing and, by extension, new-truck demand.

Demographics

If one goes to the internet to read about demographics, there are any number of definitions of what constitutes generations, as well as the names of the generations. For our purposes, generations span approximately 18 years.

Figure 2



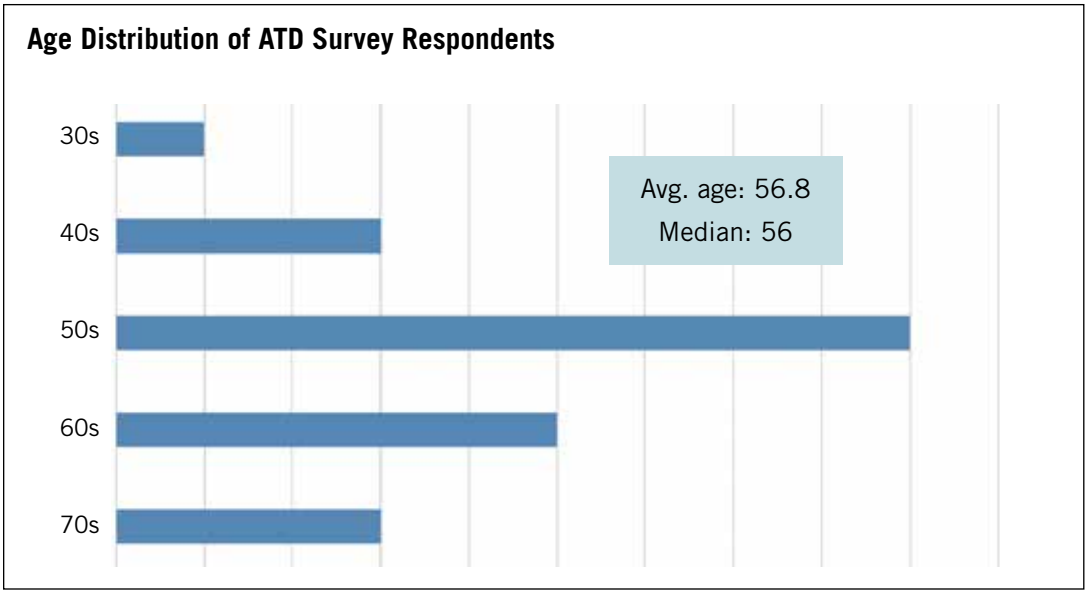
- **Baby boomers:** Birth years 1946-circa 1964. The youngest baby boomers are in their mid-50s and the oldest are just turning 70. The majority of the baby boom generation remain in the workforce and are in their peak earning and spending years. While they are often leaders in their fields, they are gradually ceding control to an advancing (and maturing) Generation X. The leading edge of the baby boom turned 65, the traditional age for retirement, back in 2011.
- **Generation X:** Birth years circa 1964-1980. The youngest Gen Xers are in their mid-30s, while the oldest cohorts are entering their mid-50s. If the baby boomers have started to cede control, they are turning over the reins to Generation X, where the front edge of the cohort is moving solidly into senior management roles. This generation was particularly hard hit by the Great Recession, when the majority of the generation was in their 30s.
- **Millennials/Generation Y:** Birth years circa 1980-1999. Current ages range from late teens to mid-30s. The oldest are moving into middle management, and the youngest are still in high school. Millennials are covered in greater depth later in the survey, but one dealer's comment stands out in paraphrase: "We didn't see eye to eye with our parents in the 1960s either."

This background on overall U.S. workforce demographics is a helpful framework for understanding and contrasting the demographics of our dealer survey sample.

Turning to survey participation, some generational handing off has started to occur, but the bulk of this transition has yet to take place. Of those dealer principals surveyed, the average age was 56.8 years, and the median was 56.

In our sample, 38 percent of those volunteering their age were over 60 years old, while 43 percent were in their 50s. The remainder were below 50 years old. Further dissecting the 21 responses where average age was included (by decade):

Figure 3



Given the 10-year outlook, and extrapolating our small sample to the industry at large, it would not surprise us to find that 40 percent to 50 percent of dealer groups in the U.S. are likely to be under new management by 2027. Of the survey's sample, 19 percent are already eligible for Social Security. By 2027, the percentage of SSI-eligible survey participants will increase to 43 percent. In 2028, that percentage rises to 52 percent. These findings fit a comment from a supplier: "There are a lot of late 60s and 70-year-olds still actively managing their operations. How will the industry transform as ownership transitions to the next generation?"

A secondary demographic split is the measurement of the size of the dealers. The survey was designed to touch all dealer segments, OEMs and regions. Of the 21 dealer responses to the question, the average dealership size was 10.5 locations. Excluding the one mega-dealer in the survey, the stores-per-dealer average drops to 5.8.

Following is a demographic breakdown of dealerships by location of survey participants:

Figure 4

Our goal was to seek as broad a rate of participation across the industry as possible. While there was a heavy-duty truck focus to the survey, medium-duty specialists were sought out as well. In the dealer portion of industry survey, we interviewed 22 dealer principals at 21 dealerships. The count of brands represented was significantly higher, as many dealers represented multiple OEMs. By brand, and including OEM reps, the tallies were as follows:

Autocar 2	Hino 8	Mack 6
Ford 3	International . . . 4	Peterbilt 3
Freightliner 5	Isuzu 9	Volvo 7
Fuso 5	Kenworth 4	Western Star . . . 5

Rewards of the Dealer Business

As an open-ended, probative question, we queried the dealers in our interviews about what the most rewarding aspect of being a truck dealer was. Asked another way, "What gets you excited about coming into work in the morning?" The primary intent was to understand where the dealers' passion lay. The responses we heard were many and as varied as the dealers themselves. However, as we categorized their input, a few common themes emerged.

Problem Solving

First and foremost, the group as a whole loves the variety of new challenges each day brings. Whether working with customers, employees, OEMs, regulators or any other of a whole host of stakeholders, the rewards of bringing solutions to an ever-changing array of challenges serve as a primary motivator. Problem solving is the driving force behind the successful dealer. Also, the task never appears to get old for them since, as one dealer put it, "[it is] always different every day." Many already look to the future, strategizing to figure out how to adapt to what's coming their way. These common characteristics bode well for addressing the opportunities identified as part of this study.

Management Development, Rewarding Careers

As mentioned above, dealers bring passion to all areas of the business, particularly to staff development, an area that has its own unique challenges and rewards. So it is no surprise that the dealers we surveyed thrive at finding new and exciting ways to motivate, build and grow their teams. One dealer commented that he often takes time with his direct management team to brainstorm new ways to be the most unique and innovative employer in the industry … and beyond. Another dealer shared, "Creating competitive teams, with competitive and creative compensation packages and a special environment in which to work, drives me and inspires me, daily."

We also heard numerous reports that employees were upbeat in their attitudes, excited about being included in decision making and control in their workspace, thankful for a rewarding place to work and the opportunity to make a career, and comforted by the assurance that their jobs are staying here, not going to China or Mexico. This was evidenced by the long lengths of staff tenure that were reported by many of the dealers. At their core, these attitudes and sentiments speak to the dealers' desire and ability to shape the culture of their organizations. They truly enjoy their relationships with their staff and watching them grow professionally.

Customer Loyalty

In the same vein as the chicken-and-egg debate, dealers seem split on whether great staff attract great customers or vice versa. Regardless, greatness is the common denominator, and growth of both the customer base and staff capabilities has to be the highest priority for a successful dealer.

While the word "loyalty" was more implied than explicit, its importance was anything but diminished. Perhaps it was uniformly assumed to be a major underpinning of the network and is arguably one that is a well-traveled, two-way street – i.e., customers loyal to dealers, but also dealers loyal to customers. Whether it is the prevalence of trucks, which we were reminded "touch everything in our lives and economy," or the pride a dealer felt when his children recognized a truck on the highway as one his dealership sold, nothing moves dealers more than the pursuit of meeting customers' needs, finding the appropriate solutions, and earning or retaining their business.

The challenge of learning about their customers' diverse, complex, constantly evolving businesses, developing meaningful relationships, and finding avenues for improvement to make their customers' businesses successful are part of the DNA of a successful dealer. This knowledge inspires dealers to synthesize their experience with a goal of transferring knowledge, both inside and outside the organization, ultimately leading to strong customer loyalty. One dealer said it best when he remarked, "I see many different types of companies and can share the best ideas and solutions across traditional boundaries. That makes me a partner. I am not just hawking metal. I am a problem solver and can help make my customers successful."

We would be remiss if we did not mention how frequently dealers talked about the fun associated with their work. Many have developed personal relationships with their customers outside the context of the business world. The importance of both types of relationships cannot be stressed enough. They are the inner fabric of the soul of business. While discussed later in this report, expansion and consolidation initiatives have the potential to threaten customer-dealer relationships. The challenge will be to adopt the best of both worlds in a manner that achieves a balance that further improves customer loyalty and enhances the value of the dealer franchise.

Continuous Improvement

The observations above ultimately funnel into one mutual, overarching theme: the pursuit of excellence. It is clear from this body of dealers that whatever they do, they want to do it to the best of their ability. Interviews were peppered with phrases like "world-class" and "best of the best." The dealers realize, too, that improvement is a journey, not a destination. Many shared the fruits of their labors, talking about their own story, about starting small and growing to varying degrees, and the focus is not necessarily just internal. Many alluded to helping customers and even OEMs and suppliers improve. That sentiment was embodied in the words of one dealer who said, "Our goal is to sell every customer their perfect truck. … We're working on it."

Key Issues

People

While the core product commercial vehicle dealers sell is a truck, in many ways a commercial vehicle dealership is a people business. A dealership depends on its associates successfully delivering customer solutions by leveraging the resources of the manufacturer, suppliers and financial partners. First-rate dealerships are driven by an effective leadership team managing and motivating its associates.

This is why more than half of our surveyed dealer principals cited the interaction and development of their employee associates as among the most rewarding aspects of their work.

But it is also the reason that "people," in one form or another, were named by almost every dealer principal as one of the three leading challenges faced by their dealership. More so than any other people-related issue, the recruiting of technicians was the foremost concern of the dealers we sampled, with almost 50 percent of surveyed dealers listing hiring of techs in their top three business challenges, and a good number of these saying it was number one. That is with good reason – in our detailed analysis (Appendix, Figure 16) we estimate that even with productivity gains, dealers across the U.S. will have to hire more than 6,200 new technicians annually to cope with the future service demands of the business.

Coupled closely with this is the recruitment of a younger generation into the trucking business. The in-migration of the millennials (or Gen Y, birth years roughly 1980 to the late 1990s) to the workforce in replacement of exiting baby boomers (birth years 1946 to circa 1964) is today's most urgent human resources issue, and a particular challenge to commercial vehicle dealerships.

There are some commonly cited factors at work. One is the reputation of the trucking business. It lacks the glamour dimension of Silicon Valley technology, or entertainment or sports, and doesn't receive social media buzz.

While selling trucks will never be confused with making movies in Hollywood or Wall Street high finance, the business probably underestimates its value proposition. Starting with its vital role in the national economy ("Trucks Bring It," per American Trucking Associations' [ATA] old slogan) the contributions of the industry are subtle but profound and usually overlooked.

It's a technology business, but the technology tends to be under the hood or in a service bay and out of public sight (though autonomous trucks may change this).

Dealers we surveyed took pride in offering their associates careers with high job satisfaction, solid financial rewards and, perhaps most important, stability. There is little risk of seeing dealership jobs migrate to China or Mexico to chase lower labor costs.

A potential stumbling block in bringing younger people into the business is a generation gap between dealer principals, often of the baby boom generation or older and targeted millennial hires. The gap manifests in conflicted views of Gen Y, even distrust. Our respondents raised concerns about poor work ethic, reliability, short attention spans, overdone sense of entitlement, unrealistic expectations, even reluctance to make eye contact.

While these stereotypes may be true in some cases, they are the exceptions. Researchers have found these key drivers for successful employee engagement in younger workers: (1) feeling valued by their employer; (2) confidence in employer leadership; (3) job satisfaction; (4) steady personal growth and skill development at work; and (5) an organization that treats an associate as a person, not a number.

Truck dealerships are in an excellent position to respond on each of these counts.

On recruiting techs, especially bringing on new, younger techs, dealers we surveyed were proactive, but often characterized their programs as conventional or "the usual." Frequently cited were:

- Job fairs
- Visiting high schools with tech programs
- Partnerships and co-op programs with nearby technical institutes
- Building relationships with tech school faculty
- Employee referral bonuses
- Donating tools and equipment to tech schools

Some other ideas put forward ran against convention:

- Hire from outside the trucking business (for sales, finance and management/administrative roles, even for technician positions) and turn to non-traditional labor pools (such as women, minorities and veterans).
- Assemble customer-oriented teams composed of members drawn from sales, finance and tech service – this gets the benefits of specialization and additionally breaks down silos and builds teamwork. Look for opportunities to put together an intra-generation mix of team members in linking senior personnel with junior and new associates. It helps new employees reduce their learning curve by picking up knowledge from veterans.
- Take advantage of the "human scale" and sense of community and family embedded in most dealerships; accentuate positive differences compared with more impersonal, more institutional large corporate or government workplaces.
- Recognize, reward and promote managers with a track record of successful recruiting and development of new and younger associates, especially techs. In the same sense, remediate or discipline managers who can't bridge to younger associates or shirk this responsibility.

While some concerns about younger hires and prospects are legitimate, there is no alternative – millennials have been entering the workplace over the last 15 years, and will be assuming middle management and senior decision-making roles in the next 15 years.

As with all sales situations, the game will be played out on terms set primarily by the customer. So if the "buyer" is the prospective millennial/Gen Y hire, successful dealer recruiting will be done by those who enhance the appeal of their workplace.

We offer more ideas for talent recruitment in the Action Plans section of this document.

OEM Relations

Drive to Scale and Implications

Dealer consolidation was cited repeatedly as one of the top three challenges facing dealers today and in the future. Whether or not they embrace the trend, it appears to be generally well understood by those interviewed and will continue into the foreseeable future. More specifically, dealers understand the reasons behind it. Cost savings, maintaining profitability, smaller inventories (ratio to sales), the pursuit of economies of scale, efficiency, a response to a changing market landscape, customer consolidation, the dealers' desire to grow, fewer relationships (for the OEMs) to manage and more consistency in those relationships were among the comments shared as justification for consolidation. It is worth mentioning that the initiative is directed more toward dealer ownership than the number of dealership locations, which are expanding at some OEMs.

The pushback or challenge comes into play on several fronts. Among smaller dealerships, there is frustration over the OEMs' and large dealer groups' perception that small family dealers can only be successful for two generations. They see that as simply wrong. On the other side, larger dealer groups and OEMs have encountered an entitlement mentality at some second- or third-generation shops. They point out that these locations are subject to stasis and either need to buy or sell to facilitate growth.

Aside from the obvious concerns about their own livelihood, smaller dealers point out that dealer consolidation will probably lead to a move away from relationship buying to one that commoditizes the transaction and ends in lower profitability. By the same token, one small dealer noted that as the customer base consolidates, there is a risk to the small dealer when a (or the) major customer gets swallowed up in a merger and equipment sourcing flows to the consolidating fleet.

Commercial vehicle dealers bring value to the marketplace and to the community – a count of just some of the ways:

- Offering custom tailored truck solutions to customers
- Making complex new technologies tangible and understandable to the truck buyer
- Bridging the business interests of OEMs, suppliers and trucking operators
- Providing careers that are satisfying and rewarding for workers in their home locations
- Arranging sensible finance options across the broad size and risk spectrum of operators
- Engaging in the local community, through contributions to charities, volunteering, support of arts, culture and education, and other forms of community involvement

For their part, the OEMs have many reasons, enumerated above, that justify or drive their desire to push for scale. What remains much more elusive is an answer to the question: "What is the right number of dealerships?" The answer, based on our discussions with the OEMs, is more quantitative than qualitative. Clearly, the move is away from a model where one or a few locations comprises the group. But the opposite end of the spectrum may be even less desirable from their vantage. The formation of a mega-dealer creates a potential competitor, and presents a whole new set of unwanted challenges. Somewhere in the middle lies Goldilocks' "just right" answer. Based on feedback gathered during these interviews, something in the 10- to 20-location range seems to be the sweet spot from the OEM perspective. It confers most of the advantages of scale, but not to the extent of setting up a business threat or a launching pad for competitive entry into business lines such as dealer-brand name parts.

How consolidation takes place will be the key to its success at meeting OEM goals. First and foremost, it needs to be part of a well-thought-out and well-communicated strategic plan that makes sense. It cannot be driven by a one-size-fits-all model. The ideal solution will likely be a blended model. As such, the OEMs should openly communicate what they want to achieve and make all of the resources available to all of their dealers, giving them the opportunity to develop plans to achieve the desired objective.

Ensuring Consistency, Uniformity and Quality in the Customer Experience

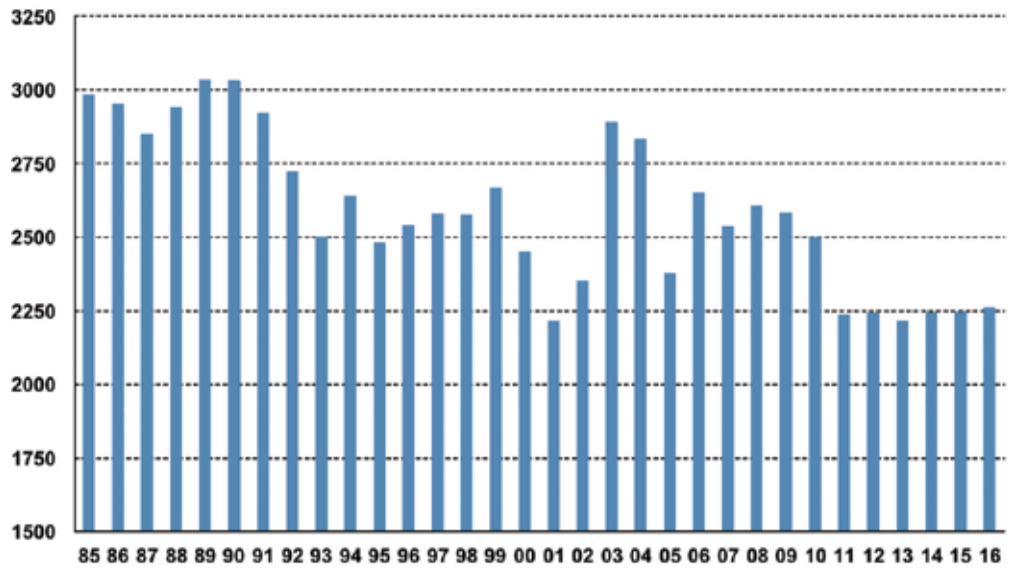
One of the key objectives of any customer-centric enterprise today is to "delight the customer." No longer is it good enough to perform your core competency to the best of your ability and expect to earn high marks in customer service. Instead, attention must now be paid to every aspect of the interaction, from initial contact through the ubiquitous customer satisfaction survey. The change has come about in the commercial vehicle industry in many cases because of the increasing size and sophistication of customers.

There was a concern frequently voiced in our interviews with fleet operators – both large-scale national organizations and regional fleets that send trucks on long hauls outside of their customary range of operation. The concern centered on the variance on the quality and responsiveness of the sales experience, and particularly of repair, parts and service operations between dealerships. These operators praised and commended the best, but had complaints about the worst, noting that the gap in quality between the strong and the weak was far too wide.

Ultimately, the truck buyer demands a familiar transaction in everything from the initial vehicle purchase to the minimization in downtime when a service need arises. Implicitly, that requires a process that guarantees that high-quality interaction be replicated regardless of how or where customers access the network. In a business with such diverse products and customers, this is a tall order. While customer

Figure 5

Medium- and Heavy-Duty Commercial Vehicle Dealer Rooftop Count, 1985–2016



Source: NADA/ATD, ACT Research Co., LLC: Copyright 2017

desire for uniformity is legitimate, the structure of the dealer network implies that such execution should be a guiding principle, not a strict mandate. As in the discussion on 24/7 service, not every market demands or needs round-the-clock support. Applied with such judgment, having standards that meet the demand, or even making progress toward it, can differentiate a dealer, providing a competitive advantage that will keep existing customers and win new ones.

This gap may be addressed by OEM action in response to customer complaints, though the OEMs know they must tread carefully to avoid interfering with independent dealerships. More likely, the gap will close over time as a result of the industry's Darwinian evolution – the "survival of the fittest" as consolidation continues (see Figure 5). The trend in dealer rooftops over the last 30 years, illustrated here by ATD members' rooftop counts, is for a gradual reduction in count. We believe it is highly likely that this broad trend will be sustained for the next 10 years, and perhaps to be accelerated if a business downcycle (either specific to trucking, or a general economic recession) occurs.

Product

Good News

Dealers we surveyed were nearly unanimous in their assessment of the quality of the product. Across all manufacturers and brands, they said their OEMs are producing a better product than ever before. They particularly noted an accelerated quality upgrade in the last five to eight years.

Here again, several dealers used terms like "world-class" to describe their respective OEMs' product offerings. The quality, reliability and durability are all considered very good or even excellent in some cases. The comments also extended beyond emissions-based comparisons to the 2007 and 2010 standards for reliability and fuel economy. Even aspects such as performance, ride and handling got accolades. None of these achievements would have been possible without the foresight of and investment in product and technology development. One of the key ingredients of the process is the OEMs' listening to the dealer body when they have ideas or comments from customers about their needs. And when the product does not live up to expectations, the OEMs are there with service and warranty to support and take care of the customer.

Bad News

As any participant who has been in the industry can attest, none of the achievements mentioned above came without a cost. ACT Research estimates that meeting the cost of emissions standards added in excess of $20,000 (plus the taxes on those dollars) to the cost of a Class 8 tractor across the 2001-2010 period. This was necessary to comply with increasingly demanding EPA mandates from 2004 to 2010, and these costs continue to rise in the current decade. The addition of new hardware, electronics and software has only made the vehicles more complex, especially with respect to service. That is to say nothing of the anxiety the changes have caused customers or the untold millions of dollars invested by the OEMs and suppliers for research and development. As an aside, more than one dealer expressed concerns about the impact of vertical integration on customers. They won't be able to go to competing dealerships for work on components that become part of a vertically integrated system, in the way they can today for independent manufacturers' product. The takeaway here is that products will only continue to increase in complexity, so successful dealers will be those who embrace the change and parlay their handling of that complexity into a strength.

Partnership Dimensions

Product Competitiveness and Partnership Risk

Two separate trains of thought were expressed during our dealer interviews with respect to partnership risk as it relates to product competitiveness. The first was a view that the product OEMs are producing today is the best it has ever been. While they believed the brand they represented was the best, they generally conceded that the playing field is fairly level.

However, there remains this big risk – a single misstep by their OEM could have dire consequences on their business as the degree of vertical integration increases.

The other line of thinking is related to dualing, or dealers representing more than one OEM. In general, the consensus among dealers is that the OEMs do not care for this practice, but the degree of dispersion among the various OEMs ranges from passive acceptance to disdain, stopping short of prohibition.

On a related note, numerous dealers mentioned their desire for a broader range of product offering from their respective OEM(s), indicating an opportunity for increased market potential, competitive advantage and the chance for increased profitability were more product available. The obvious implication is that broader product lines reduce the motivation for dualing.

Financial Leverage and Risk

Some of the dealers we surveyed spoke at length about the risks of financial leverage in their business, and the fact that it reflected the requirements of doing business with their OEM partner. This carried both positive and negative connotations. At their simplest, the move by the OEMs to "outsource" back-office functions to the dealer has resulted in a higher financial burden for the dealer. One example that was given pertained to customer invoicing, which used to be centralized at the OEM. That responsibility, and cost burden, now resides at the dealership. Dealers also cited increasing burdens related to training, technical support and computer support, and diagnostic equipment, particularly burdens associated with emissions mandates and compliance. Some dealers were concerned about how leveraged their businesses were.

Over the last few years of relatively stable markets and low interest rates, the situation was tolerable – particularly as the OEMs might be offering assistance with financing and helping to deliver a lower net cost of capital. The anxieties centered on the downside of bringing a highly leveraged business into the next recession, when a severe market downcycle, perhaps coupled with significantly higher interest rates, would be toxic for their business.

Perhaps the most frequently mentioned concern was the amount of capital required as the network consolidates. Smaller dealers who desire to grow can easily get shut out of the game because of the size of the transaction and debt financing needed to complete a transaction. Numerous dealers posited about the power that a small number of very large dealer groups would wield and the impact on the OEMs. One dealer went so far as to suggest that large dealer groups could eventually represent alternative distribution paths and essentially become competitors with the OEMs. In fact, some large dealers are already forming mega parts-buying groups that compete with the OEMs.

Knowledge of the Customer

One comment by a single dealer went to the core of this issue, pointing out that the OEMs excel in the production and manufacturing processes, but it is the dealer network that excels in the sale and distribution of trucks. That simple thought drives home the principle that the dealership body lives on the front line and works with customers every day. Therefore, they are the most qualified to understand the customer. Said one dealer, until they "live in our shoes," the OEMs cannot have the same appreciation for customers' needs, which vary across a wide spectrum.

Again based on comments from the dealers surveyed, the OEMs can be overly aggressive and tend to want to be over-involved in the upfront negotiations with customers. There are suspicions of OEMs considering cutting dealers out of deals or making agreements with large customers that look a whole lot like a sales contracts. In defense of the OEMs, these large customers sometimes want to deal directly with the manufacturer, and in some instances do not fully appreciate how the dealer can bring value.

Push for Service Availability

Dealers can be caught in a squeeze between their OEM partners and certain customers who desire round-the-clock service hours and mobile service availability. The dealer understands the desire, but also runs the business that incurs the cost; in the end, he or she has to make the service shop viable as a profit center. This is a tough tightrope to walk, since dealers are well aware that it is a world where uptime is everything, and in the drive for return on assets, customers have squeezed out spare trucks as underutilized assets.

The dealers we spoke to (as well as OEMs and fleets) seem to be able to deal with this in the context of a business question. They make the case to OEMs and customers in business terms – high-density lanes, or severe-service, high-cost-of-downtime vocational applications, justify a shop with around-the-clock (or near to it) hours. But just as no fleet can operate with idle capacity, or a manufacturer with an idle plant, no dealer can operate profitably if his or her service staff and bays are underutilized.

OEM Commitment to Parts Availability

Closely related to service availability is parts availability. A 16- to 24-hour shop requires same-day parts delivery support from the OEM – if a shop goes with extended hours, a parts order placed at 9am needs to arrive on-site by 6pm.

While each of the OEMs appears to have its own unique perspective on parts availability, it seems clear that collectively, they are working hard to reduce inventory, increase turns and, most importantly, be more proactive at anticipating parts demand so as to support the higher goal of maximizing uptime.

From the perspective of the dealer body, the OEMs are experiencing varying levels of success with these initiatives. The importance of these efforts cannot be overstated, particularly in light of increasing competition from outside parts sources. This becomes even more critical as shops extend their hours of operation. And they are of paramount importance in today's dealer revenue model, where the absorption rate is a critical determinant in dealership profitability.

Customer Evolution

Size and Scale

Just as the dealer body is experiencing consolidation, so, too, are its main customers – truck fleets – and generally for the same reasons. While these changes are taking place primarily at for-hire trucking companies, other end markets are experiencing the same forces, pushing to scale as well.

Figure 6 illustrates the gradual consolidation of the truck transportation industry, at least in the for-hire segment. Since the start of the 2000s, the *Transport Topics* Top 100-sized fleets have seen a market share increase, from 42.2 percent share of industry revenues in 2000 to 53.3 percent in 2015, the latest year for which data is available.

Figure 6

Trucking Consolidation: *Transport Topics* Top 100 Share of Total For-Hire Revenue

Year	For-Hire Trucking Revenue ($B)	TT Top 100 Sales ($B)	TT Top 100 Share
2000	280.7	118.3	42.2%
2005	342.4	176.1	51.4%
2011*	325.0	179.6	55.3%
2015	395.8	211.0	53.3%

*2011 chosen because reduced impact of recession on the data

The net effect on the dealer organization is likely to be one of increased demand for equipment and service, more power in the hands of a scaled-up buyer, but also having the possible benefit of lower costs of doing business. While the size of the pie may not change dramatically, customer consolidation carries the potential for market share shifts when business moves from one dealer to another. As the group has already related, while shrinking in number and increasing in size, these customers are also more sophisticated and more demanding than ever. This metamorphosis has the potential to completely change the way dealers and truck buyers interact in every facet of the relationship.

Customers Want Uniformity at "Best of the Best" Levels

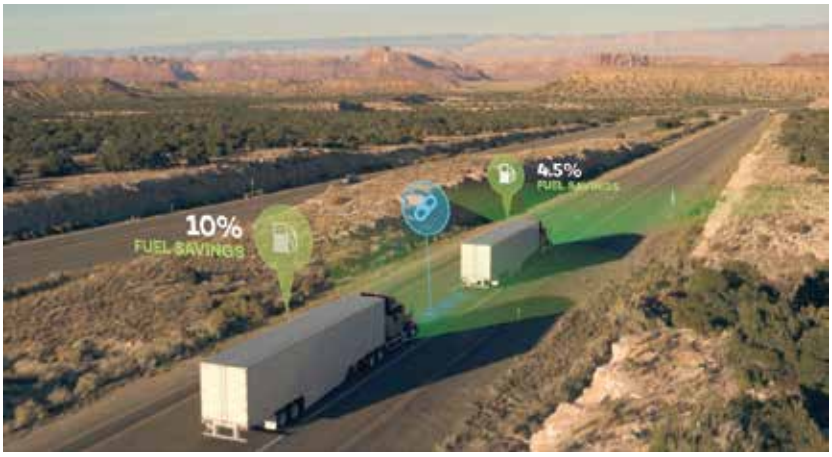
There appears to be a commonly held belief among dealers and in the industry that these larger customers desire and will get the same world-class service from their supplier/provider. In response, the OEMs are all increasing their investment in capabilities, production, technology and facilities to meet customer needs. Many of the dealers realize that this trend is only going to continue and have begun developing their response to customer demands.

Service Demands

Regardless of their size, after the initial purchase the next most important aspect of the transaction is uptime. All customers really care about is that the truck starts and runs, every day. Many operations run with no spare trucks in order to save money on insurance, registration, fees, maintenance, etc. – fundamentally to maximize return on assets. When a truck is down, it is not generating revenue and is accumulating costs, both direct and as idle capital. When the truck is down, the first thing the customer demands is to know when it will be back in service so he or she can make a plan for how to proceed. In the future, with the advent of "truck trains" and automated trucks, equipment utilization will only increase, making uptime even more important.

Figure 7

Visualization of Peloton Technology "Truck Train"



Other Issues

Supplier Transformations

The migration to vertically integrated business models for major truck OEMs goes back 20 years or more, but it has clearly accelerated over the last decade, with ramifications for fleet and vocational operators/customers, suppliers and commercial vehicle dealers.

For operators/customers, there is a mix of gain and loss. The potential benefit of choice in driveline components with competitive alternatives narrows. However, it also means that the spec'ing process becomes simplified and potentially optimized, as OEMs offer the benefit of a higher-quality truck with uniform single-source design, engineering and production from the very start.

Independent merchant suppliers are faced with almost-inevitable loss of market share, especially the traditional driveline suppliers. Future success will depend in part on strategic alignment with other suppliers, and with OEMs who have business models based on a smaller degree of vertical integration. Additionally, suppliers may enjoy success by identifying and exploiting smaller-volume niche markets that are "below the radar screen." OEM efforts are more likely to target high-volume segments, giving advantage to scaled-up production. OEMs may therefore bypass smaller niches, leaving them to suppliers who could capture sufficiently high margins to justify a product offering in selected smaller-volume corners of the market.

For commercial vehicle dealers, the push to vertical integration has had implications that are largely beneficial, but with some downside risk. Single-sourced OEM drivelines have generally been well-received in the marketplace. They simplify spec'ing. For warranty and repair, they usually cut the cost of administration and eliminate problematical finger-pointing between different suppliers when failure cannot clearly be attributed to one or another component in a linked but separately sourced system.

Figure 8

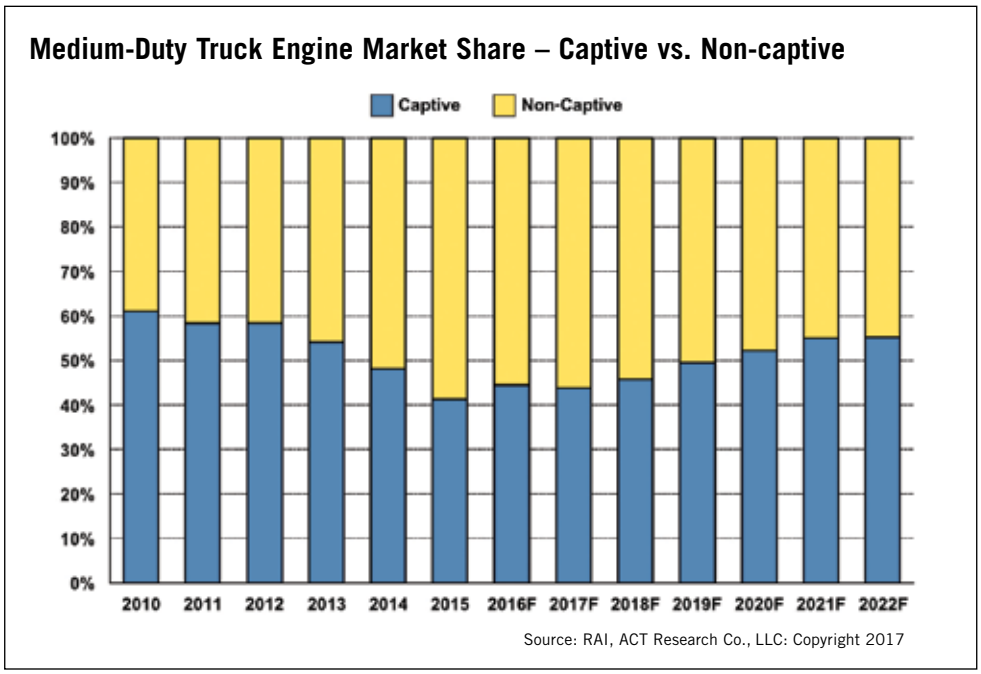
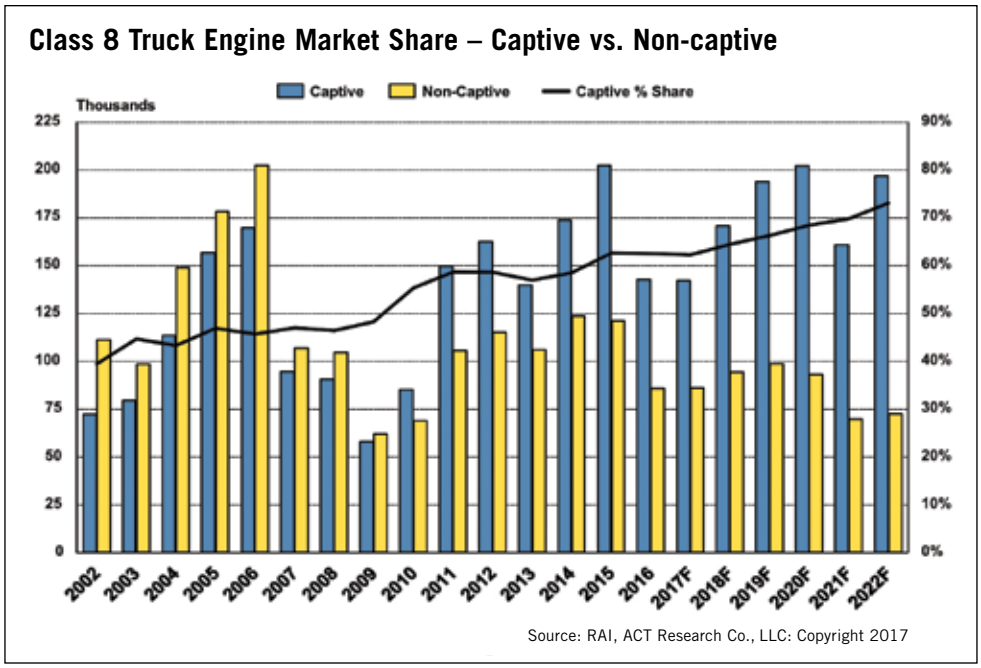


Figure 9



Dealer risk enters the picture in the "sole-sourcing" aspect of vertical integration. When the OEM becomes the dominant or sole supplier of not only the assembled truck but critical components, the dealer will thrive or suffer depending on customer reception and ultimately product reliability. In an "all about uptime" world, the risk of substandard performance of a critical system could leave the dealer with limited alternatives in his or her product portfolio, resulting in foregone sales – or, worse, loss of customer loyalty.

Governments Shape the Business

"We're from the government and we're here to help." So goes the joke. But there is no denying that government – especially at the federal but even at the state level – has profoundly influenced trucking, and truck dealerships, in the last decade.

Regulations

- Federal and state impact
- Vehicle complexity
- Cost/benefit questions
- GHG phase 2
- Autonomous … patchwork confusion or guidance?
- Simplification could happen, but would require long-term effort

In the previous section we discussed how the technological complexity of the truck, due in part to clean-air and safety regulations, has added to product complexity and increased barriers to entry.

Two other issues were frequently cited during our dealer interviews as potential stumbling blocks for dealerships – the federal excise tax (FET) today, and prospective LIFO accounting changes as part of a down-the-road tax reform initiative.

FET is a discriminatory industry tax that, in the past, had been scheduled for expiration as a levy against trucks and trailers. In the context of total revenue sources for the federal budget, it is of minor significance. But for truck dealers, it is a major negative. ATD has correctly identified the FET issue as a high priority for action.

The potential for meaningful tax reform is one of the outcomes of the surprise November 2016 election results. It is possible that Congress will, in whole or in part, take a clean-sheet-of-paper approach to issues such as FET. This represents both opportunity and risk for dealers and for ATD if all options are put on the table – including the risk of higher rates of FET and tinkering with LIFO reserves. But it may also open up the opportunity to reduce or eliminate these items. Action in concert by ATD and its member dealers, OEM partners, suppliers and even select customers could turn out to be decisive in lifting this burden if the statutory process takes a favorable turn.

Some of the dealers surveyed also pointed out that state and local governments can set a tone that can range from conducive to hostile for business in general and trucking in particular. The impact can be seen from taxes, to environmental regulations, to zoning. California and Illinois were singled out as particularly challenging states in which to do business. Action plans at this level would best be taken with vehicle dealer organizations in the various states and localities, perhaps in conjunction with local chambers of commerce and other pro-business groups to bring sensibility, balance and equity at these levels of government.

Technology Revolution

Semiconductor-based technology is a game changer that is transforming the face of global business. The commercial vehicle space is no exception. If managed to realize its full potential, electronic technology can improve product performance and enhance commercial vehicle dealership business and the overall value proposition to the customer.

Without exception, the dealers we talked to spoke highly of the product portfolio they bring to the market today. This was directly connected with the improvements that have taken place since the start of the decade, when the industry was coping with performance and reliability issues as a consequence of 2007 and 2010 emissions compliance. Subsequently, engine performance improved with time, experience and production volumes, enabling advancement up the learning curve.

At the same time, advances in complementary technologies (software, sensor, processors, etc.) have delivered an array of new driver-assist and safety features. These include automated manual transmissions (AMTs), lane departure and braking systems, vehicle proximity management, stability control, in-cab and external cameras, and a host of other technologies.

The general sentiment of our surveyed dealers was that the skepticism of the conservative customer base upon technology introduction is giving way to gradual acceptance, particularly as these technologies deliver tangible dollars-and-cents benefits in improved vehicle drivability, driver safety, reduced accidents and liability protection.

The flood of technology raises the issue of complexity and cost. This is a double-edged sword. Today's commercial vehicle is more complex (driven not only by the value deliverables but also regulatory compliance) and costly. That is off-putting to the customer, and the added complexity makes it difficult for dealership personnel as they try to keep up to speed on the product they sell and service.

But the same complexity and sophistication set up barriers to entry. These barriers are at every level of the business, from manufacturer to dealer. It is a likely cause for the absence of a China-based OEM in the North American market. In addition, the 25 percent import tariff on trucks serves as a strong disincentive. It is also a factor that has pushed business away from low-tech, low-cost truck service and repair shops into high-tech, high-expertise dealer service bays. Complex technology generates an increasing demand for a consultative sales approach, especially for the smaller and midsize heavy-truck buyer and for the medium-duty market.

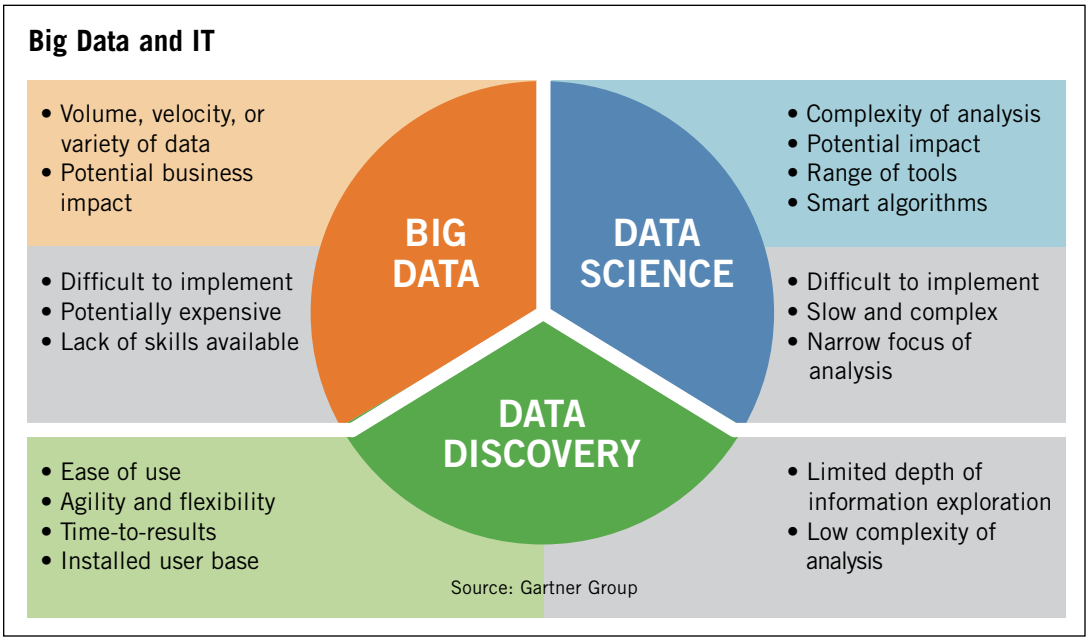
Big Data and Information Technology — Collecting, Collaborating and Gaining Competitive Advantage with Information Tools

Going hand in hand with the technology revolution in trucking is the generation of a veritable Niagara of "big data." The ability to monitor, record, and save information on vehicle routing and use, key vehicle system performance and component operation, preventative diagnostic capabilities, and driver operating and safety characteristics has been another important dimension of the technology revolution of the last decade.

Today the data are gathered in copious amounts. While having the data is a first critical step, it is just as important to make it easily accessible (data discovery), and then finally to organize it into useful management information (data science), leading in turn to the final and most critical stage: actionable analytics to help manage operations. These are for the benefit of customers for their efficiency and uptime, for dealers in the management and allocation of their resources, or for the manufacturers in the design and production of the product.

While opinions differ, all participants in our survey indicated that we are only at the threshold, taking the first baby steps in realizing the potential for "big data." For those who can take leading roles in sorting through and extracting information from this data to enable better decisions to be made, real competitive advantage will accrue.

Figure 10



A critical intellectual property issue is collaboration between the key stakeholders: customers, dealers, manufacturers and suppliers. How they go about sharing this wealth of information and then using it to guide actions are likely to determine future competitive advantage and market share gains. As one dealer commented: "No one has all the answers yet – but the first to figure this out will be off to a big lead."

Turning the focus onto dealer operations, who has access to the "big data" generated by the operations within the dealership? Obviously this is the dealer, but is there an obligation to share information on personnel, customers and repair parameters with the OEM partner? Is there full disclosure from the OEM (or does there need to be?) on the data they may be collecting at dealerships? Also what are the obligations of the dealer to the OEM? Once again, who owns the results of information that falls out of a sorting, prioritizing, compilation or analytical process? Finally, who makes this data and information secure, and guards against hacking, theft or worse?

Over the next 10-15 years, these and similar issues will assume a larger and larger profile in all businesses, including commercial vehicle dealerships. Thus, an initiative or task force on the part of ATD and its board members in the interest of further defining the parameters, discussing the issues with OEMs and key customer partners, and even the drafting of model legislation that protects dealer interests in this evolving landscape, may be warranted.

Financial Challenges – Higher Interest Rates, Higher Costs of Capital

As noted in the introductory section of this report, the nine-year period of extraordinarily low interest rates is on its way to normalizing. In the next two to three years, we will likely be back to a more conventional structure of interest rates, term premiums, bank spreads and credit availability.

For commercial vehicle dealers, this may require a return to a mentality and financial management practices that predate the Great Recession. The management of financial and banking relationships, insuring lines of credit availability, monitoring the creditworthiness of customers, and care in the deployment of working capital and inventory are always top of mind. However, the implications of interest

rates and capital costs that are 2-4 percent or more points higher than those we have seen since 2008 may dictate a major mind-set change.

Closely associated with this is the implicit leveraging that some dealerships have had to assume because of the nature of their local business or the requirements of their OEM. Some dealers we surveyed have voiced concerns that because of commitments to customer finance and particularly to leasing finance, the degree of financial leverage in the business has risen to high-risk levels.

Under the prevailing circumstances of the post-2010 world, with generally stable (macro) new-unit sales levels and historically low financing rates, along with low levels of trucking business failures, the increased leverage was tolerable.

In the next few years, we may return to a different world. Varying degrees of lending exposures and a wide variety of banking relationships make it difficult to generalize for all dealers. It is fair to say that borrowing rates rising by two to three percentage points (short- and long-term) is a likely case over a forward-looking intermediate time frame. If so, it would have a significant financial impact on dealers and customers. If higher interest rates are linked to a severe economic downcycle, it would lead to a drop in sales, in residual values and in used-equipment inventory value – a toxic combination of circumstances.

Game Changers and New Entrants

The emergence of Amazon and other online retailers to displace traditional brick-and-mortar channels is perhaps the most revolutionary change in global business of the last 15-20 years. It substitutes a high-cost, fixed-capital-intensive business model of traditional storefront and mall retailing for an information- and transportation-intense, low-cost warehouse space model. It also puts the accent on speed and close-to-customer inventories, placing a premium on tighter, shorter, faster-responding supply chains.

We believe the ramifications for truck transportation and for commercial vehicle dealers are positive, though the dealer body will need to be fast and flexible in response.

More than ever, the emphasis for transportation agents in the logistics chain will be on speed and service. Players such as online leader Amazon effectively swap in warehousing space, information technology and transportation services for traditional retailing space and high levels of working capital (inventory and receivables). This should be a plus for commercial vehicles in the foreseeable future. It is fairly safe speculation that Amazon's huge level of capital spending ($6.7 billion in 2016, double the level of three years prior) and its propensity to launch or expand its own logistics operations (both air and surface transportation) guarantee the company will be a formidable future factor in transportation.

The ability of traditional retailers such as Wal-Mart, Target and Macy's to transform parts of their retail space to last-mile distribution points will be a test for them, but at worst it should be neutral for commercial vehicle sales. After all, population change is not the issue, but rather distribution channels. Residential and business delivery operations in high-density urban areas and "last-mile" solutions might also give a boost to medium-duty trucks.

New Technology (Driver Assistance, Autonomous Vehicles)

The speed of adoption of technologies for driver assistance and ultimately driver displacement will probably be the variable with the biggest potential influence and the biggest unknown to be faced in the broad transportation space over the next 15 years. For trucking and truck dealerships the adoption path will shape the nature of the product, unit sales volumes and structure of services (see Appendix, Figure 18, for the SAE table on "Five Levels of Vehicle Automation").

If adoption is along the time norms of Silicon Valley (or China), the end of a 10- to 15-year time horizon could see fairly widespread deployment of AGVs (automated guided vehicles) in personal vehicles and commercial vehicles. The table in Figure 11 shows speculated trajectories for automated or "self-driving" vehicles, in terms of sales or in-use populations, at points in the future from various forecasting sources.

Clearly any forecast made right now is guesswork. While the advance of technology and the ability to lower implementation cost are important, they are only one element that will determine speed of adoption.

Others involve government's role in promoting and fostering competition. This competition can occur on an international level (China, United States, Europe, Japan and others) and within the U.S. on a state-by-state level as they compete for a leadership position in these emerging technologies.

Finding appropriate operating conditions will be another determinant. Even now, the majority of self-guiding vehicles are in operation "out of the public eye" in construction and mining sites and in the energy patch. That said, the trial Anheuser-Busch Colorado beer shipment in October 2016 by an Otto-controlled Volvo delivery truck garnered considerable publicity. It did demonstrate the viability of the technology. Such a run points to the likelihood of gradual introduction via low-density, low-variability, low-risk environments and lanes.

Another vital element is public knowledge and acceptance. Here is where the general public's exposure to automated vehicle technology through personal vehicle operation is important. Exposure to driverless taxi fleets operating in select urban areas, or even consumers' own personal vehicles incorporating elements of driver-assist technologies, will reduce the public's fear and anxiety, and increase comfort levels.

That said, we also recognize the factors that would trigger a slower adoption pace of AGV technologies. These would include constraining governmental regulation; reluctance by a skeptical, cautious public; and/or punitive action against frontier-pushing tech pioneers by the tort bar.

At this point, we can see the promise and it is tangible; the difficulty is it's too early to know the pace.

Figure 11

Forecasts on Autonomous Truck Adoption

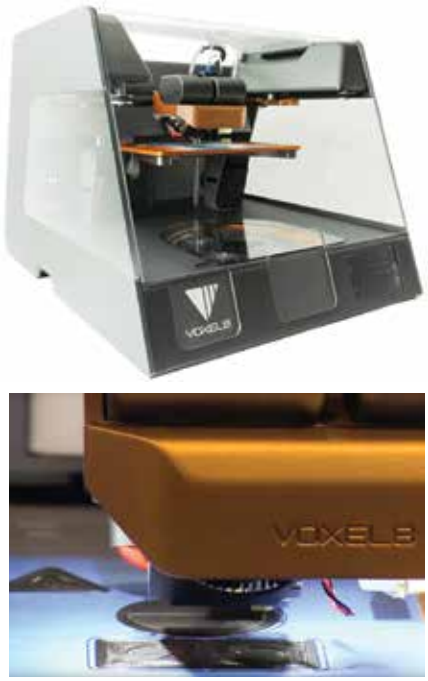
Source	Date Projection Made	Outlook Year	Volume	Comment
IHS	2016-06	2035	60K	US sales of self -driving HTD; 43% CAGR 2025-35
Frost & Sullivan	2015	2035	25K(L3) 0.3K(L4)	US-SAE automation levels up from 3.2K (L3) in 2025
Navigant	2014-11	2035		75% vehicles sold expected to have "autonomous" capability
BI intelligence	2016-06	2020		10 million "self-driving" cars globally, trucks adopt faster

Additive Manufacturing (3D Printing)

In 2018 and for the next few years, 3D printing can be regarded as in its infancy and still principally for prototype fabrication and for high-cost specialty componentry in industries such as aerospace. Over time the technology will advance, resulting in cost reductions for the printers and materials. Once use becomes economical and widespread, the threat to transportation and logistics will be real.

Figure 12

Examples of 3D Printing, aka "Additive Manufacturing"



The ability to locate a fabrication process at the destination and simplify or eliminate stages of processing in the upstream would have profound, and negative, impacts on logistics and transportation. Instead of delivering high-value goods on tight schedules, trucking would conceivably be delivering printing powders and polymers.

The critical-value added dimension of truck transportation is high service and high speed (compared with alternatives like rail) at modest cost (compared with air transport). 3D printing/additive manufacturing may represent a rival to trucking's traditional competitive advantages – speed and service. Additive manufacturing has been embraced by companies like GE Aerospace; if the technology advances, it could someday match truck transportation in cost-effectiveness. There is a potential upside for truck dealers, however. Sometime in the future this technology could offer on-site parts fabrication, enhancing parts availability particularly for low-volume parts with high stocking costs.

Entry/Expansion of Asian-Based OEMs in USA/North America

Over time, there has been speculation with regard to the capacity and willingness of one or more China-based OEMs to gain a foothold in the North American market. Entry would require surmounting three hurdles: first, a product that would comply with North American safety and emissions regulations and would meet the unique performance demands of the region's applications and customers (viable but costly); and second, the buildup of a dealer network for sales and service (expensive and time-consuming to construct).

Japanese manufacturers already have a presence in North America in the medium-duty market and a high profile in many key Asian markets, but building a bigger North American presence, especially via Class 8 entry, would be a demanding undertaking. However, Hino announced plans to produce a Class 7 and 8 in the U.S. by late 2019. Finally the third barrier: the 25 percent tariffs on truck imports. Given that it has been in place since the 1970s, there is no reason to expect it will not remain in place.

The views of the dealers we surveyed was mixed. Some thought Chinese entry at some point was viable, with the majority of those viewing it as a "10 or more years away" possibility. A few more thought a move by a Japanese maker to be the bigger likelihood, especially in a near-to-intermediate horizon, most likely combined with building a production facility in North America to avoid the tariff. The majority consensus view was that the playing field of current competitors was not likely to see a major shift.

Paradigm Shift – New Power, New Distribution

A legacy of the 2000-2014 period of high and rising oil prices, EPA and CARB initiatives, and the go-green tilt in public sentiment in favor of environmental causes was a commitment to research and investment into diesel alternatives for trucks and buses. The early manifestation of these efforts was natural gas power. At least for the time being, that seems to have run its course, as the economics of diesel operation compared with natural gas were transformed by the 2014-15 collapse in oil prices.

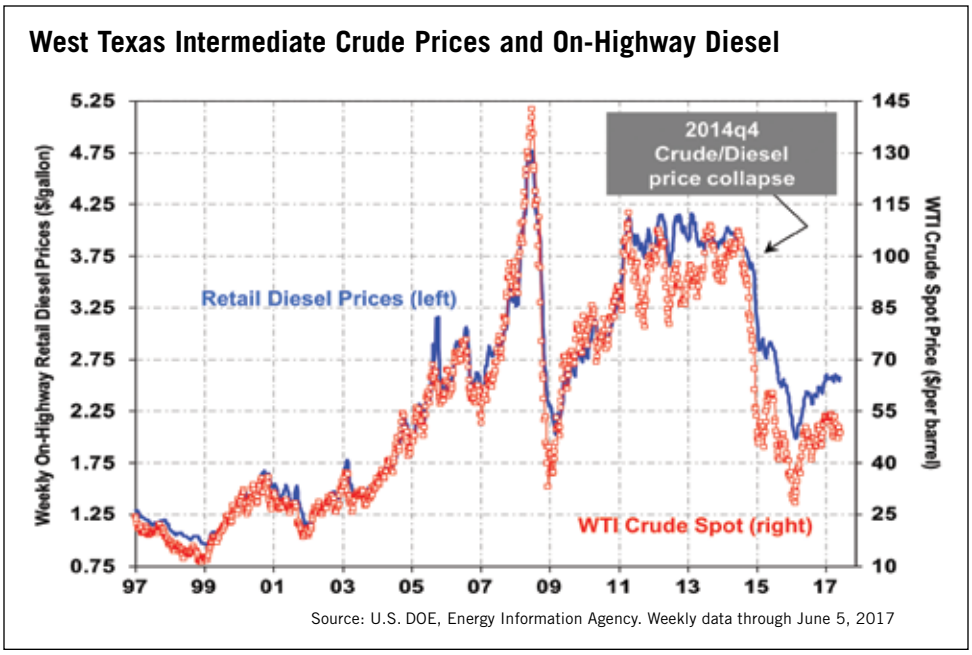
In the last few years, a new wave of technology utilizing electric power, hydrogen fuel cells or hybrids has come to the fore. Announcements have been made by traditional truck OEMs and by brand-new entrants into truck manufacturing.

While high volumes and market shares on the part of any of these technologies are unlikely in the intermediate term, they may have a more prominent role to play in high-density urban areas that are highly sensitive to air quality (e.g., Southern California). Longer term, the demonstrated willingness on the part of the new providers to bypass traditional dealer channels via distribution (such as leasing companies) and to employ new pricing algorithms (per-mile pricing, perhaps hours-of-use pricing) could represent a threat to current market structure.

In the same sense, we believe that a material impact on the parts and service business of commercial vehicle dealers is remote – in fact, beyond the 10-year horizon of this study.

It is true that electric vehicle designs eliminate the mechanical content of the internal combustion engine and associated components (transmission, exhaust and after-treatment, etc.). The simpler electric motor powertrain poses a potential risk if maintenance needs are reduced. However, sales volumes in the next

Figure 13



10 years are unlikely to be high enough for electric vehicles to make up a meaningful share of the total vehicle population. This is true even in the medium-duty ranges (Classes 4 and 5), where they are likely to make their most rapid initial progress. Since significant parts and repair business would in turn follow with a lag of four, five or more years from the initial sales and share gains of electric-powered vehicles, the impact from now to 2027 will be slight.

Figure 14

Nikola Press Announcement of Ryder as Distribution and Maintenance Provider

Nikola One Truck Revealed Tonight @ 7:00 p.m. MST
Class 8 zero-emission hydrogen-electric truck in production by 2020

SALT LAKE CITY. December 1, 2016 -- Nikola (pronounced Neek-oh-la) Motor Company will unveil its highly anticipated Nikola One electric semi-truck tonight at an invite-only event in its Salt Lake City headquarters. The event will be attended by more than 600 members of the media, industry partners, customers and government leaders. For those not in attendance, the event will be live streamed on Nikola's website: www.nikolamotor.com, beginning at 6:45 p.m. Mountain Time.

Nikola One

The Nikola One utilizes a fully electric drivetrain powered by high-density lithium batteries. Energy will be supplied on-the-go by a hydrogen fuel cell giving the Nikola One a range of 800 - 1,200 miles while delivering over 1,000 horsepower and 2,000 ft. lbs. of torque – nearly double that of any semi-truck on the road. Never has a production model class 8 truck achieved best-in-class fuel efficiency while also dramatically improving performance over its diesel competition – all with zero-emissions.

Figure 15

Nikola Announces Price-per-Mile Plan

Commercial Carrier Journal
June 2017

Nikola Motor details options for hydrogen truck's leasing, design

In a letter sent in late April to reservation holders of its Nikola One tractor, Nikola Motor Co. detailed possible changes to lease options and the truck's chassis design. The letter, signed by Nikola founder Trevor Milton, says the company is "evaluating several pricing options for a lease or purchase of the Nikola trucks." One such option is a mileage-based system that charges drivers a fixed cost per mile to operate a Nikola truck, with a minimum annual mileage.

Nikola Motor Co. will work with Fitzgerald Gliders for initial truck assembly and anticipates its first 5,000 trucks will be assembled by Fitzgerald.

"We anticipate this price-per-mile option could reduce the overall cost of ownership, compared to a diesel, by as much as 30 percent," Milton writes. "This price-per-mile option will also help drivers better control their cost of ownership by billing them for each mile driven – rather than a set lease price whether a truck is on the road and making money." Nikola expects pricing specifics to be available for review by early 2019.

Conclusions

After extensive primary research, conducting more than 50 interviews with commercial vehicle dealers, truck customers (both fleet and vocational), OEMs, suppliers, leasing and finance businesses, and NADA/ATD staff, plus independent study and analysis, we draw these conclusions as a guideline for dealership businesses now and for the decade ahead:

- **The value proposition offered by dealers to customers is as strong as ever, and will likely be sustained into the foreseeable future.** The "product" in its most robust sense – medium- and heavy-duty trucks, and the surrounding array of maintenance and finance services – is increasingly complex and sophisticated. The customer base and its needs are more demanding and more diverse. The dealer role in bridging product and services with customer needs and requirements guarantees the future of the business.
- **The pace of change will quicken.** The commercial vehicle dealership will take on some characteristics of the light-vehicle business – a faster pace of change, even becoming like Silicon Valley in some respects, as big data looms and names like Uber and Google enter directly or on the periphery.
- **Forces for consolidation at all levels are strong.** Powerful forces are driving scale at all levels – manufacturers, suppliers, customers and dealers. While there will always be a place for excellently run small dealership businesses that are nimble, fast-acting and attuned to their customers (often niche customers), the general tendency, driven by complexity, regulation and efficiencies of scale, will be to fewer and bigger.
- **It's a people business that happens to sell trucks.** A substantial majority of truck dealers who were interviewed for the study credited personal relationships with customers, suppliers and most of all with their employees as the key to their success. For all the remarkable technology, governmental challenges and business environment changes set to come in the next 10 years, dealerships will depend on the productivity of their people for success.
- **Hiring a new generation of associates (especially technicians) from the ranks of "millennials" is a management imperative.** Many dealers recognize that their business tends to "skew to seniors," with the postwar baby boom generation (birth years 1946 to circa 1964) predominant on their management teams and representing a high percentage of their workforce. Time will force a change from now to 2027 in that profile – a handoff to Generation X and the millennials. It can be either proactively anticipated and managed, or allowed to happen and be reacted to.
- **The industry image has to be upgraded.** A frequently cited, long-standing concern voiced by dealers is the unglamorous reputation of the business, in spite of the satisfying, rewarding careers enjoyed by those who migrated into it. The prospect of evolution to a faster-paced, technology-driven business, found to be attractive to some of the Silicon Valley names cited above, could be a major opportunity to change that image.
- **OEMs are solid business partners – but need to be handled with care.** Dealers praised their OEM business partners for managing to cope with costly regulatory compliance demands over the last 12 years while still providing excellent, feature-laden trucks for them to sell. While recognizing that, there were also citations of onerous service and warranty issues, financial requirements, and upsides and downsides vis-à-vis the trend toward vertical integration. As in any tightly bound business partnership, this involves give-and-take on both sides that needs to be managed.

- **Governments are also a business "partner" for dealers – though not by choice.** Unlike OEM partners, for whom there is broad alignment in fundamental business objectives (delight the customer, profitability), governments at the federal, state and local levels can decisively and adversely impact dealer prosperity. FET, taxes and accounting are particularly in focus now; there will always be more to work with, or through, given the omnipresence of governmental influence on dealer businesses.
- **Successful dealers feel great satisfaction and ample rewards – and not just money.** While financial prosperity is certainly important, almost all dealer conversations we had highlighted problem solving, customer relationships, and professional development of their management teams and associates as the key rewards of their jobs. We believe those are likely to continue as the greatest sources of satisfaction in the business.
- **Keep the value of your business top of mind through a formal planning and valuation process.** While all dealers live and breathe their businesses, not all engage in a formal financial valuation to put a price tag on their dealership. As a regular part of a strategic-planning process, valuing the business through a disciplined process with standard financial tools (net present value, EBITDA [earnings before interest, taxes, depreciation and amortization] multiples, etc.) provides dynamic insights; doing it as a regular exercise means that if and when valuation information is needed, you are not starting from scratch.

Action Plans

Recruiting New Talent

An unsurprising finding of this research was that it is critical to hire quality, high-potential new recruits for a people-based business like a truck dealership. It is also no surprise that almost all the dealers we interviewed had tactics and channels they described as "the usual stuff" or "the standard" when sourcing talent. Commonly cited were:

- Campus visits to trade schools, high schools with vocational programs for techs, college campuses, and high school and college career day participation (techs, sales, finance and administration).
- Partnering with local trade schools (techs).
- Employee referral programs and bonuses (all personnel).
- Recruiters/talent search firms (techs, sales, finance and administration).
- Faculty contacts and recommendations – for tech schools and business programs at high schools and colleges (all personnel).
- Co-op programs (techs).
- Donation of diagnostic and repair equipment to schools (techs).

Some dealers we surveyed offered up their own flavor on searching out, hiring or onboarding new employees – often breaking the mold.

- Hiring talent from outside the trucking industry, especially sales talent from banking, insurance or technology firms that were accustomed to team selling and C-suite presence.
- Assembling teams drawn from sales, tech staff and finance/admin functions together to assigned customer accounts, and attempting to link together veteran and junior associates in these account-development teams.
- Turning to labor pools beyond the stereotypical – directing recruiting efforts to women, minorities, veterans or those with past (minor) scrapes with the law.
- Recognizing, rewarding and promoting managers based on demonstrated competence in hiring, training, and developing incoming and younger associates.
- Reaching out to distressed work sites and labor pools – contacting outplacement programs, conducting job fairs, launching special recruiting efforts at or near work sites that have experienced layoffs and downsizing.
- Leveraging the industry's technology story, which will click with the right person. The marriage of mechanical and electronics technology embodied in today's commercial vehicle product makes it unique. It puts trucks and buses on the technology frontier. The downside is it makes it hard to find techs who can service a complex product and salespeople who can communicate the value story to customers. The upside (just as it is for dealer principals) is that for the right individual, the job is dynamic, with an ever-changing product and customer landscape. No monotonous, "same-old same-old" here.

Our research reinforced insights on recruiting millennials/Gen Y; some stereotypes are true: It's a video, texting and social media generation that gives credibility to peer-to-peer relationships. Here are a few suggestions for reaching this group:

- At a job fair or a school function, if you engage you increase the odds of success. If your reps sit behind a desk with a sign or banner, that desk is a barrier. The prospective recruit may not surmount that barrier and come to you. Get out from behind your desk, and mix and mingle with student prospects.
- Since videos are a preferred medium, make a video of your best young employees. Follow them around their place of work with visual documentation and voice commentary about the things they like about their job and their excitement to be working at your dealership. The video doesn't have to be professional – in fact, it may be better to have an amateur/homemade "real people taken with a cell phone" look. Then post the video on your website and send the link to your prospective recruits.
- Be sure to use Facebook, Twitter, Snapchat and similar sites in addition to your website and email to reach your potential recruits. Remember that Gen Y may not get past the subject line on an email if that subject doesn't hook them to read the rest.
- In selling the future, don't let it be a secret that dealership positions are almost never offshored or vulnerable to robotics – a dimension to future job stability that may give you a competitive edge against rival lines of work.
- Drive a truck to where people gather, and put it on display. It might be a school or church function, a minor league baseball game, outdoor charity function (especially if you are a sponsor), or high school or college athletic event. The point is, we collectively complain of the industry's image challenge, but do we take enough advantage of many (most?) people's fascination with big equipment? Yet the public at large usually doesn't get to see, feel or touch big trucks.

  The auto industry has long-standing experience in getting its product in public spaces for show and tell. Indeed, commercial vehicles are different: Insurance considerations have to be dealt with, and permissions from relevant site operators have to be obtained. But exposure could create powerful, positive impressions for the public, and also plant the seeds that could turn into career interest for the younger set.
- Consider some type of "job shadowing" program or apprenticeship opportunities as appropriate. A recurring theme in our dealer interviews was how, after some exposure, new employees discovered that the dealership business was very interesting and challenging. Making that experience available as people begin to consider potential careers could help draw potential hires into the fold.

OEM Relations

Consistency and Uniformity

Consistency and uniformity are really the two guiding principles of the customer experience, which at its core is about creating delighted, and therefore loyal, customers. Like any other worthwhile pursuit, creating the desired experience is an ongoing endeavor and one that requires investment, which is sometimes significant. However, before any capital outlay takes place, there are a number of basic steps that should be taken to identify areas of focus. While it may sound simplistic, defining the vision you want for your customers' experience is an essential first step, especially for communicating within the dealer organization. The next step is to truly understand customers and what they want in their dealership experience. As mentioned elsewhere, a one-size-fits-all model is probably not appropriate for providing

world-class customer satisfaction. Once these two tasks are underway, you have a framework for connecting with customers and soliciting their feedback to see if you are meeting their needs. That loop is critical for communicating back to dealership management and employees so they will know if they are on track or if adjustments are needed.

Reciprocal Responsibilities in a 16/6 to 24/7 World

While the decision in setting sales, and especially service, hours is an evolving issue, a strategy to support extended hours with better parts availability has the potential to pack a powerful one-two punch. Provided the decision to move to extended hours is justified by demand in the given market, then it makes sense to do everything possible to maximize uptime, including taking parts availability to the next level.

Based on our conversations, there appear to be numerous strategies to do this, though they may not necessarily be employed uniformly across like-branded dealerships. Most solutions are some form of an inventory management system and a logistics infrastructure that carries some predictive capabilities in terms of parts demand, and locates OEM parts distribution centers proximate (within eight hours' drive time) to dealers. OEM telematics systems have the ability to enhance these capabilities, setting the stage to minimize local stock outs. Since not every part can be anticipated and held in stock at the dealership, OEM support through a fast-to-respond parts distribution network can back up and complement the dealer stocking strategy.

Bringing Subpar Dealers Up to Par

Customer expectations are formed by their experiences with "the best of the best." Many motor freight carriers and even some vocational operators will conduct, purchase and service transactions with multiple dealers across wide geographic regions and even nationally. The feedback we received from interviewing truck operators with a broad geographic reach pointed to all-too-wide variance between best and worst dealership experience.

Addressing this issue starts with a clear definition of mutually agreed upon expectations and an objective assessment of the subpar dealers' performance. The natural byproduct of this step should be a well-defined, time-bound action plan designed to tackle and improve the metrics that require attention. As with all good continuous-improvement processes, a follow-up or feedback loop is essential to make sure the plan stays on track and achieves the desired objectives. We note that new-car and -truck dealers have already advanced far along this path.

This ambitious undertaking presents an interesting challenge that can be addressed from three separate perspectives. From ATD, a solution could be best focused on sharing best practices and/or continuous-improvement initiatives (such as the NADA/ATD 20 Group program).

We recognize that quality and performance issues are ultimately resolved in the marketplace. OEMs can assist in design and implementation and even intervention to address weaker elements in the network. Dealer acquisition and consolidation will be a remediating force in removing weaker stores and service locations. Ultimately, the "survival of the fittest" aspect of marketplace discipline will be at work, forcing lower-performing dealers to upgrade or exit as customers migrate to superior alternatives.

Business Valuation as an Ongoing Strategic Process

Inherent in industry consolidation and the narrowing number of participants is the potential to be an agent in the transformation – as either an acquirer of properties or a seller of your dealership. However, the family legacy of many commercial vehicle dealerships leads some dealer principals to be reluctant to consider alternatives to passing the business to a son, daughter or other family member. While most dealers have a succession plan, and can make a reasonably informed guess as to value of their dealership, not all have a systematic, regular process for determining that value.

A disciplined business-valuation exercise should be part of a dealer's strategic-planning process. It can be conducted by in-house financial staff, an accounting firm, or a banker or consultant, using widely accepted tools like EBITDA multiples, discounted cash flow or a comparable properties/assets review. Knowing the value of a dealership business from an arm's-length perspective based on a recent review of fresh financial information could become critical in the right circumstances.

The same logic holds for the component parts of a dealership. In a large corporate environment, investment analysts often look at the breakup value of a firm. The "breakup" of new sales, used sales, parts sales and service is not a practical action path for dealerships. But going through the exercise of examining and putting a value on these businesses by conducting a stand-alone valuation for each component piece can yield actionable insights when it comes to head count or asset allocation and working-capital decisions.

A maxim for owners of real estate, medical and legal practices, and many other businesses is "don't wait until the day before you put your property on the market to think about the right price." The same holds for truck dealers. Put the numbers and analytics together well before the time that you actually need them.

Dimensions of the Dealer Business – Barriers to Entry and Bringing Solutions to Customers

One of the themes we have interwoven into this study is that while dealers face constant challenge and a variety of difficulties, there are pluses to the fact that there is no "Easy Button" to press.

First, these problems are also a barrier to entry. The heavy capital commitment, the leading-edge technology in the product and the service bay, demanding customers, challenges of right-size staffing and team motivation and reward – this is not a mix suited for the faint of heart. It also comes with the imperative that profits have to adequately reward those who make this commitment and have the skills to manage the mix and produce results.

Second, the problems – or perhaps the solutions to the problems – end up being one of the major rewards to the dealer. In our survey, almost every dealer used terms like "ever-changing," "problem-solving," brought "fun" to the business and fired up their "passion" for it as they described what they most enjoyed about being a commercial vehicle dealer. (Note: "Problem solving" along with "dealing with people" – customers and associates – led the list.)

Government Relations – FET, LIFO, Regulation

Everyday business presents enough challenges, with products, customers, technology, employees, financial and profit issues all at work. When government tax policy is added to the worry list, that's a problem, especially with tax provisions that burden your business with arcane, extra costs on the product you sell.

FET is a tax imposed on a subset of highway-use vehicles to help finance the Highway Trust Fund. At issue is the high rate imposed (currently 12 percent), and the discriminatory, almost punitive nature of the tax itself because it singles out one class of equipment and associated buyers to be taxed in order to fund maintenance of a widely used public asset.

Also, FET is a complicated and costly tax to administer and comply with, relative to the small amount (from a federal budget perspective) of revenue raised.

Finally, it sets back other public policy goals (notably environmental) by discouraging the purchase of newer and greener equipment, keeping older, higher-polluting equipment in the vehicle population.

We recommend that ATD continue its role in advocating repeal of this harmful and outdated tax to stimulate the sale of new heavy-duty trucks that would directly benefit the 7.3 million Americans employed in the U.S. trucking industry. ATD can marshal its own membership, and energize coordination with other stakeholders up and down the truck supply chain. OEMs, suppliers, fleets, leasing companies and their representative organizations—American Trucking Associations (ATA); National Private Truck Council (NPTC); National Truck Equipment Association (NTEA); Truck Renting and Leasing Association (TRLA)—would all stand to gain from the end of FET.

Additionally, the evolving political situation in Washington opens the door to a change in the status quo – which can be both positive and negative for trucking and commercial vehicle dealerships.

The positives include the potential for a clean-sheet-of-paper approach on taxes, including FET.

The negatives are that the search for new tax revenue sources could also arise from that clean sheet of paper. The inertia of a status quo situation of the past could give way to adverse developments if new tax revenue sources are sought to aid in a budget-balancing process.

LIFO inventory accounting – and, indeed, even an FET increase – fall into that camp. In our dealer survey, several dealers were emphatic about the adverse impact that a change in LIFO practices would have. These would be manifest in the costs of administrative and accounting changes, and the increase in tax expense that could result from making accumulated reserves subject to current taxation.

As with FET, the call to action from dealers was for ATD to stand as a strong voice to make arguments against legislative initiatives that would especially hurt those in the business of selling trucks.

Appendix

A consistent thread running through the survey conducted by ACT was the difficulty dealers have in recruiting diesel technicians. This of course begs the question, how many technicians does the industry need to service the vehicle fleet?

According to the latest Bureau of Labor Statistics (BLS) Occupational Employment Statistics (OES) data, in mid-2016, there were 254,280 individuals employed as "Bus and Truck Mechanics and Diesel Engine Specialists." The estimate includes some "mechanics working primarily with automobile or marine diesel engines." Given job portability and consideration of this short analysis, we take an inclusive approach and consider the data in its entirety. The BLS analysis of the space can be found on their website at the following link: https://www.bls.gov/oes/current/oes493031.htm#nat. The BLS' OES data is a time series, so we are able measure change.

First, if we assume a 40-year career for the average diesel tech, that would suggest underlying replacement demand on 2016's population of 254,300 techs is 2.5 percent, or around 6,400 employees per year (assuming an equal demographic distribution). Of course, it is not just about replacing techs, but also about the number of techs needed to account for new-truck fleet population growth.

Comparing the outputs of ACT's U.S. Classes 4-8 population models against the number of techs reported in the BLS data, we are able to derive a truck-to-tech ratio. At the end of 2016, ACT's modeling suggests there were 7.013 million Classes 4-8 vehicles being operated in the U.S. Dividing that vehicle population by the number of techs reported by the BLS, there were 27.6 U-15 trucks per tech in the U.S. in 2016.

Looking forward, ACT's new demand modeling anticipates that the U.S. Classes 4-8 vehicle population will rise 10.7 percent from the end of 2016 to the end of 2027, to 7.762 million units. Assuming no productivity growth and holding the trucks-to-tech ratio constant, the number of techs needed by the end of 2027 would rise to 281,500. In this scenario, and accounting for voluntary retirements, the industry would need to recruit just over 9,500 techs per year for the next decade.

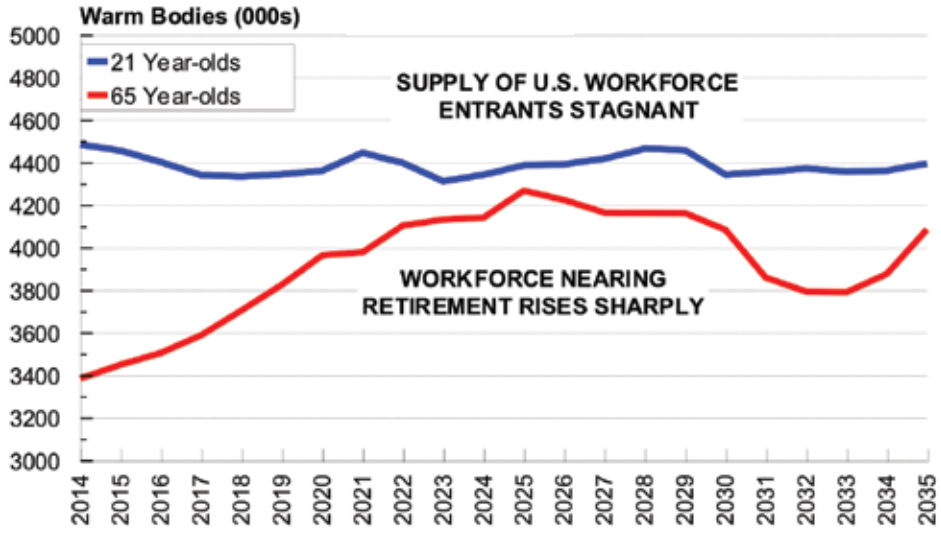
Figure 16

Forecasting Diesel Technician Demand

Year	BLS Techs	ACT U.S. Cl. 4-8 Population	Truck-to-Tech Ratio	Techs: Retirees (2.5%)	Techs: New	New Tech Demand (ex. Turnover)
1997	234,000	5,637,900	24.1	5,850	--	--
2000	258,800	6,163,500	23.8	6,470	8,300	14,770
2005	248,300	6,695,700	27.0	6,210	-2,100	4,110
2010	222,800	6,760,100	30.3	5,570	-5,100	470
2016	254,300	7,013,400	27.6	6,360	6,300	12,660
2027						
No productivity	281,500	7,762,400	27.6	7,040	2,500	9,540
1% prod. trend	253,600	7,762,400	30.6	6,340	-100	6,240
2% prod. trend	230,700	7,762,400	33.6	5,770	-2,100	3,670

Figure 17

U.S. Demographics – Potential Hirees and Impending Retirees, 2014-2035



Source: U.S. Census Bureau, ACT Research Co., LLC: Copyright 2017

Assuming a 1ppt productivity trend, the trucks-to-tech ratio would rise to just above its 2010 peak at 30.6 trucks per tech. Achieving that level of productivity, the number of techs required to service the fleet would remain virtually unchanged at just over 254,000. If this scenario comes to pass, the industry would need to hire 6,200 new techs per year.

With trucks and technology getting better, it is not inconceivable that a 2ppt productivity trend could be established. If the industry can wring that type of efficiency out of the system, the ratio would rise to 33.6, and the number of techs needed would fall to just under 231,000, a 9 percent decline from the number of techs working in 2016. If this ambitious scenario can be translated into reality, the industry would need to only come up with 3,700 new techs per year.

This analysis does not address turnover. We recognize that employment terminations are an issue, especially after a dealer has invested time and money in boosting a technician's skills. However, as we believe the primary cause of technicians leaving their jobs is horizontal moves within the industry, we see that as more of a retention issue than one of attracting new talent into the industry.

Adding to the recruiting challenge as we move through the next decade are the retirement of the baby boom generation and a relatively stagnant supply of new workers entering the job market. The once-large gap between 20-year-olds and 65-year-olds started closing rapidly in 2014 and will continue to do so into a 2025 peak. Here are two high-level predictions from the demographic data: (1) Competition for young talent will rise sharply in the coming decade; and (2) competition will lead to rising wages. In addition to better trucks and better technology, we suspect that rising competition for a finite pool of workers will help drive productivity that boosts the truck-to-tech ratio over the coming decade.

Figure 18

SAE Five Levels of Vehicle Automation

SAE level	Name	Narrative Definition	Execution of Steering and Acceleration/ Deceleration	*Monitoring* of Driving Environment	Fallback Performance of *Dynamic Driving Task*	System Capability *(Driving Modes)*
***Human driver* monitors the driving environment**						
0	**No Automation**	the full-time performance by the *human driver* of all aspects of the *dynamic driving task*, even when enhanced by warning or intervention systems	Human driver	Human driver	Human driver	n/a
1	**Driver Assistance**	the *driving mode*-specific execution by a driver assistance system of either steering or acceleration/deceleration using information about the driving environment and with the expectation that the *human driver* perform all remaining aspects of the *dynamic driving task*	Human driver and system	Human driver	Human driver	Some driving modes
2	**Partial Automation**	the *driving mode*-specific execution by one or more driver assistance systems of both steering and acceleration/ deceleration using information about the driving environment and with the expectation that the *human driver* perform all remaining aspects of the *dynamic driving task*	**System**	Human driver	Human driver	Some driving modes
***Automated driving system* ("system") monitors the driving environment**						
3	**Conditional Automation**	the *driving mode*-specific performance by an *automated driving system* of all aspects of the dynamic driving task with the expectation that the *human driver* will respond appropriately to a *request to intervene*	System	**System**	Human driver	Some driving modes
4	**High Automation**	the *driving mode*-specific performance by an automated driving system of all aspects of the *dynamic driving task*, even if a *human driver* does not respond appropriately to a *request to intervene*	System	System	**System**	Some driving modes
5	**Full Automation**	the full-time performance by an *automated driving system* of all aspects of the *dynamic driving task* under all roadway and environmental conditions that can be managed by a *human driver*	System	System	System	**All driving modes**

Source: SAE International
http://media.cygnus.com/files/base/MASS/document/2017/04/automated_driving.pdf

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