AIAG

In collaboration with

Deloitte.

QUALITY **2020**

Automotive Industry's View
on the Current State of Quality
and a Strategic Path Forward

Contents

Foreword

In October 2013, a group of 22 automotive OEMs and suppliers met for an Automotive Industry Action Group (AIAG) board meeting. AIAG is a not-for-profit organization that works collaboratively with automotive and manufacturing companies, suppliers, and service providers to help them operate at peak performance — so no one was surprised when the discussion turned to a sharing of concerns about the growing complexity of OEM customer-specific requirements, quality systems, and the proliferation of audits. In this environment, existing audit schemes seemed insufficient for driving improvements.

The leaders in that room recognized that to meet the quality needs of the near future — even five years out — the industry needed to gain a data-driven understanding on what was working and what wasn't. With advancements the industry has made over the last 20 years, the time was ripe for conducting an in-depth, current-state survey of OEMs and suppliers — a study that would also illuminate specific areas of focus for a near-future, industry-wide, quality-focused initiative. Following a lean improvement approach, current-state data would be the baseline from which the industry could chart a strategic course to the desired future state.

AIAG Executive Director J. Scot Sharland coined the name **Quality 2020** for the project, a reasonable timeframe to put improvements in place by 2017 and measure results by 2020. The project launched with AIAG leadership conducting face-to-face interviews with every AIAG board member. An additional 23 leading automotive companies were added to the list, and these, too, were interviewed.

Assuming a neutral position, AIAG facilitated the discussions, letting each automaker put their own emphasis on the issues. Given the common refrain in the feedback from these leaders — "Quality is the best it's ever been, but ..." — it was soon apparent that while the current state was good, there were specific areas where even better efficiencies were desired and could be achieved.

AIAG created a mind map (affinity diagram) of the quality-related concerns voiced across the interviews and took the chart to focus groups comprised of functional leaders representing various disciplines including quality, warranty, and engineering teams from Tier 1 and Tier 2 suppliers. With feedback from the focus groups, the list of concerns was chiseled down from hundreds to the top 10 on which AIAG would concentrate for an industry-wide survey.

By third quarter 2014, AIAG had formed a collaboration with Deloitte Consulting LLP (Deloitte), which helped conduct a survey of OEMs and suppliers and quantify the responses used to inform the following report and recommendations. The electronic questionnaire was sent to AIAG member organizations as well as non-members, and to AIAG sister associations such as the Society of Motor Manufacturers and Traders (SMMT), Southern Automotive Conference (SAC), German Automotive Industry Association (VDA), and others. To further extend the pool of potential respondents, the 22 AIAG board member companies distributed the survey to companies in their supply chains as well.

While Deloitte collected, organized, and analyzed the survey findings, AIAG provided perspective and helped draw accurate conclusions from the story the data had to tell. The results of the comprehensive study highlighted in this white paper provide a summary of the key findings,

some insightful interpretation, and a path forward so that Quality 2020 becomes a call-to-action supported and propelled by AIAG and its member companies.

Quality 2020 is a reflection of the automotive quality culture of today and an illumination of where the industry needs to take action. Improvement is only possible if automotive companies are willing to put resources behind the plan, get engaged, and address the concerns.
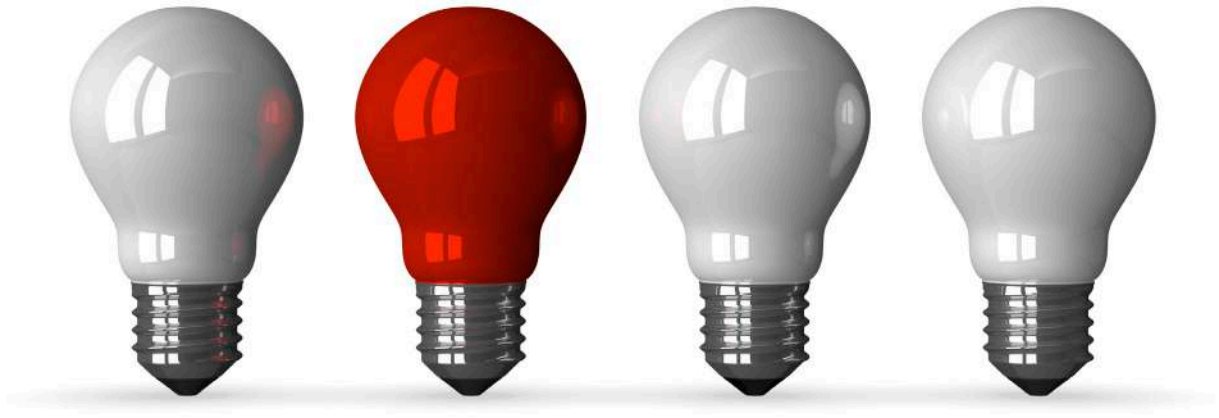
QUALITY 2020 STUDY FINDINGS & INSIGHTS

*Survey results reveal that OEMs and suppliers both rank **Problem Solving** and **Customer-Specific Requirements (CSRs)** as the most critical issues impacting quality. **Quality Management System (QMS), Product Development, and Loss of Experience** round out the top five issues as ranked by all respondents.*

Problem Solving

OEMs and suppliers say problem solving is important because it impacts the organization's *ability to manage, monitor, and respond to quality-related events*; **their** *ability to implement operational efficiencies*; **and** *brand and customer relationships.*

OEMs and suppliers identify the same four reasons that they believe the industry's problem-solving capabilities are *inadequate,* although they rank them in a different order of importance: *Root cause analysis is lacking, management/organizational culture*, and *feeling rushed* are emphasized roughly the same.

Interestingly, *jumping to the solution* is considered by OEMs as the top reason problem solving is inadequate, while suppliers rank it as having the least impact.

Particularly intriguing is that almost two-thirds of respondents feel their organizations are, at best, *moderately capable* at problem solving. More than half see *significant risk* if no action is taken to close the gap between where the industry is today versus where the industry should be in problem solving.

About 95 percent of respondents believe closing the gap in problem solving would have a moderate to extremely high impact on quality.

Introspection

"The fact that the majority of survey respondents describe themselves as only moderately capable at problem solving is interesting and concerning," says David Kneisler, vice president, global quality for Dana Holding Corporation and chairman of the AIAG board of directors. "Problem prevention may be the preferred requirement, but there's no doubt that OEM leadership expects excellent problem-solving skills, and that's the standard in the industry. Our industry needs to keep a focus on improving our problem-solving skills. That being said, if we can prevent it in the first place, that is the preferred outcome."

AIAG's Scot Sharland believes that the industry's challenges in problem solving and problem prevention are simply manifestations of a common performance shortfall that is "more cultural than technical in nature — namely, discipline."

"If the industry is problem solving the same problems over and over again, that's not problem solving, that's problem fixing," agrees David Schultz, head of Global Performance Partners (GPP) and co-author of AIAG's CQI-22 Cost of Poor Quality Guideline. "Often, the attitude is find it and fix it, which means we've slipped from problem prevention to fire-fighting mode."

Customer-Specific Requirements

OEMs and suppliers both agree that Customer-Specific Requirements (CSRs) are a critical issue impacting quality. However, suppliers are most concerned with their ability to *standardize business processes and systems,* while OEMs were concerned with *managing customer expectations and relationships.*

OEMs and suppliers overwhelmingly agree that automakers would benefit from having one consolidated set of OEM CSR requirements; however, they also agreed that *significant effort* would be required to change QMS standards or requirements. Despite the expected challenge, a near-unanimous agreement on the benefits of a single set of requirements indicates *an opportunity for collaboration* in addressing this impediment to optimum quality.

Introspection

AIAG's Scot Sharland notes that most OEM purchasing teams have reduced their number of Tier 1 suppliers, favoring larger, more technology-laden companies with global manufacturing capabilities. "These mega-Tier 1s enjoy a more balanced book of business than they did when they were quasi-captive suppliers for one or two OEMs only," he says, "and as a result, CSR variations from OEM to OEM have quickly driven up compliance complexity and cost."

That being said, Dana's David Kneisler points out that "obviously, the OEMs believe quality is not only critical to their business but also

a competitive advantage, so there is a need for some Customer-Specific requirements. Speaking as a tier supplier, however, the complexity of CSRs for Tier 1s is difficult, and the challenge for Tier 2 through Tier N must be incredibly confusing. A standard approach would have significant benefits — we should commonize what could be commonized."

Kneisler finds it interesting that across both OEM and Tier respondents, all recognize a significant resistance to change, while acknowledging that there would be significant benefits to that change. "We need to explore together those areas that everyone feels could significantly benefit the industry and work diligently at removing some of the barriers and perceived risks associated with that endeavor," he says.

To that end, Sharland says that AIAG and the International Automotive Task Force (IATF) have begun active projects with OEM and Tier 1 stakeholders focused on CSR consolidation. "We are confident that the lion's share of the current CSR redundancies can be incorporated into the basic quality standard or diverted to the OEMs and Tier 1s Terms & Conditions," he says. "We can collaborate to standardize the CSR development and review process, and constrain their rate of growth."

Quality Management System

Respondents agree that *standardization* is the #1 area impacted by complex and redundant QMS requirements, which also affects *operational efficiencies, relationships,* and a*bility to respond to quality-related events.*

Top among the reasons why QMS is important is an agreement from OEMs and suppliers that it *impacts our ability to standardize business processes and systems.*

On a per-site average, respondents invest *116 workdays annually to comply with QMS requirements*. More remarkable is that they forecast at least a 40 percent reduction in this investment if complexity and redundancy are *reduced even to a minimum.*

On average, respondents spend *over $100,000 annually* per site to comply with QMS requirements, and project *savings of nearly $50,000 per site* if complexity and redundancy are reduced.

About 96 percent of respondents expect a moderate to extreme impact on quality *if standardization of QMS were improved and the complexity of standards and requirements were reduced.*

Despite the indicated opportunity to reduce effort and cost, and the potential impact from improving standardization and reducing complexity, respondents overwhelmingly believe that there would be *significant effort needed to change current QMS standards.*

The top three actions that have the most potential for improving QMS are *reducing TS requirements to only those elements with direct impact on product quality and reliability; determining audit schedules based on performance;* and c*ombining TS and Verband der Automobilindustrie (VDA) requirements.*

Respondents also are closely aligned on their top three concerns if no changes are made to QMS: *the need to maintain multiple systems to satisfy multiple standards, a continued increase in the number of OEM and Tier 1 specific requirements*, and *continued incidents of poor correlation between certification status and actual performance.*

Introspection

Bill Hurles, who serves as director of General Motors' supply chain and leads the global operations of 69 assembly plants and 90 component/stamping/powertrain plants, says the potential savings gained by reducing QMS complexity and redundancy is likely greater than the estimate in the Quality 2020 study. Furthermore, he thinks that any potential resistance to the effort would be less about resistance to support commonization and more "the result of a lack of process to reduce the variation."

As for the perceived resistance to change cited in the study results, Hurles believes "there's potential to reduce the resistance by getting suppliers and OEMs together to define common ground by reviewing the specific requirements that exist today, and then tackling the easiest first and expanding from there. I think there's more common ground than we might expect," he says.

"Anything we can do to improve the efficiency of the QMS gives us more time to focus on the up front — whether that be product development or up-front quality activities — rather than the reactive work that we do in quality management systems today," says Dana's David Kneisler. "It's not about decreasing our quality resources — it's about redeploying them to areas where they can be more effective."

"Standardization is an important tool that can be used to drive quality improvements," says Sig Huber, director, purchasing, supplier relations for Fiat Chrysler Automobiles (FCA). "We have found that parts which are reapplied to new applications have smoother launches than parts which are newly developed. Standardization is also helpful in decreasing complexity and increasing efficiency in the product development process."
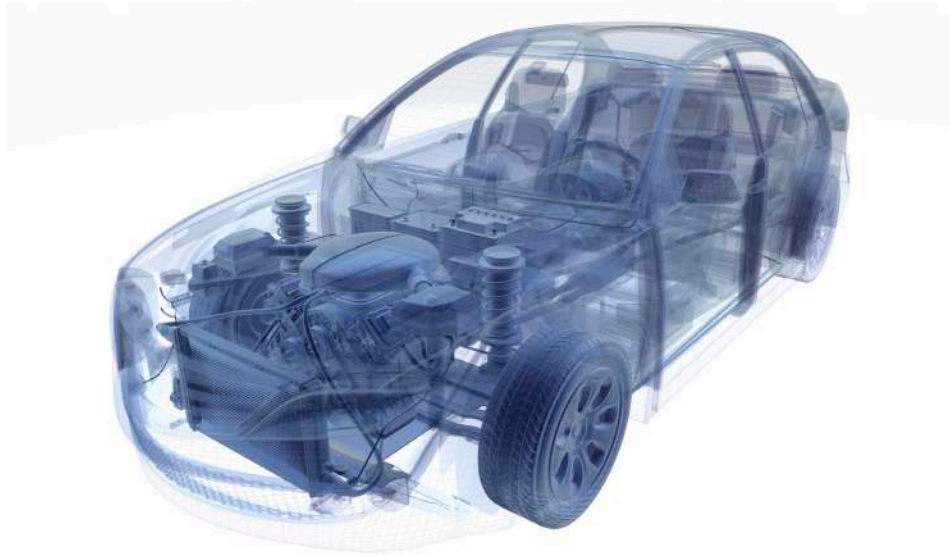
Product Development

Survey respondents agree that *assuring product compliance* is the top reason why product development is important. OEMs also feel this issue is *important to innovation* and to *sustained quality performance*, while suppliers place greater emphasis on *impact to profitability and operations.*

OEM and supplier respondents overwhelmingly believe they are *capable* in product development, and they agree on the top five product development improvement opportunities: *design in quality, design for manufacturability, lean product development, system DFMEA*, and *design for Six Sigma.*

> *OEM and supplier respondents are in complete agreement that the top two sources of complexity and risk are* unrealistic expectations *and the concern that at times,* system validation occurs at launch.

Introspection

"We strongly believe very close collaboration is needed between suppliers and their customers to drive world class levels of quality," says FCA's Sig Huber. "Whether done through early selection of suppliers and/or strict adherence to program milestones, it is important to provide as much development time for the program as possible."

"The effort to take action on design in quality and design in manufacturability is critically important to problem prevention," says GM's Bill Hurles, "and their effective use will be a win-win-win for customers, suppliers, and OEMs."

"Our industry needs to improve its capabilities in effective problem solving, but at the same time, take all of the knowledge from the lessons learned and ensure that we build it into future products," says Michael G. Sinnaeve, global vice president, operational improvement and quality, for Magna International Inc. "We cannot only focus on the one element to advance our industry."

Loss of Experience

Wrapping up the top five concerns that could affect automotive quality is loss of experience. Survey respondents indicate that a *lack of skilled workers, compensation that does not meet requirements*, and *little incentive for young people to select careers in automotive* are long-term concerns that may impact automotive quality.

OEMs and suppliers are particularly concerned about the *large number of retirements* in the next five to eight years (due to retiring Baby Boomers), which will result in a loss of *know-how, teachers, and mentors.*

The top three concerns for survey respondents regarding the industry's near-future loss of experience include the *ability to avoid repeating past mistakes; the ability to implement operational efficiencies;* and *the ability to develop new talent.*

The three most popular methods for preserving and transferring industry know-how are F*ailure Mode and Effects Analysis (FMEA), electronic document storage and retrieval,* and *databases.* Nevertheless, over three-quarters of respondents rate their organizations, at best, *moderately capable of preserving and transferring knowledge.*

Furthermore, over one-third of OEM respondents describe themselves as *somewhat capable* or having *no capability* in preserving and transferring knowledge.

Nearly half of respondents expect it will require a *high level of difficulty* to reduce the industry's risks associated with the loss of knowledge and expertise.

More than half of respondents expect a high level of risk to the industry if no actions are taken to close the gap between the current rate at which the industry is losing experienced workers versus its ability to attract and replace these workers with new talent.

Introspection

Dana's David Kneisler says that while he sees "some of the best talent in the world in automotive," he does "worry about the retirement factor and turnover in the next 10 years."

"The good news about concerns related to loss of experience is that AIAG is already active in assessing and benchmarking current industry skill sets and levels of knowledge through a series of self-assessments," says AIAG's Scot Sharland. *"These assessments are important because they highlight what deficiencies may exist — or have the potential to exist — in the future. They also show by region, country, and population where certain skill sets are lacking."*

To Kneisler's observation, it's important to make the distinction between loss of experience and knowledge due to retiring Baby Boomers versus the industry's ability to continue attracting top talent moving forward. "I see many new young people joining our industry, excited and motivated to contribute," points out GM's Bill Hurles.

Scot Sharland adds that AIAG is engaged with a number of very prestigious academic institutions to help "accelerate the personal and professional development of the next generation of automotive purchasing and supply chain professionals and fast-track them to auto industry assignments."

EXPLORING QUALITY IN THE GLOBAL AUTOMOTIVE INDUSTRY

Survey overview and insights
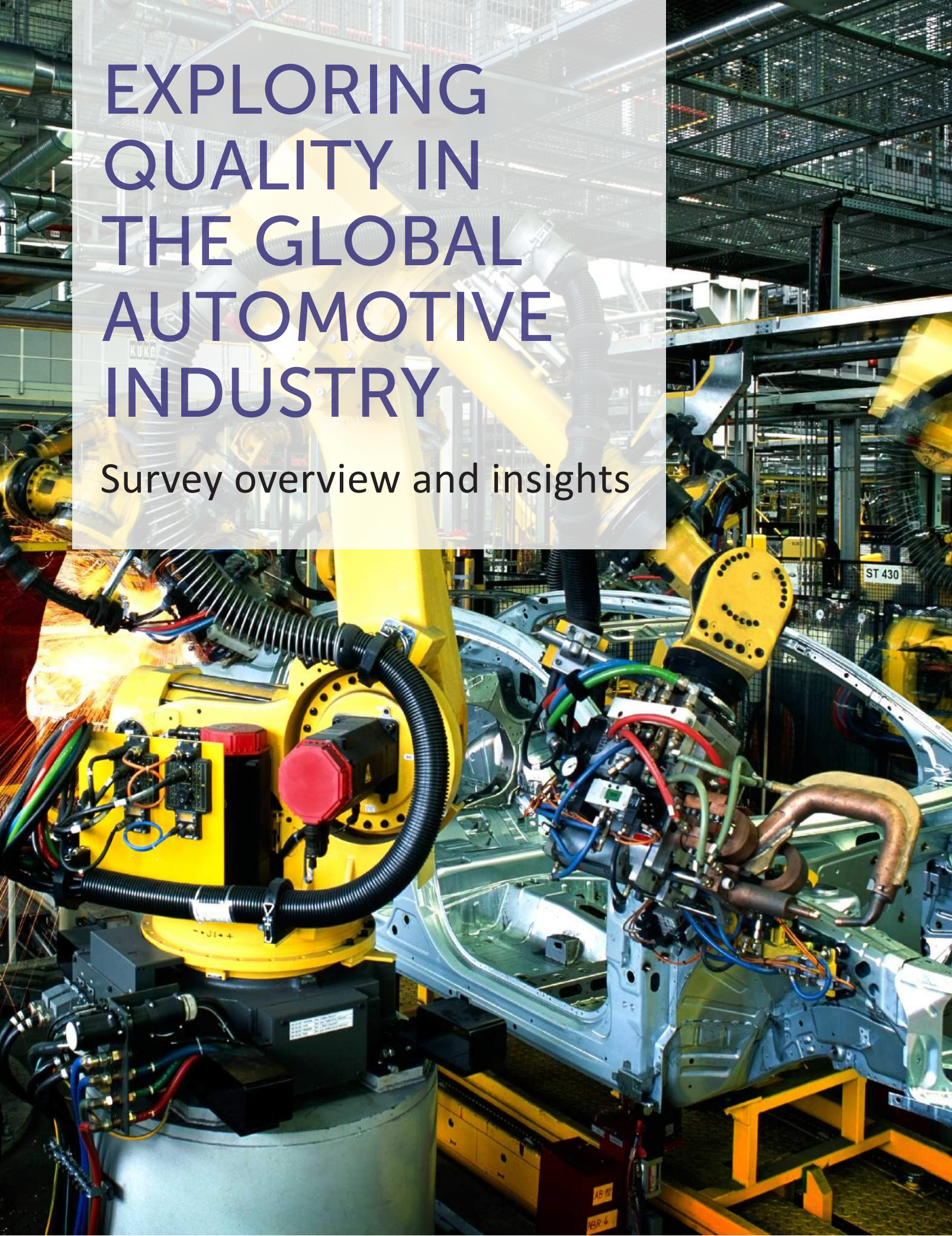
Demographics and Segmentation

Suppliers represent most of the respondents in the study, with a good mix of respondents from both management and technical functions, and representation across all commodities.

Segments represented

85%

- OEM: 8%
- Tier 1: 54%
- Tier 2: 26%
- Tier 3: 5%
- Other: 7%
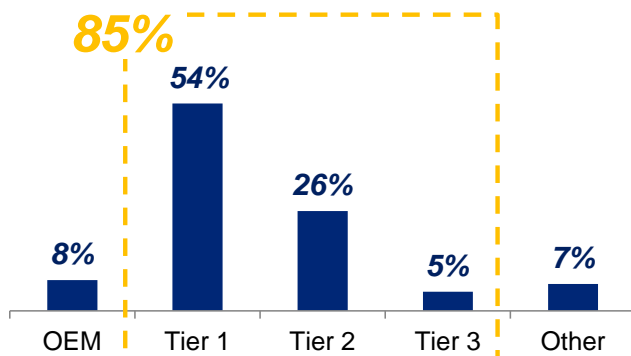
Level within the organization

	OEM	Supplier	Total
Executive/Corporate	17%	16%	16%
Management	42%	54%	52%
Functional/Technical/Operations	41%	30%	31%

■ OEM ■ Supplier ■ Total

OEMs led among this group of respondents
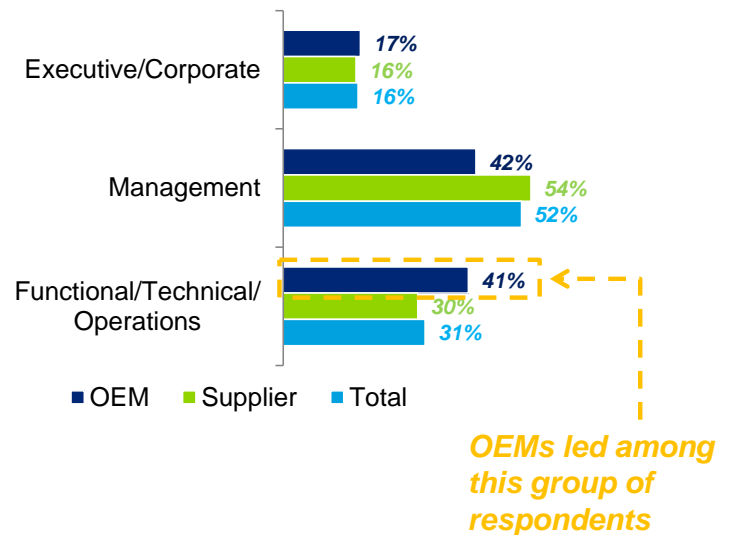
Supplier commodities represented*

- Powertrain: 31%
- Interior: 30%
- Exterior: 22%
- Electronics/Electrical: 20%
- Chassis: 18%
- Body/Body-in-White: 8%
- Raw Materials/Commodities: 8%
- Other: 16%
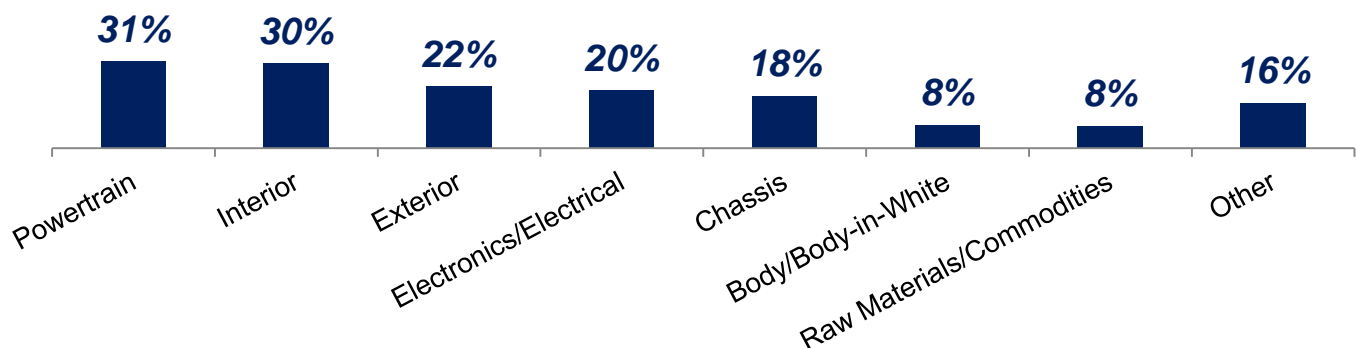
* Respondents could select multiple commodities. Percentages may not add to 100.

Source: Deloitte/AIAG Quality 2020 Study

Demographics and Segmentation

Almost two-thirds of respondents represented quality and warranty functions. Notably one-third were from outside of quality, but engineering represented only 6 percent of the total.

6%

64%

Total respondents that represented quality and warranty functions across OEMs and suppliers.

Chart categories (top to bottom): Engineering, Quality Systems Management, Supplier Quality, Warranty, Design/Engineering Quality, Product Quality, Manufacturing/Operations, Service (OEM Dealerships), Purchasing, Training/Development, Finance, Sales (Tier 1), IT, Other

Legend: ■ OEM ■ Supplier ■ Total

X-axis: 0% 10% 20% 30% 40% 50%

Source: Deloitte/AIAG Quality 2020 Study

Quality Challenges Identified By OEMs and Suppliers

Top 10 issues

OEMs and suppliers both ranked Problem Solving and CSR as the most critical issues impacting quality. QMS, Product Development, and Loss of Experience also rounded out the top issues as ranked by all respondents.

Issues	All Respondents*	OEM	Supplier
Concerns related to Problem Solving	**1**	**1**	**1**
Concerns related to Customer Specific Requirements (CSR)	**2**	**2**	**2**
Concerns related to Quality Management System (QMS)	**3**	7	3
Concerns related to Product Development	**4**	5**	4
Concerns related to Loss of Experience	**5**	4	5
Concerns related to Supplier Management	6	3	6
Concerns related to Change Management	7	5**	7
Concerns related to Core Tools	8	8	8
Concerns related to Warranty	9	9	9
Concerns related to Metrics	10	10	10

*   Ranking based on all respondents
** Composite scores for OEMs ranked Change Management and Product Development the same.

Source: Deloitte/AIAG Quality 2020 Study

Exploring Quality Challenges Identified By Automakers

Based on the priority order identified by respondents, we believe there are *five areas where OEMs and suppliers should first focus efforts to improve quality.*

1 **Concerns related to Problem Solving**
The lack of effective problem solving resulting in continually repeating the same problems.

2 **Concerns related to Customer Specific Requirements**
Quality Management System requirements defined by an OEM or Tier 1 customer that are in addition to or outside the scope of QMS requirements as defined within the standards audited by third party certification bodies (e.g., TS 16949, ISO 9001, ISO 14001, etc.).

3 **Concerns related to Quality Management System**
The policies, processes, and procedures required in all elements of business planning and execution throughout the organization, and in support of manufacturing product that satisfies customer requirements. Defined in standards that include ISO, TS, VDA, customer specific requirements, etc.

4 **Concerns related to Product Development**
The processes, methods, and tools to design, develop, specify, verify, validate, and launch new products, including parts, assemblies, and systems. Includes the concepts of Design in Quality, Design for Manufacturability and Design for Six Sigma.

5 **Concerns related to Loss of Experience**
The impact resulting from a large number of retirements in the next five to eight years, including the loss of know-how, teachers, and mentors.

Source: Deloitte/AIAG Quality 2020 Study

Concerns Related to Problem Solving

OEM and supplier rankings of the top three reasons why Problem Solving is important were the same. Although slight differences emerge when ranking why these capabilities are inadequate, both point to a desire for a rapid answer, compromising analysis.

Top reasons why OEMs and suppliers believe Problem Solving is important

1. Impacts ability to manage, monitor, and respond to quality-related events

2. Impacts ability to implement operational efficiencies

3. Impacts brand and/or customer relationships

Top reasons why Problem Solving capabilities are inadequate
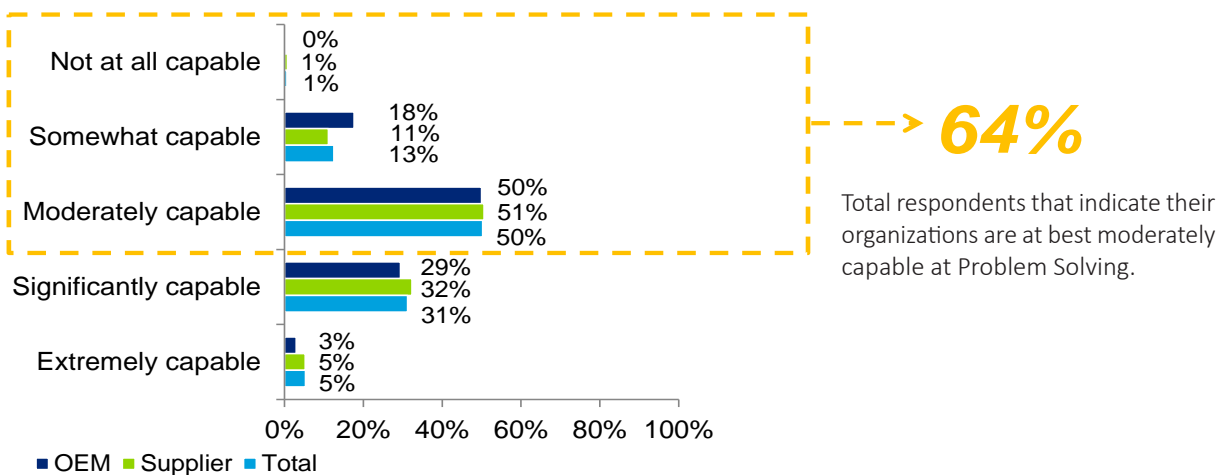
Reasons	OEM	Supplier
Root cause analysis lacking	2	1
Management / organizational culture	3	2
Rushed	4	3
Jumping to the solution	1	4

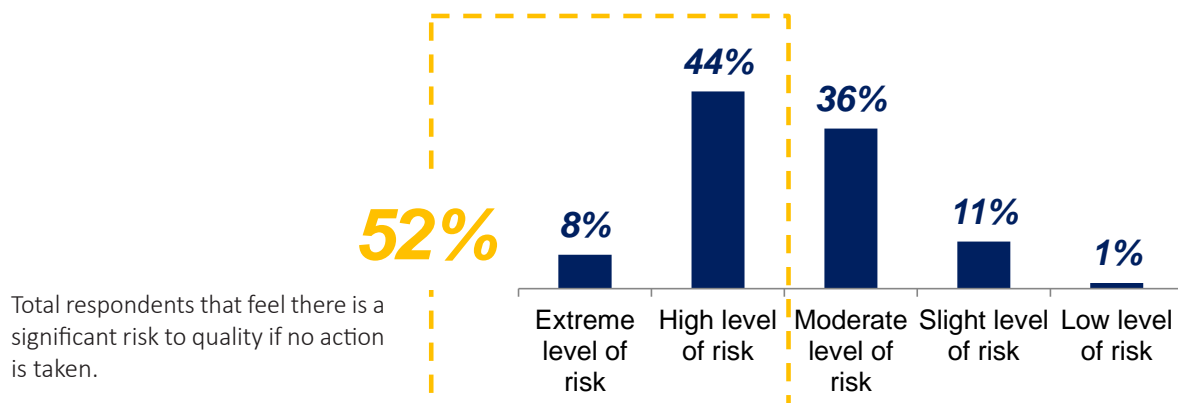Source: Deloitte/AIAG Quality 2020 Study

Concerns Related to Problem Solving

Almost two-thirds of respondents feel their organizations are at best moderately capable at Problem Solving. More than half see significant risk if no action is taken to close the gap between where the industry is today versus where the industry should be.

How capable is your organization at Problem Solving?

Category	OEM	Supplier	Total
Not at all capable	0%	1%	1%
Somewhat capable	18%	11%	13%
Moderately capable	50%	51%	50%
Significantly capable	29%	32%	31%
Extremely capable	3%	5%	5%

■ OEM ■ Supplier ■ Total

64%

Total respondents that indicate their organizations are at best moderately capable at Problem Solving.

Level of risk if no action is taken

Extreme level of risk	High level of risk	Moderate level of risk	Slight level of risk	Low level of risk
8%	44%	36%	11%	1%

52%

Total respondents that feel there is a significant risk to quality if no action is taken.

Source: Deloitte/AIAG Quality 2020 Study
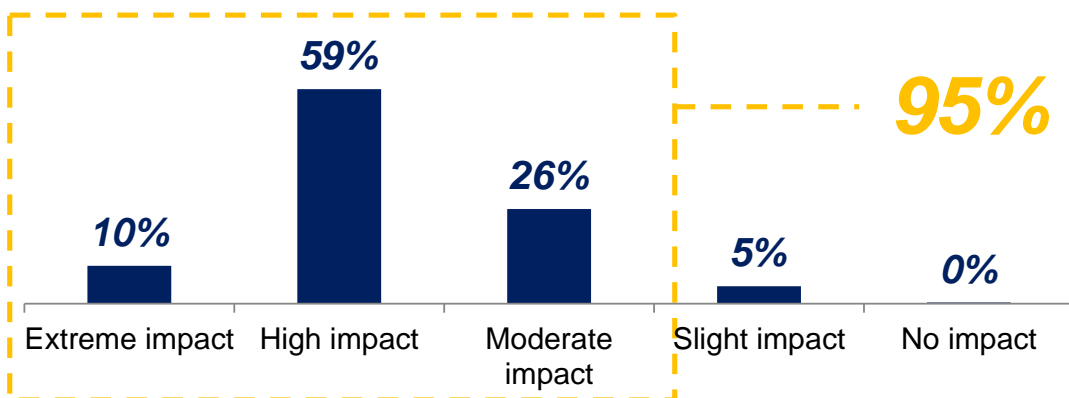
Concerns Related to Problem Solving

OEMs and suppliers almost unanimously agree that closing the gap is not easy, but doing so would have a significant level of impact on improving quality.

Level of difficulty to close the gap

Extreme level of difficulty	High level of difficulty	Moderate level of difficulty	Slight level of difficulty	Low level of difficulty
2%	30%	56%	11%	1%

88%
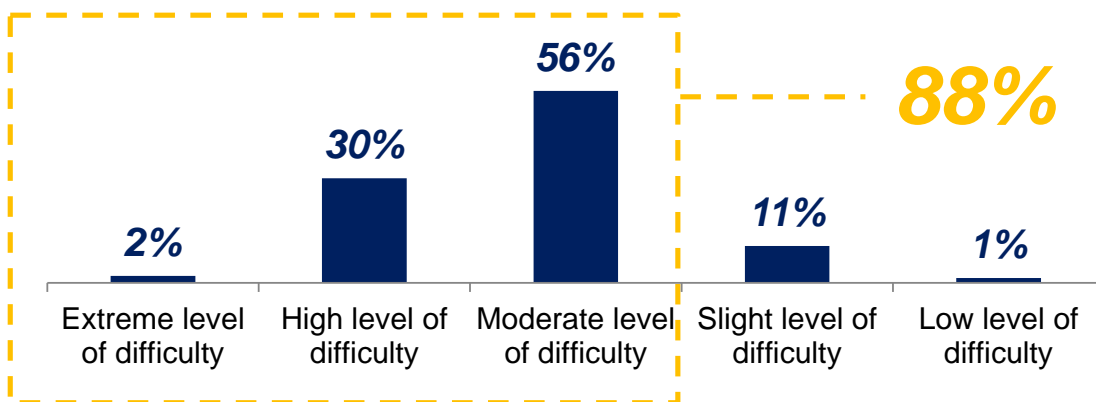
Level of impact that could result from closing the gap

Extreme impact	High impact	Moderate impact	Slight impact	No impact
10%	59%	26%	5%	0%

95%

Source: Deloitte/AIAG Quality 2020 Study

Although difficult to solve, the importance respondents placed on Problem Solving, and the potential level of impact, positions this issue as a priority.

Concerns Related to Customer-Specific Requirements

OEM and supplier rankings differed among the top reasons why CSR is important to improving quality in the automotive industry.

Top reasons why OEMs and suppliers believe CSR is important

Reasons	OEM	Supplier
Impacts ability to standardize business processes and systems	5	1
Impacts ability to manage customer expectations and relationships	1	2
Impacts ability to implement operational efficiencies	3	3
Impacts ability to manage profitability	4	4
Impacts ability to manage, monitor, and respond to quality-related events	2	5

Source: Deloitte/AIAG Quality 2020 Study

"Every customer has their own quality system. TS certification means nothing, since I have to do everything uniquely to every customer's unique standard."
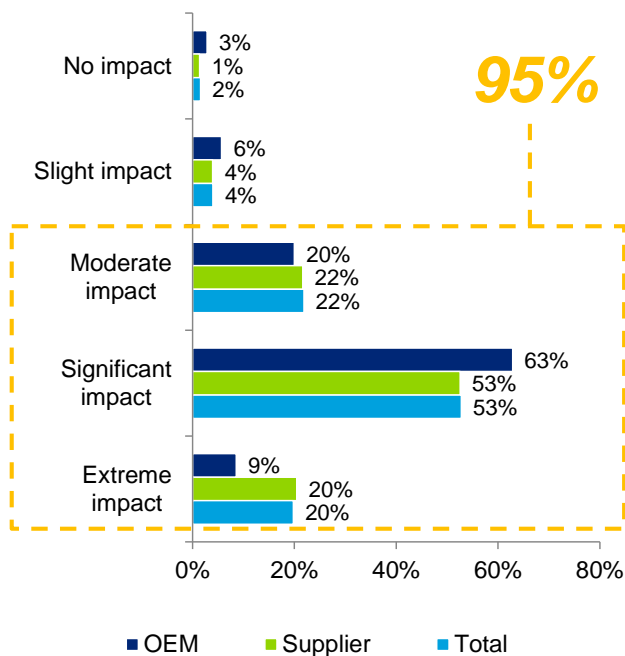
— Survey response to ranking the top reason why this issue is important
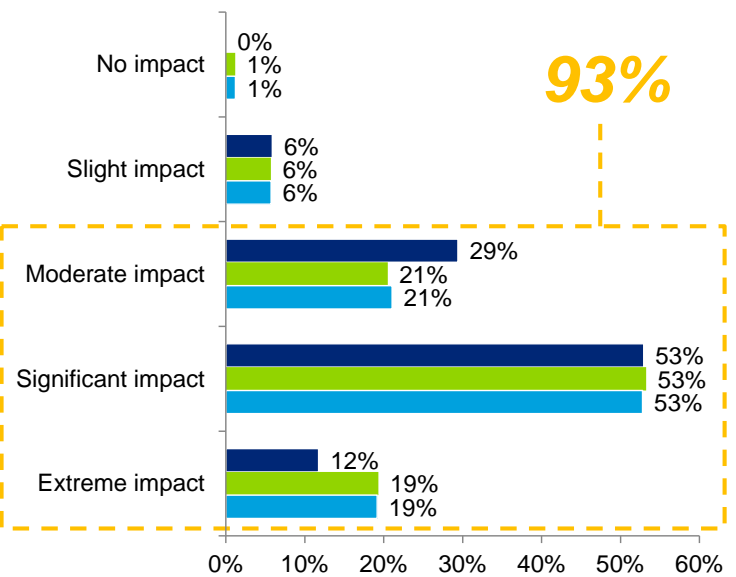
Concerns Related to Customer-Specific Requirements

OEMS and suppliers overwhelmingly agree that automakers would benefit from having one consolidated set of OEM and Tier 1 CSR requirements, but...

Level of impact from the creation of a consolidated set of OEM CSR requirements

Impact	OEM	Supplier	Total
No impact	3%	1%	2%
Slight impact	6%	4%	4%
Moderate impact	20%	22%	22%
Significant impact	63%	53%	53%
Extreme impact	9%	20%	20%

95%

Level of impact from the creation of a consolidated set of Tier 1 CSR requirements

Impact	OEM	Supplier	Total
No impact	0%	1%	1%
Slight impact	6%	6%	6%
Moderate impact	29%	21%	21%
Significant impact	53%	53%	53%
Extreme impact	12%	19%	19%

93%

■ OEM ■ Supplier ■ Total

Source: Deloitte/AIAG Quality 2020 Study

Concerns Related to Customer-Specific Requirements

...respondents also overwhelmingly felt that the degree of difficulty required to change QMS standards or requirements would be significant.

Level of difficulty required to change current QMS standards or requirements
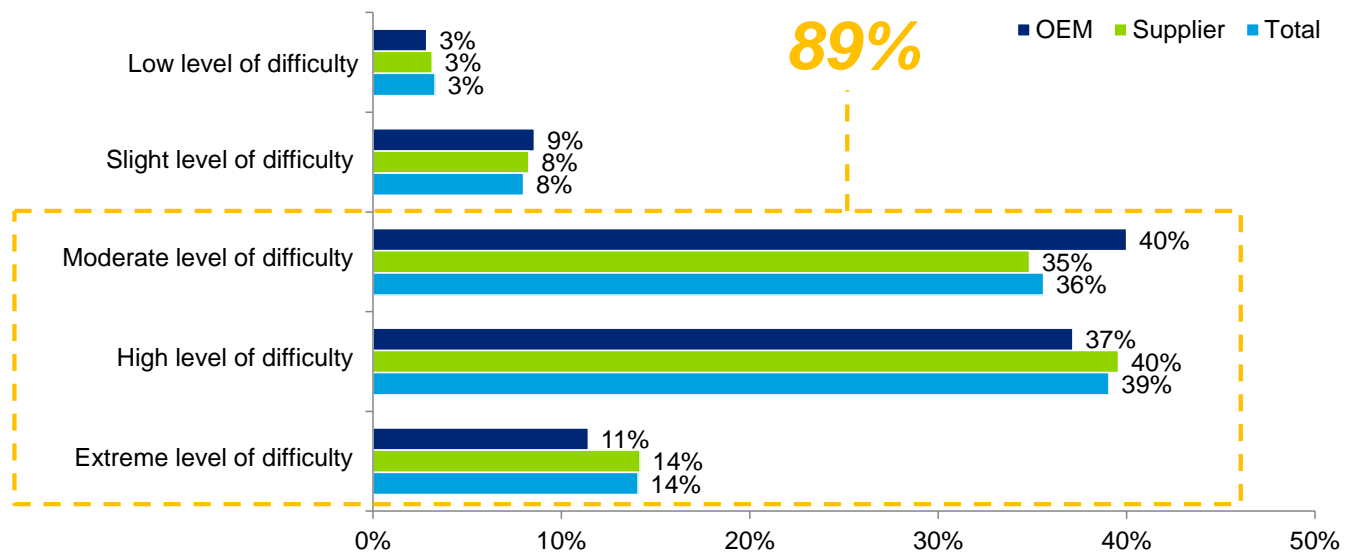
Source: Deloitte/AIAG Quality 2020 Study

Despite expected difficulty, the near unanimous alignment from respondents on benefits resulting from a single set of requirements indicates collaboration opportunities.

Concerns related to Quality Management System

Respondents agree that *standardization is the #1 area impacted* by complex and redundant QMS requirements, which also impacts operational efficiencies, relationships, and ability to respond to quality-related events.

Top reasons why QMS is important

Reasons	OEM	Supplier
Impacts ability to standardize your business processes and systems	1	1
Impacts ability to implement operational efficiencies	5	2
Impacts ability to manage customer expectations and relationships	3	3
Impacts ability to manage, monitor, and respond to quality-related events	2	4
Impacts ability to manage profitability	4	5

Source: Deloitte/AIAG Quality 2020 Study

"Standardize. Standardize. Standardize. It is nuts to try to maintain eight different Customer-Specific quality management systems in addition to ISO-TS 16949. And if each customer is mandating their own particular QMS, what is the point of ISO-TS?"

– Survey response to what long-term concerns may impact quality

Concerns related to Quality Management System

On a per-site average, respondents invest 116 workdays annually to comply with QMS requirements, and forecast over 40 percent reduction if complexity and redundancy are reduced.

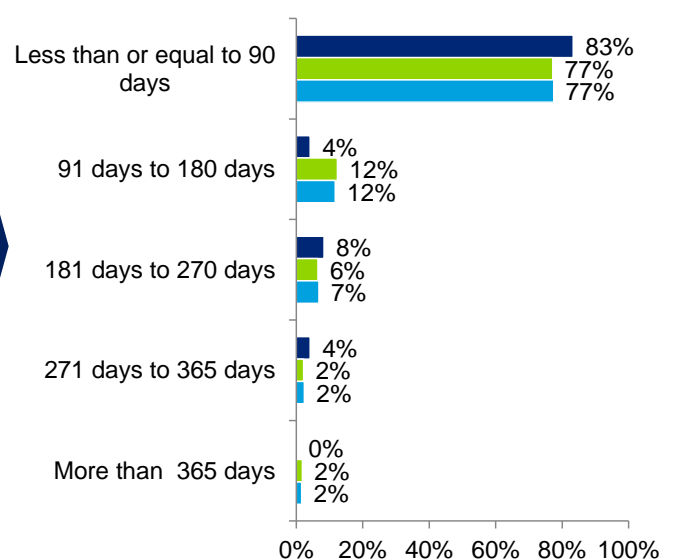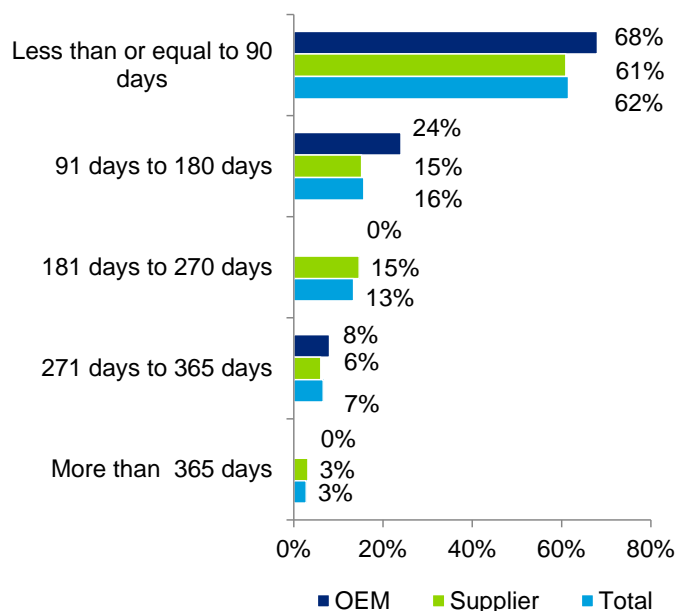## Average workdays annually to comply with all QMS requirements

OEM	Supplier	Total
83	120	116

Opportunity: 2.7M workdays*

Average workdays annually if complexity and redundancy was reduced

OEM	Supplier	Total
57	69	67

* Per-site average x 55,000 TS-certified sites

	OEM	Supplier	Total
Less than or equal to 90 days	68%	61%	62%
91 days to 180 days	24%	15%	16%
181 days to 270 days	0%	15%	13%
271 days to 365 days	8%	6%	7%
More than 365 days	0%	3%	3%

	OEM	Supplier	Total
Less than or equal to 90 days	83%	77%	77%
91 days to 180 days	4%	12%	12%
181 days to 270 days	8%	6%	7%
271 days to 365 days	4%	2%	2%
More than 365 days	0%	2%	2%

■ OEM ■ Supplier ■ Total

Source: Deloitte/AIAG Quality 2020 Study

Concerns related to Quality Management System

Respondents spend $100,225 annually per site to comply with QMS requirements, and project savings of nearly $50,000 per site if complexity and redundancy are reduced.

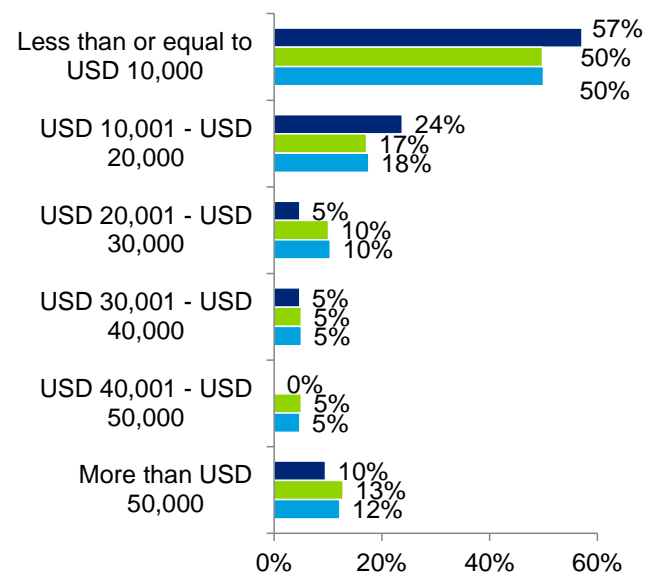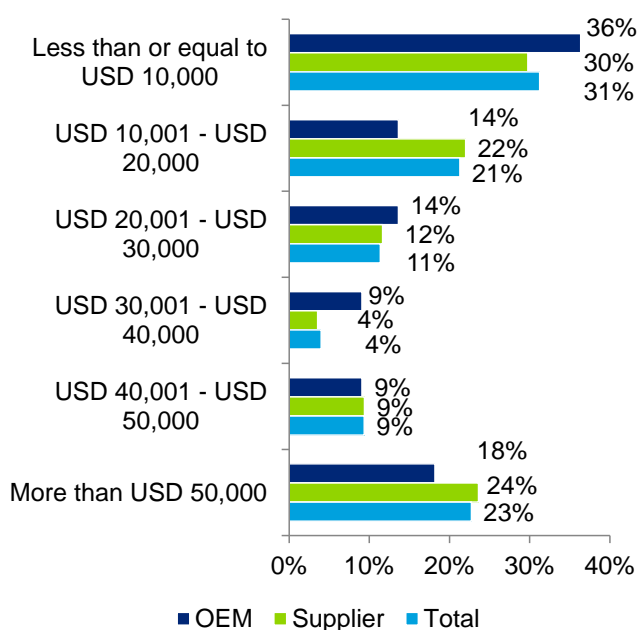## Approximate total average expenses related to all external audits

OEM	Supplier	Total
$65,750	$104,734	$100,225

Opportunity: $3.5B+*

Approximate average total expenses if complexity and redundancy was reduced

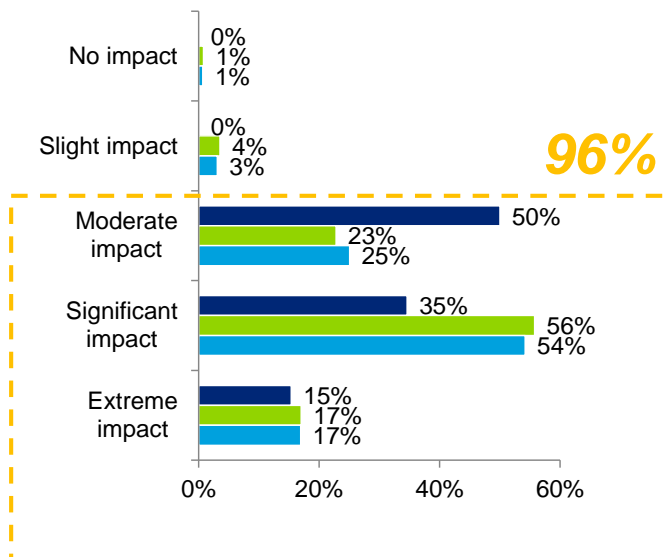| OEM	Supplier	Total
$32,029	$51,397	$51,189

* Per-site average cost including labor from prior page x 55,000 TS-certified sites

	OEM	Supplier	Total
Less than or equal to USD 10,000	36%	30%	31%
USD 10,001 - USD 20,000	14%	22%	21%
USD 20,001 - USD 30,000	14%	12%	11%
USD 30,001 - USD 40,000	9%	4%	4%
USD 40,001 - USD 50,000	9%	9%	9%
More than USD 50,000	18%	24%	23%

■ OEM ■ Supplier ■ Total

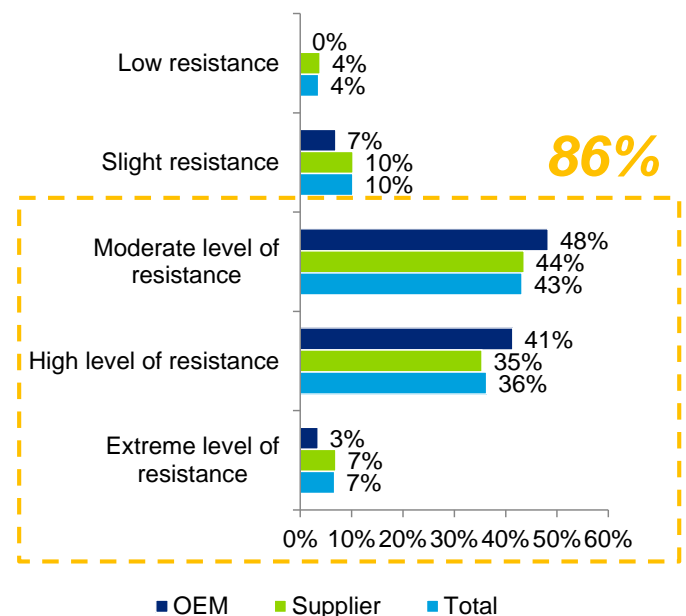|	OEM	Supplier	Total
Less than or equal to USD 10,000	57%	50%	50%
USD 10,001 - USD 20,000	24%	17%	18%
USD 20,001 - USD 30,000	5%	10%	10%
USD 30,001 - USD 40,000	5%	5%	5%
USD 40,001 - USD 50,000	0%	5%	5%
More than USD 50,000	10%	13%	12%

Source: Deloitte/AIAG Quality 2020 Study

Concerns related to Quality Management System

Despite the indicated opportunity to reduce effort and cost, and the potential impact from improving standardization and reducing complexity, respondents overwhelmingly feel there would be a significant degree of difficulty in changing current QMS standards.

Impact that could result from improved standardization and reduced complexity of standards and requirement

	OEM	Supplier	Total
No impact	0%	1%	1%
Slight impact	0%	4%	3%
Moderate impact	50%	23%	25%
Significant impact	35%	56%	54%
Extreme impact	15%	17%	17%

96%

Level of difficulty to change current QMS standards or requirements

	OEM	Supplier	Total
Low resistance	0%	4%	4%
Slight resistance	7%	10%	10%
Moderate level of resistance	48%	44%	43%
High level of resistance	41%	35%	36%
Extreme level of resistance	3%	7%	7%

86%

■ OEM ■ Supplier ■ Total

Source: Deloitte/AIAG Quality 2020 Study

Concerns related to Quality Management System

Respondents agree on the top actions to improve QMS, and are aligned on the potential implications if no changes are implemented.

Top actions that have the most potential for improving the effectiveness and efficiency of current QMS requirements

1. Reducing TS requirements to only those elements with direct impact on product quality and reliability

2. Determining audit schedules based on performance

3. Combining TS and VDA requirements

Top issues or concerns if no change is made

Issues	OEM	Supplier
The need to maintain multiple systems in support of multiple standards	2	1
Increase in number of customer-specific requirements (OEM and Tier 1)	1	2
Poor correlation between certification(s) and actual performance	3	3

Source: Deloitte/AIAG Quality 2020 Study

Concerns related to Product Development

Respondents agree that assuring product compliance is the top reason why this issue is important. OEMs also feel this issue is important to innovation and managing recalls, while suppliers place greater emphasis on impact to profitability and operations.

Top reasons why Product Development is important

| Reasons	OEM	Supplier	Total
Impacts your ability to assure product compliance	**1**	**1**	**1**
Impacts your ability to manage profitability	**6**	**2**	**2**
Impacts your ability to implement operational efficiencies	**3**	**3**	**3**
Impacts your ability to drive innovation and collaboration	2	4	4
Impacts your customer relationships	7	5	5
Impacts your ability to manage, monitor, and respond to quality-related events	3	6	6
Impacts your ability to manage and leverage resources	8	7	7
Impacts your ability to achieve global scale	5	8	8
Impacts your corporate image	8	9	9
Other	10	10	10

Source: Deloitte/AIAG Quality 2020 Study

"Supply chain risk management and Tier-N management will become one critical capacity in global automotive OEM and OES companies, and this is not yet fully understood."

– Survey response to what long-term concerns may impact quality

Concerns related to Product Development

Respondents overwhelmingly feel they are capable in product development, agree on improvement opportunities, and agree on where risks exist if no action is taken.

Current level of capabilities to design, develop, validate, and launch new products effectively

88%

Legend: ■ OEM ■ Supplier ■ Total
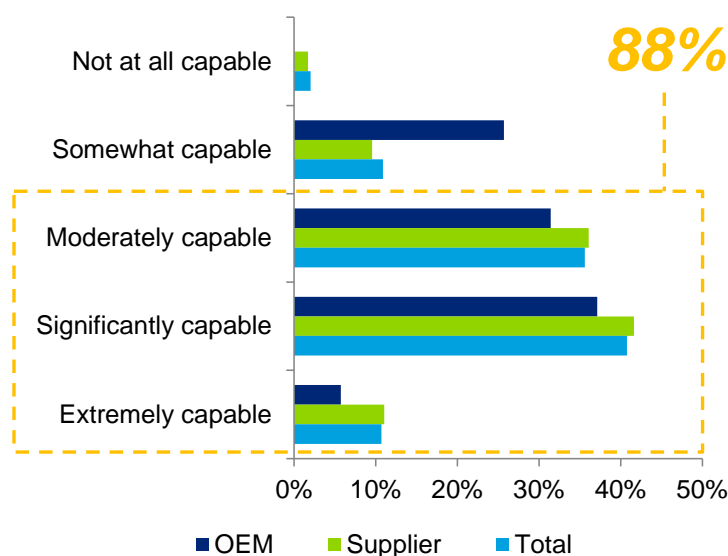
Top improvement actions the industry could pursue to improve upon current performance

Actions	OEM	Supplier
Design in quality	**1**	**2**
Design for manufacturability	**2**	**1**
Lean product development	5	3
System DFMEA	3	4
Design for Six Sigma	4	5

Top sources of complexity and risk if no action(s) is/are undertaken to improve

Sources	OEM	Supplier
Unrealistic specifications	**1**	**1**
System validation occurs at launch	**2**	**2**
Continuous launch cycles	4	3
Global platforms	3	4
Advanced technology software	5	5

Source: Deloitte/AIAG Quality 2020 Study

Concerns related to Loss of Experience

Respondents believe this issue will impact their ability to avoid repeating past mistakes and ability to implement operational efficiencies. OEM concerns extend to the impact on talent development, problem solving, and management of quality-related events.
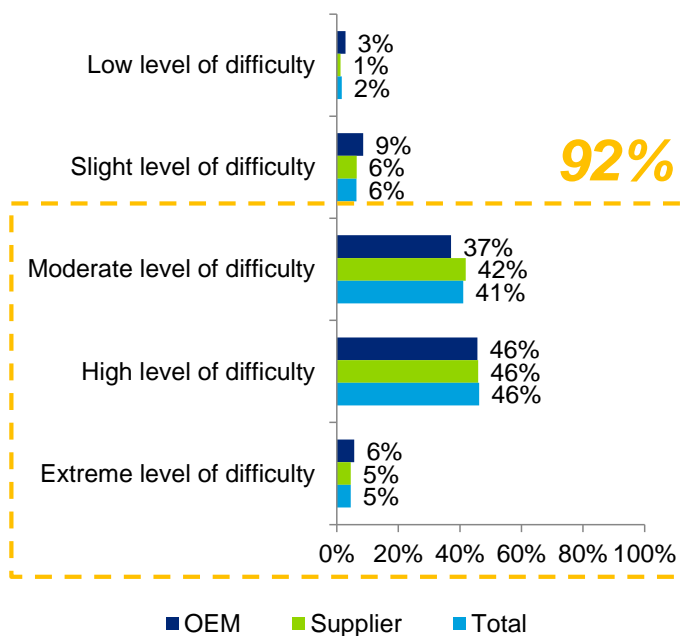
Top reasons why Loss of Experience is important

Reasons	OEM	Supplier	Total
Impacts your ability to avoid repeating past mistakes	5	**1**	**1**
Impacts your ability to implement operational efficiencies	**1**	**2**	**2**
Impacts your ability to develop new talent	**2**	**3**	**3**
Impacts your ability to solve problems	**2**	4	4
Impacts your ability to manage, monitor, and respond to quality-related events	**2**	5	5
Impacts your ability to manage and leverage resources	6	6	6
Impacts your ability to manage profitability	8	7	7
Impacts your ability to drive innovation and collaboration	9	8	8
Impacts your brand and/or customer relationships	7	9	9
Impacts your ability to achieve global scale	9	10	10
Other	11	11	11

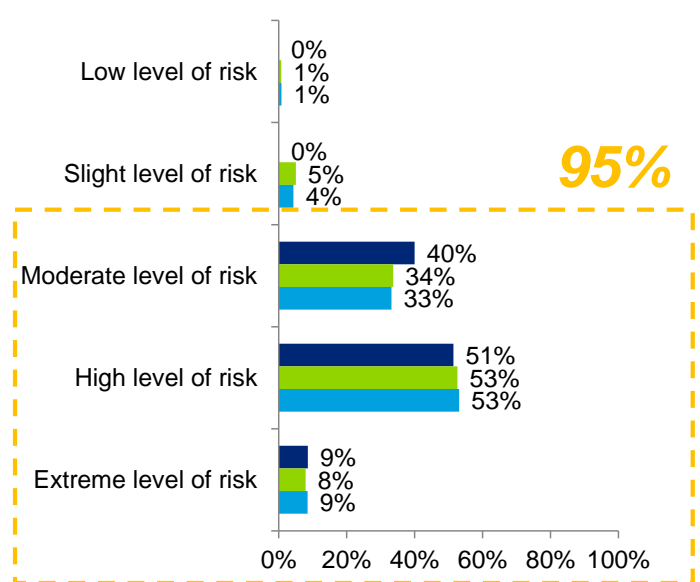Source: Deloitte/AIAG Quality 2020 Study

Concerns related to Loss of Experience

Respondents overwhelmingly feel that while it is difficult to address the issue of loss of experience, not addressing the issue is a significant risk to the automotive industry.

Level of difficulty to reduce the risks associated with the loss of knowledge/expertise.

Level	OEM	Supplier	Total
Low level of difficulty	3%	1%	2%
Slight level of difficulty	9%	6%	6%
Moderate level of difficulty	37%	42%	41%
High level of difficulty	46%	46%	46%
Extreme level of difficulty	6%	5%	5%

92%

Legend: ■ OEM ■ Supplier ■ Total

Estimated level of risk to the industry if no action is taken to address the issue of loss of experience

Level	OEM	Supplier	Total
Low level of risk	0%	1%	1%
Slight level of risk	0%	5%	4%
Moderate level of risk	40%	34%	33%
High level of risk	51%	53%	53%
Extreme level of risk	9%	8%	9%

95%

Source: Deloitte/AIAG Quality 2020 Study

"**Companies are trying to make production departments self-sufficient to control quality, leaving minimum quality personnel. But they do not prepare operators well enough to perform quality control, and if there are turnovers, the experience is lost at all levels.**"

— Survey response to what long-term concerns may impact quality
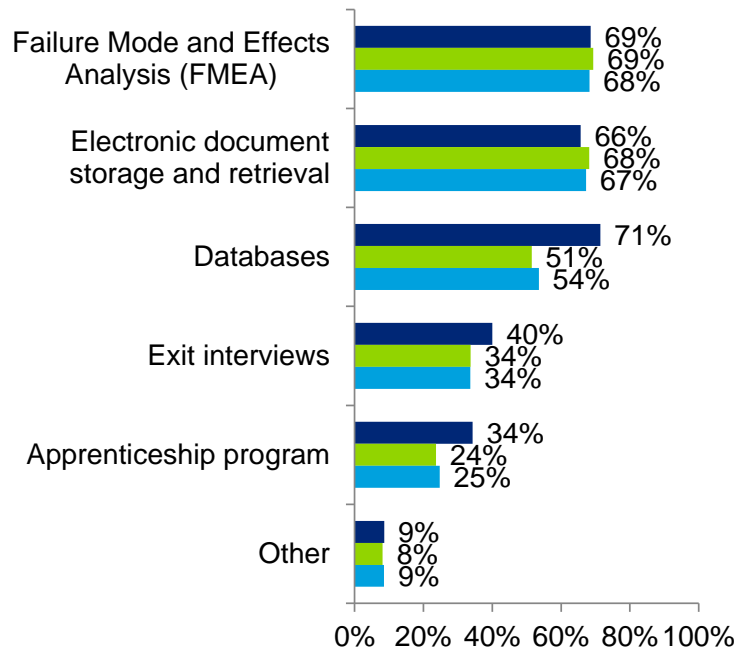
Concerns related to Loss of Experience

Over three-quarters of respondents rate their organizations, at best, moderately capable of preserving and transferring knowledge. However, over one-third of OEM respondents report somewhat or no capability.

Capability of an organization to preserve and transfer knowledge

Category	OEM	Supplier	Total
Not at all capable	9%	5%	5%
Somewhat capable	29%	22%	22%
Moderately capable	40%	55%	55%
Significantly capable	23%	17%	17%
Extremely capable	0%	2%	2%

82%

■ OEM ■ Supplier ■ Total
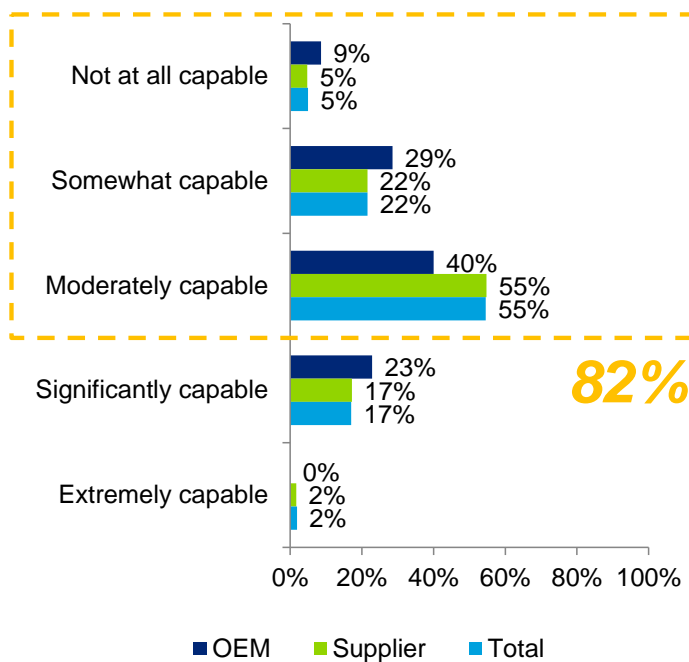
Methods used to preserve and transfer knowledge

Method	OEM	Supplier	Total
Failure Mode and Effects Analysis (FMEA)	69%	69%	68%
Electronic document storage and retrieval	66%	68%	67%
Databases	71%	51%	54%
Exit interviews	40%	34%	34%
Apprenticeship program	34%	24%	25%
Other	9%	8%	9%

Source: Deloitte/AIAG Quality 2020 Study

Issues by Function

From the list below, respondents* were asked to identify their most important issue for improving quality in the global automotive industry. (1 - Most important issue, 2 - Second most important issue, etc.)

	Engineer	QMS	Supplier Quality	Warranty*	Design	Product Quality	Manufacturing	Service	Purchasing	Training	Finance	Sales	IT	Other
Loss of Experience	2	6	5	4	5	4	3	5	2	7	5	4	3	3
Problem Solving	3	2	2	7	1	1	1	3	6	1	2	5	4	1
Core Tools	8	8	7	9	8	7	8	9	9	4	10	10	9	8
Metrics	9	10	10	10	10	10	10	6	10	5	6	9	10	9
Quality Management System (QMS)	7	3	3	8	5	2	7	1	8	2	2	6	5	5
Customer Specific Requirements (CSR)	5	1	4	6	4	4	2	1	3	7	1	2	1	2
Supplier Management	4	7	1	2	3	8	6	7	1	7	4	3	2	6
Change Management	6	4	6	5	7	6	5	8	4	3	8	7	5	7
Product Development	1	5	8	3	2	2	4	4	4	6	7	1	7	4
Warranty	10	9	9	1	9	9	9	9	7	7	9	8	8	10

* Warranty functional rankings based on only supplier responses. Warranty was not a function represented among OEM respondents.

- Most important
- 2nd most important
- 3rd most important

Key
Takeaways

Collaboration is crucial. Consistently, respondents felt significant levels of difficulty would be encountered in driving change, yet all agree significant benefit would result.

Start with the talent agenda. Problem Solving ranked #1, and Loss of Experience was in the Top 5 for OEMs and suppliers. Although difficult to solve, respondents agreed the level of impact from improving would be significant.

Standardization. Standardization. Standardization. The root cause of many concerns noted by respondents is complexity and redundancy. Implementing consistent standards will address CSR and QMS concerns, as well as others, too.

Keep it moving. Respondents agreed on Product Development capabilities and areas of improvement. Cycles are expected to continue shortening; collaboration is critical to ensuring steady speed to market while addressing customization requests.

Share the burden. The effort to implement improvements should be shared across the entire supply chain, as should the cost (time, resources, and money) of quality.

Analytics to identify the roots. Effective identification of root causes was consistently cited by OEMs and suppliers. Leverage advanced predictive analytics capabilities to sift through big data and improve root cause analysis capabilities.

PATH GOING FORWARD

Arguably, in light of the complexity of today's vehicles, the global automotive industry has reached some of the highest levels of quality in its history. The industry is also delivering record vehicle volumes with significantly fewer suppliers and fewer resources to meet ever-increasing quality and performance demands.

"Our industry has made phenomenal progress in the quality and reliability of the vehicles we produce," says AIAG's Scot Sharland, "despite a significant increase in overall product complexity and dramatic shift in our manufacturing footprint to places in the world absent of a solid industrial infrastructure and experienced workforce."

Sharland points out that while the industry has deployed "very robust processes" and supplemented them with "great tools to ensure that we are correctly applying them," the industry needs to accelerate basic knowledge transfer throughout its global supply chain and make "a renewed, focused, and industry-wide commitment to use the tools correctly and follow the processes we've developed."

Global markets, global vehicle platforms, new players in the automotive ecosystem as a result of technology innovation, and the ever-increasing demands of global consumers will continue to pressure the industry for continued improvement in the performance and reliability of the vehicles produced. The results of the Quality 2020 study substantiate agreement that there are definite opportunities for improvement in the industry's quality systems, standards, and practices. This is not a surprising result. Many of the systems, processes, and standards within the automotive industry were developed when the industry was much more regionalized within the geographic areas of the Americas, Europe, Asia, and rest of the world.

Today, a truly international economy has erased those boundaries with global manufacturing, global suppliers and customers, and global vehicle platforms. It is a significantly different landscape, and therefore, an opportune time to make the transition from a global industry managed by regional standards to a global industry managed by a global standard.

It's also clear from Quality 2020 respondents that any industry actions in this direction need to be joint initiatives between OEMs and suppliers. Solutions developed in isolation will maintain the status quo and will not facilitate driving the improvement that would address the concerns identified through this study.

Based on the Quality 2020 results, it's clear that the industry's focus on problem solving needs to be more disciplined — and also that problem prevention must rise higher on the industry's list of quality-related priorities. In fact, some open comments submitted by survey respondents suggest that the challenges with problem solving are exacerbated by the industry's focus on problem appraisal as opposed to problem prevention.

"The industry's first priority should be prevention, but suppliers and OEMs also need problem-solving capability," *says GM's Bill Hurles. "While many tools are available, there's inconsistent application of them and an ineffective ability to find the root cause and correct many problems efficiently, and this results in waste and risk."*

The Quality 2020 results suggest that problem solving is just as much about an organization's culture as it is about the tools available to its quality team. "We're focused on developing the best problem-solving tools, but if the focus isn't on creating a prevention-oriented culture, then the industry can't get where it needs to be," says Global Performance Partners' David Schultz. "And where we need to be is doing the right things right every single time."

Another interesting result from Quality 2020 is the feedback on Customer-Specific Requirements. Both OEMs and suppliers ranked CSRs as a top issue impacting quality — but for very different reasons. In essence, suppliers are concerned about the number

and complexity of CSRs, whereas OEMs in the Quality 2020 study are more concerned that their CSRs are not being followed and adhered to.

"We understand the OEMs' views about their customers, but the CSRs have no impact on the vehicle to the consumer," says Magna's Michael Sinnaeve. "What CSRs protect are the design specifications and the manufacturing of that component and vehicle assembly. A common CSR between the OEMs would benefit the OEMs both from a quality and a cost perspective."

Encouragingly, both groups are in agreement that the current state of CSRs impacts their ability to manage customer expectations and relationships, as well as their ability to manage and respond to quality-related events. Quality 2020 results clearly identify potential advantages through consolidation and alignment of both OEM and Tier 1 specific requirements. Despite the challenge inherent in any consolidation attempt, the potential benefits clearly justify the effort required.

"OEMs and suppliers must focus on the outcome, not on the structure," says Global Performance Partners' David Schultz. "If consolidated CSRs benefit the end-user, then resistance should not be our issue. The important questions are: What does the customer need, want, and expect? And what prevention-oriented processes and culture do we need to make that happen?"

"There could be significant gains in commonizing CSRs," agrees GM's Bill Hurles, "and one common set of requirements should be our goal. But realistically, if we could reduce the variation by 50 percent in the next 12 months, that would be a huge benefit to both OEMs and suppliers. I think that is possible, and AIAG is in a great position to help achieve that target."

The Quality 2020 study suggests that QMS offers similar opportunities. "Currently, we have a QMS audit scheme that is pretty much a one-size-fits-all," points out Dana's David Kneisler. "There's no consideration for performance at any individual site, which means that regardless of whether a site does extremely well, they still see the same level of complexity in the current requirements and audit scheme."

Kneisler doesn't see the need for an overhaul of the QMS audit scheme, but he believes that in the interest of efficiency and best-practice sharing, it is "time to step back a little bit, look at what we have, and see if there's not a way to tweak the system for efficiencies that would allow us to reward those plants and facilities that are doing extremely well."

The goal, he emphasizes, is not to reduce quality resources — rather, it is to reallocate those resources to the plants that have had more of a challenge in performing to OEM standards. "It's more about finding opportunities for efficiencies so that we can redeploy resources toward areas of need. That's true for both QMS and CSR," he says.

As for respondents' concerns about the industry's loss of experience, Sharland says AIAG has already begun an initiative designed to assess the current quality knowledge gap for the new generation of automotive professionals entering the industry worldwide. "AIAG is poised to provide further insight into regional employee population variation with a more data-driven, customized-training approach to closing the gaps," he says. "Surveys, assessments, certifications, standards, best practices, and training are all integral parts of AIAG's strategic thought leadership in the industry."

The Quality 2020 study is potentially a watershed moment for AIAG and the automotive industry. For more than 30 years, AIAG has worked collaboratively with its member automakers, suppliers, service providers, government entities, and academia to address the industry's pain points and drive continual improvement. The process and due diligence behind the Quality 2020 study has provided a credible opportunity to hear the voice of the entire industry. Furthermore, with its numerous long-standing relationships with other influential automotive associations, AIAG is in a unique position to facilitate the industry's use of the Quality 2020 findings and data.

AIAG's industry leadership maintains that the focus must be on actionable items that will truly make a difference in the automotive industry's quality performance and efficiencies. In the coming months, AIAG member companies will decide which opportunities, identified through the Quality 2020 study, will result in specific calls-to-action.

If we are to drive improvements that will help sustain the quality levels demanded of our industry, Quality 2020 cannot end up as an academic exercise or another industry white paper. AIAG will need the support of automotive professionals and companies in any attempt to address the industry's top five concerns identified through this survey: Problem Solving, Customer-Specific Requirements, Quality Management Systems, Product Development, and Loss of Experience.

"I think this is the right blueprint forward, and AIAG can play a significant role by coordinating and leading the industry's efforts," says GM's Bill Hurles. "AIAG is a knowledgeable, neutral party that can find common ground and help overcome resistance. It can also help the industry be time efficient and refrain from trying to take on everything at once."

Dana's David Kneisler agrees that AIAG is the logical partner and can facilitate the industry's need to get past any barriers to change. "This is not about challenging current systems," he says. "But we've come such a long way over the past two decades, and given the maturity of the system, it is time to step back and reevaluate all of the Customer-Specific requirements and quality management systems and bring some commonality where we can.

"At the minimum, we need to simplify where possible, to benchmark, and potentially drive common approaches across the industry," Kneisler continues. "Suppliers understand the need to follow existing procedures, but can we do so more efficiently — and probably more effectively."

As an industry thought leader, AIAG has spent the last 24 months developing, deploying, and analyzing comprehensive enterprise and practitioner interviews and surveys to better understand the industry's extended supply chain and document the quality related risks and challenges it now faces.

"Collaboration, standardization, and pervasive deployment of quality knowledge and allied tools are the only ways we can successfully mitigate risks and deliver more predictable outcomes on a global basis," says AIAG's Scot Sharland. "The good news is that AIAG is uniquely positioned to support the industry and totally committed to help make it happen — faster."

"AIAG is the natural forum, given that it is the only organization with the breadth of OEMs and Tier 1s through Tier Ns in its membership," agrees Dana's David Kneisler. "AIAG is best suited to look for opportunities for efficiencies.

"And remember, we're not looking to roll back quality," he adds. "We are looking for opportunities to simplify where we can, address best practices, and standardize where possible. More proactive quality measures allow our professionals to address the areas of greatest need.

"We aren't challenging what we have or how we got here," Kneisler concludes. "We're simply stating that it's time to reassess if there is a better, more effective, and efficient way to do the same things that we are trying to accomplish in quality."

Acknowledgements

AIAG

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