15 April 2020

COVID-19 Automotive R&D Impact Survey

Main findings

-13%

Average reduction in 2020 development budget

-8%

Average reduction in 2021 development budget

Tech Deployment Delays

Listed as the main impact by 54% of respondents

1 in 5

Respondents think the R&D impact will last longer than 12 months

-17%

Average reduction in 2020 advanced research budget

-12%

Average reduction in 2021 advanced research budget

E-mobility Technology

The most impacted according to 22% of respondents

only 4%

Respondents expect no reduction or delay to development projects

Background

The speed and scale of COVID-19 social and economic fallout is quickly materializing in concerns about the future recovery of vehicle demand with the associated consequences on OEMs' and suppliers' investment decisions. With cashflow drying up due to sales activity grinding to a halt in core markets and little prospect for an imminent "return to normal", automakers and suppliers are looking to shore up their finances by preserving cash and other non-critical expenses. This context combined with potential adjustments to the regulatory framework on key automotive aspects in the areas of e-mobility, autonomy and connected car, for example, could potentially have far-reaching implications on the technology deployment as well as short- and medium-term research investment priorities.

The Automotive Supply Chain and Technology Team at IHS Markit has conducted a survey to gather automakers' and suppliers' view on:

- Size of research and development (R&D) budget cuts
- Outsourcing vs. in-sourcing of R&D activities
- Role of start-ups
- Impact on different domain and technology areas
- Regulatory framework changes

Methodology

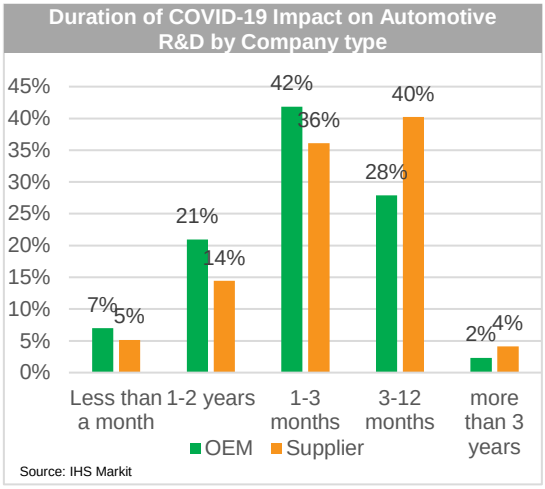
- 140 companies have taken part in the survey, controlling an automotive R&D budget in excess of 70 billion USD as of 2019.
- The Survey was conducted between March 30th and April 9th to capture OEMs' and suppliers' views on the above topics
- 30% of respondents worked at an OEM, the vast majority of these in a research and development or engineering capacity.
- 70% of respondents worked at a supplier. The majority of supplier respondents worked in a sales and marketing function.
- 34% of respondents were based in North America, 34% in Europe and 32% in Asia of which 7% in China, 12% in Japan and Korea, and 12% in India

COVID-19 Impact assessment on Automotive R&D

COVID-19 Impact duration

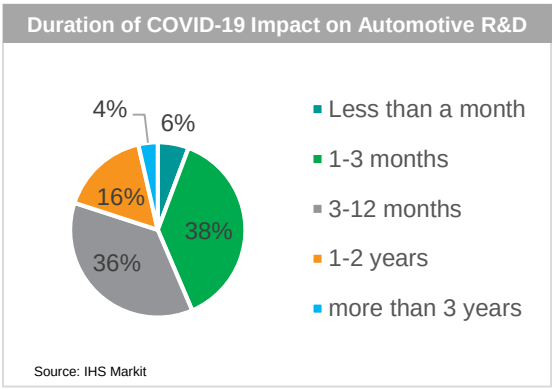
Survey results show OEMs and suppliers clearly expect significant disruption to both R&D as well as sales and production due to the COVID-19 outbreak. Most respondents have indicated that the automotive R&D impact should be concentrated in the coming year, when a major contraction of development and advanced research budgets is expected.

- Interestingly 28% of respondents think COVID-19 will impact revenues beyond the next 12 months, while only 20% indicated that their automotive R&D activities will be impacted beyond the next 12 months. This suggests that OEMs and suppliers might have to retain a sustained R&D investment level despite a weaker revenue outlook beyond 2021.
- Respondents in Asia (China in particular) indicated a greater concern on long term R&D impacts (over 3 years) compared to Europe and North America. Most North American respondents think the impact on R&D will disappear within 3 months.
- OEMs are generally more upbeat about the COVID-19 impact with a higher share of OEM respondents indicating it might be perceived only for 3 months or less (48% OEM vs. 41% supplier).



Measures

As the inevitable impact of revenue loss from COVID-19 works itself through the companies' budgeting processes, some 92% of respondents indicated that R&D budgets are likely to consequently shrink, which may result in a series of cost containment measures being deployed. 1 in 4 respondents indicated that they are postponing projects which are already at a good stage of maturity by six months (24% of respondents) or by one year (18%). As for projects that are at an early or conceptual stage, most respondents expect delays by one year (23%) and in some cases more than one year (11%). Some 13% of respondents also indicated that there is a tangible threat that some early stage R&D project might be cancelled altogether.



- Advanced research projects are expected to be more impacted in both 2020 and 2021 when compared to general product development activities as OEMs will have to prioritize resources for immediate product launches. Survey respondents expect 'Advanced Research projects' funding to be cut by 17% in 2020 and 12% in 2021, while development budgets are expected to be downsized by 12% in 2020 and 8% in 2021. This suggests that following a nefarious 2020 when deep cuts are expected, 2021 should offer a growth story, but not return to pre-COVID-19 levels, which is likely to materialize in 2022 and beyond.
- There are marked differences in the expected cut to R&D budgets by company size. Small* companies appear polarized with a quarter saying that they expected no impact on development budget, but at the same time, nearly 1 in 7 small companies raised the prospect for a cut in excess of 20%.
- North American companies emerge more bullish with regards to 2021 R&D budget cuts, 2 in 3 North American companies expect development budgets to be either unimpacted or be cut by 10% in 2021. On the other hand, European companies appear to be more cautious, with expectations of a cut in excess of 10% of their budget for nearly half of European respondents.

*Company size is defined based on R&D expenditure size. Less than 50M USD in R&D for suppliers, less than 500M USD for OEMs. Medium companies are defined as companies with between 50M USD and 500M USD in R&D budget for suppliers, between 500M and 1.5bn USD for OEMs, large companies are defined as companies with more than 500M USD in R&D budget for suppliers, and more than 1.5bn USD for OEMs.

R&D Insourcing and Start-ups

53%

respondents think investment momentum in automotive start-ups will remain unchanged

9%

Believe it will increase

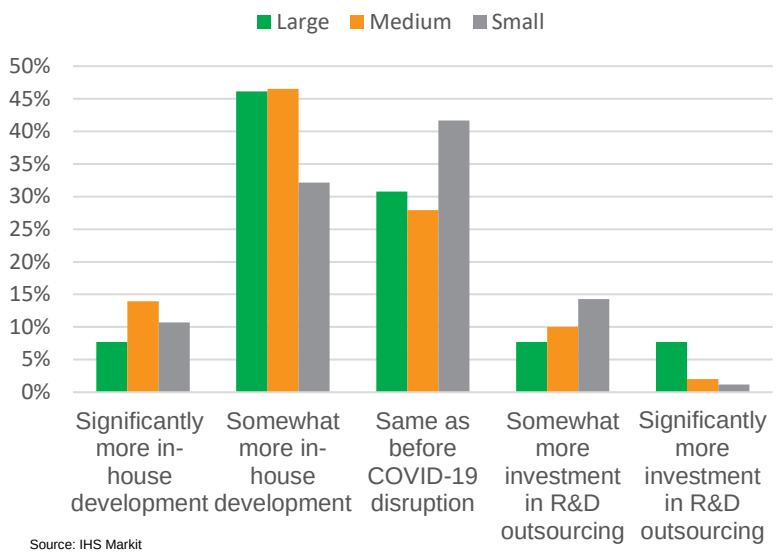
25%

Believe it will decrease

13%

Believe it will STOP

Propensity towards R&D outsourcing vs. insourcing in light of COVID-19



Source: IHS Markit

Respondents to the survey think the post-COVID-19 R&D environment will feature a major recourse to in-house capabilities and development, especially at large and medium-sized OEMs and suppliers.

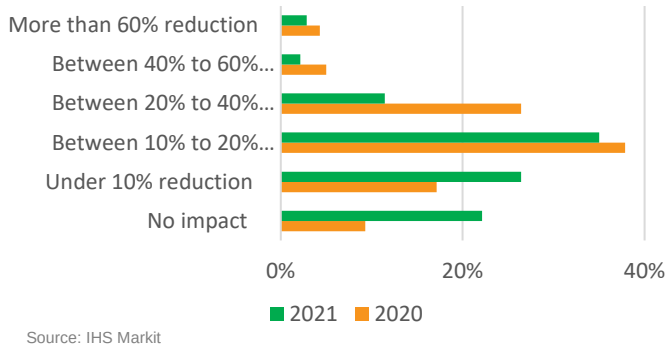
Smaller companies believe their R&D outsourcing levels situation will remain unchanged, with some 14% of smaller companies indicating there might be actually an increase in R&D outsourcing.

Whilst the majority of respondents indicated that they do not expect automotive start-up investment from OEMs and suppliers to change in the post-COVID-19 scenario, there are several respondents voicing concerns about the long-term survival of start-up companies born to complement or bolster research and development activities, particularly in emerging technology areas. One respondent summarized these concerns well

"As venture capital money dries up, many start-ups especially in Lidar development and autonomous driving software will disappear."

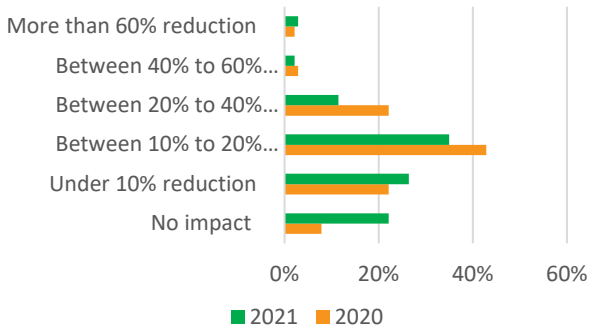
Respondents expect greater "natural selection" among start-up companies in the supply chain space rather than OEM space. They have, however indicated that some of the EV start-up companies that were already struggling in entering the market will not survive given market conditions.

Advanced R&D Budget Reduction



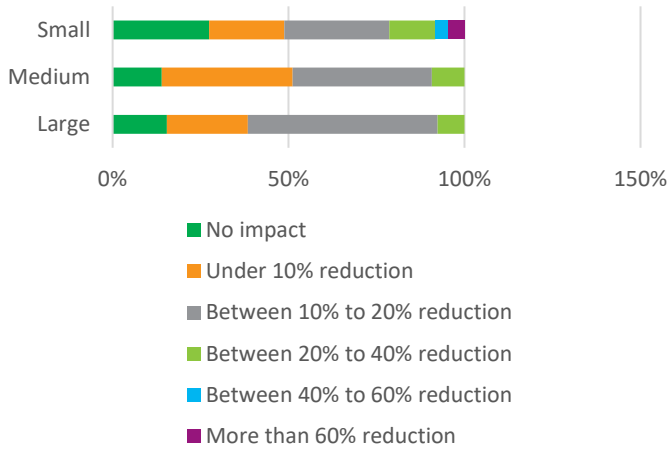
Source: IHS Markit

Development Budget Reduction



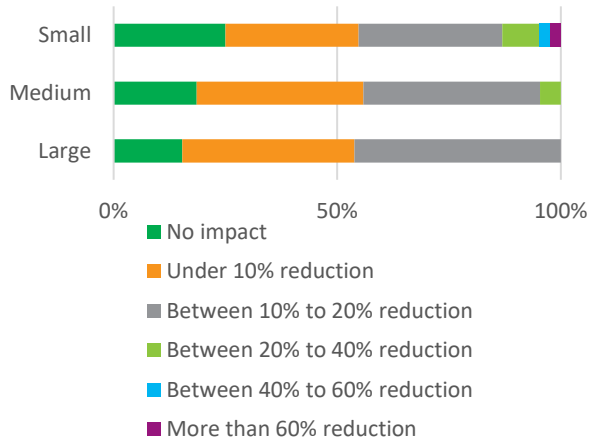
Source: IHS Markit

Advanced R&D Budget Reduction in 2021 by Company Size



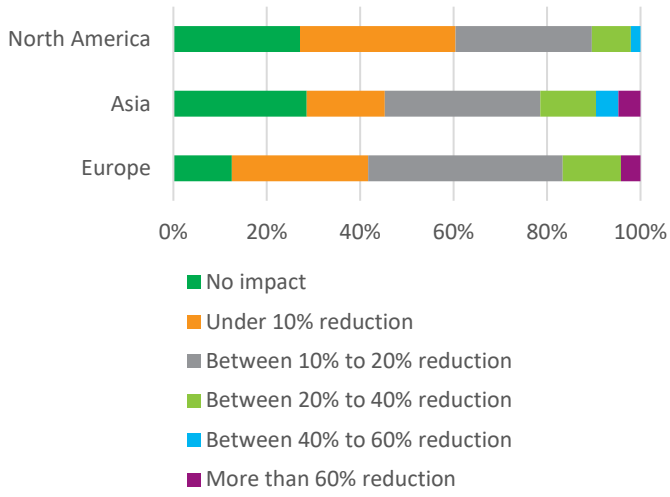
Source: IHS Markit

Development Budget Reduction in 2021 by Company Size



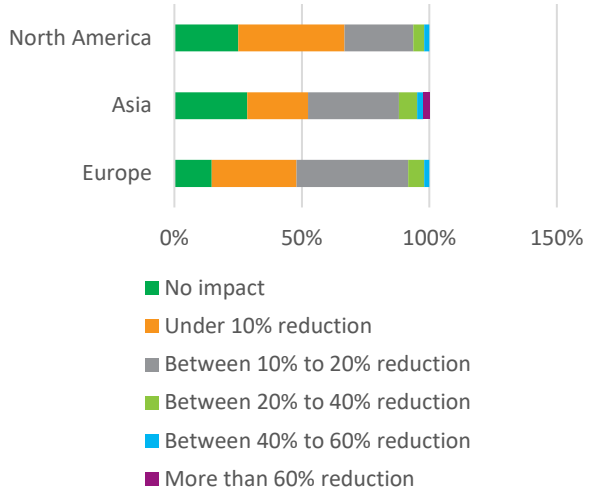
Source: IHS Markit

2021 Advanced R&D Budget Reduction by Region



Source: IHS Markit

2021 Development Budget Reduction by Region



Source: IHS Markit

Impact by domain/technology

1- e-mobility

2- L2+ to L5 autonomy

3- ICE powertrain technology

OEMs

1- e-mobility

2- L2+ to L5 autonomy

3- ICE powertrain technology

Suppliers

1- L2+ to L5 autonomy

2- e-mobility

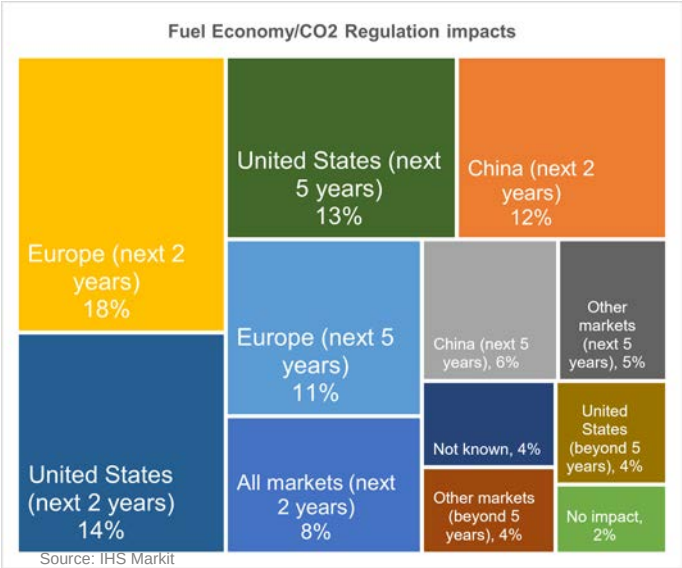
3- Other features

E-Mobility technology around battery, e-motor and power electronics emerges as the area which will be more negatively impacted by COVID-19 according to respondents to our survey (22% of respondents). This seems linked to an expectation that fuel economy/CO_2 regulation is expected to be relaxed particularly in Europe. The same rationale is behind the position of ICE powertrain technology being placed at the third place of this ranking.

There is only one percentage point difference between L2+ to L5 autonomy features vs. e-mobility with 21% respondents indicating a major negative impact from the COVID-19 outbreak in autonomy deployment. It is interesting to note that there are different views on this topic between OEMs and suppliers who participated in the survey. 25% of OEM respondents indicated e-mobility as the most impacted area, while only 19% of suppliers did so.

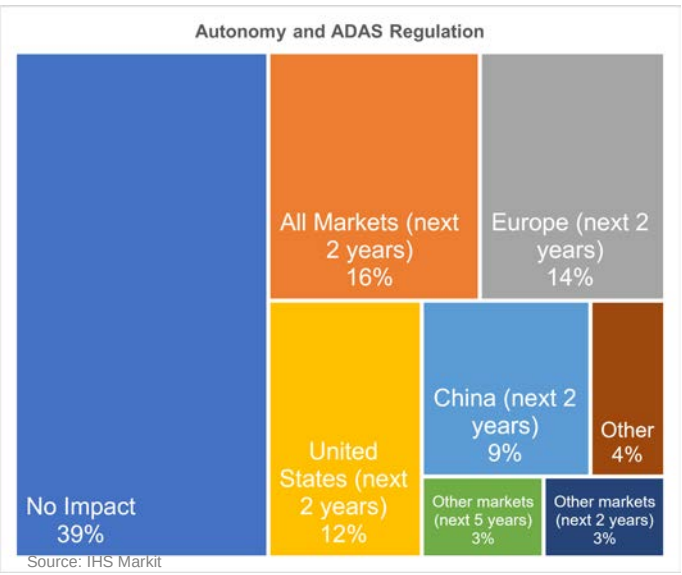
Several supplier respondents indicated that OEMs will focus on more immediate technology deployments around L1 and L2 ADAS functions, which are more “proven” and less subject to regulatory complications. One supplier also indicated that the substantial capital expenditures that OEMs have devoted to e-mobility technology in recent years should make technology deployment this area more resilient to COVID-19 related cuts. OEMs seem to have a different sensitivity on this point based on the responses we gathered.

Regulation Impact



Source: IHS Markit

We solicited carmakers and suppliers to indicate whether they expected an impact on existing and new impending regulation around CO_2/fuel economy, autonomous/active safety, cybersecurity, traffic control, and vehicle data protection. CO_2/fuel economy emerged as the regulatory area where the consequences of the COVID-19 outbreak are more likely to be materializing in terms of delays or restructuring of impending regulation. Some 98% of respondents indicated there would be an impact on CO_2/fuel economy regulation. Respondents expect that European regulation in the next two years (the 95 gr/km target phased in 2020) is likely to be delayed or targets to be relaxed as automakers face major financial challenges due to the COVID-19 sales slump. 11% of respondents also indicated that upcoming regulation for 2025 and beyond is also likely to be impacted, albeit limitedly.



Source: IHS Markit

On the other hand, a significantly smaller share of respondents expects regulation on autonomous vehicles and active safety to be impacted by COVID-19 (61%). Some 16% of respondents think that regulation of autonomous vehicles is likely to be delayed in all markets, followed by 14% who think European regulation, particularly the implementation of UNECE in mid-2022 is at risk. IHS Markit estimates this regulation will drive an increase in the content of 105 euros per vehicle. Under this regulation a set of advanced safety features such as intelligent speed assistance, alcohol interlock installation, driver distraction warning systems, reverse camera, emergency braking and lane keeping systems. Respondents suggested that regulations that significant cost per vehicle that is likely to be passed onto final consumers are likely to be reconsidered in a post-COVID-19 market environment.

Mitigating the impact of COVID- 19 on R&D

- One major strategic consideration that several responded raised in comments to IHS Markit is around **consolidation** of OEMs and suppliers. Comments suggest that the sustained R&D investment levels in light of e-mobility, autonomy and connected car development are unlikely to vanish due to COVID-19 and the financial impact of COVID-19 is likely to drive more companies to explore Merger and Acquisition opportunities in a bid to be able to support this sustained investment level. Respondents suggest that this consolidation trend, which was already evident before COVID-19, might accelerate further. Some respondents have however raised that consolidation in the supply base is likely to negatively impact OEMs as the suppliers that will survive will have better negotiation leverage, particularly in some critical sectors like e-mobility components and autonomous vehicle sensors.

"Small or very focused companies may struggle to survive whereas larger groups will benefit state support (too big to fail)." **(European OEM)**

- **Governmental aid** has also emerged as a theme in several comments that OEMs and suppliers shared with IHS Markit. The vast majority of respondents indicated that government aid was now more important than ever to support Advanced Research in particular. Several Advanced Research programs are state funded, for example the European Union's Horizon program, which has $79 billion funding for multiple industries, or several programs from the likes of the US Department of Energy ($80 million were recently allocated to a variety of powertrain/electrification projects) or the UK government's AutoDrive ($20 million to fund autonomous vehicle research).

- Some respondents referred to "cash for clunkers" or other similar incentive schemes as a potential tool to re-start demand. This would represent a repetition of scrappage schemes the US government launched back in 2009 (worth $3bn), followed by other European countries and China. However, some respondents at larger OEMs admit that spending on cars is unlikely to be the highest priority for budget allocation post as consumers seek a return to normal. A concern emerges about how frugal consumers might be following this crisis, therefore questioning the effectiveness of such scrappage schemes as well as what this might mean in terms of vehicle segment and technology.

"COVID-19 will bring significant stress to the entire upstream supply chain and an enormous impact on the retail side. Government intervention may help, but it's unlikely that automotive consumer spending will be the highest priority for budget allocation." **(European OEM)**

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