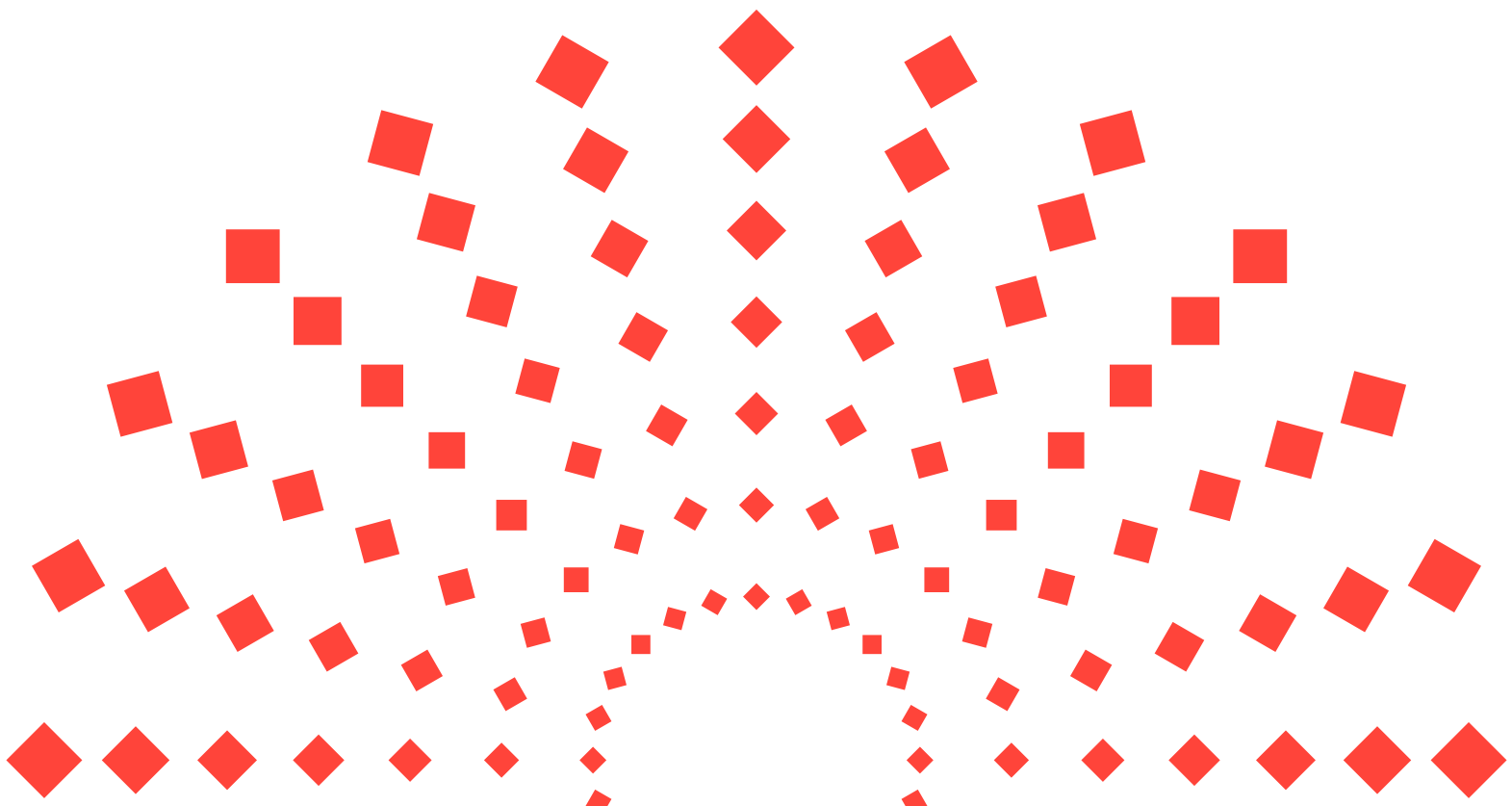


Report

Under The Hood

SDV Developer Report 2026



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Foreword

This second Under The Hood report reveals a remarkable cross-section of the software-defined vehicle (SDV) industry in eight of the world's most important automotive markets across North America, Europe and Asia. Comparing this year's responses to those we received last year, it is clear that competitive pressures are increasing, with eight out of ten participants saying their organizations are under pressure from seemingly faster-moving competitors. Yet, at the same time, they are having to grapple with a range of ever-evolving technical and regulatory challenges.

The results also indicate that there is a strategic opportunity for OEMs in shifting more focus and resources towards the application layer. Today, participants indicate that about a third of their time is still spent on foundational integration tasks. Three out of four participants (76%) believe OEMs should focus on innovation in the application layer, to increase speed-to-market and better differentiate customer experiences. Just as importantly, 75% say the lack of a common, reusable software foundation is slowing SDV development.

OEMs able to focus resources where they will make the greatest difference will still need to address several significant priorities. As this report reveals, these priorities will include security risks, the expanding influence of AI and automation, and increasingly complex regulatory requirements, particularly for OEMs operating across multiple markets. These pressures and priorities are forcing OEMs to adapt, but they also highlight where focused action can create advantage.

The path to success is finding the practical ways to manage complexity while continuing to innovate in one of the world's most dynamic industries. Our aim is to help the industry do exactly that.



Justin Moon

VP, Core Product Engineering, QNX

Key findings

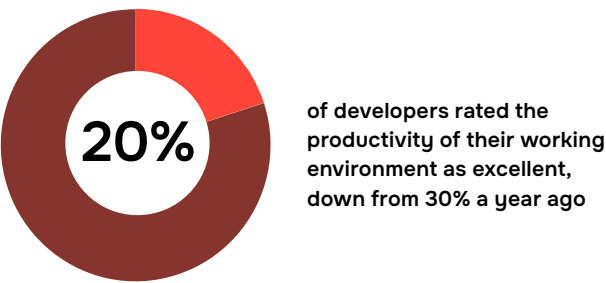
Our research findings reveal the speed at which the SDV industry is evolving in each of the eight countries covered in this report, but also the major technical, regulatory and security challenges that make their work more difficult.

76%
of survey participants said OEMs should focus on innovation in the application layer, rather than foundational software infrastructure, to increase speed-to-market and better differentiate customer experiences.

However, at present, development teams' time is spent:

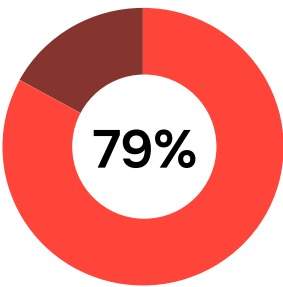
35%
on foundational integration tasks

9%
primarily focused on application-layer features and user-facing functionality

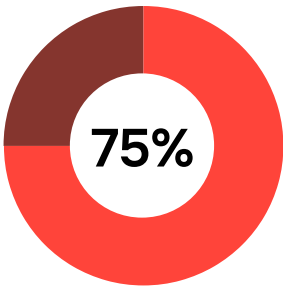


Major challenges hampering software development processes:

	Debugging and testing processes	44%
	Integration complexity	39%
	Long development cycles	37%
	Regulatory compliance	36%



of participants said their organization is under pressure from faster-moving competitors



said the lack of a common, reusable software foundation slows SDV development

Year-on-year comparisons of some responses suggest that SDV developers have a clear view of what more they and their colleagues must do to perform effectively and thrive in a fiercely competitive market. They have a better understanding of the continuous technical progress and productivity improvements that are now required to stay at the forefront of SDV development. At the same time, major concerns in relation to the challenge of remaining fully compliant with evolving regulations and threats posed by security risks, are now more sharply-defined than was the case in 2025.

83%
think SDVs will become a major target for cyberattacks during the next three years.

48%
cite security threats as one of the three biggest concerns about the future of automotive software development, up from 43% a year ago.

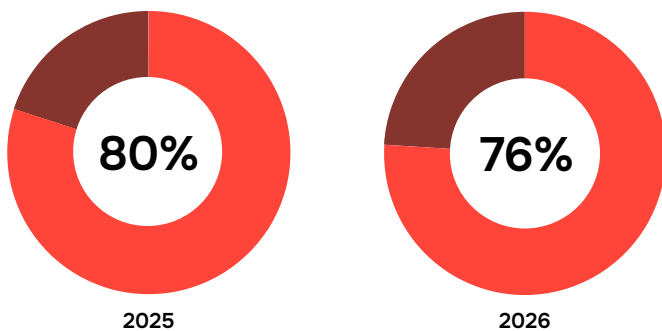
47%
rate cybersecurity vulnerabilities one of the biggest threats to the successful roll-out of SDVs during the next five to ten years, up from 44% a year ago.

Trying to convert ambition into execution

2026 provides a reality check

So much can happen in a year. The results of this year's Under The Hood report reflect the changes seen in the fast-moving, innovative SDV industry over the past 12 months. But they also show that some things have stayed the same. One consistent finding in both this and last year's report is that a large majority of developers were certain that OEMs should prioritize application-layer innovation.

Developers who agree that OEMs should focus more on application-layer innovation and less on software infrastructure



View from the top

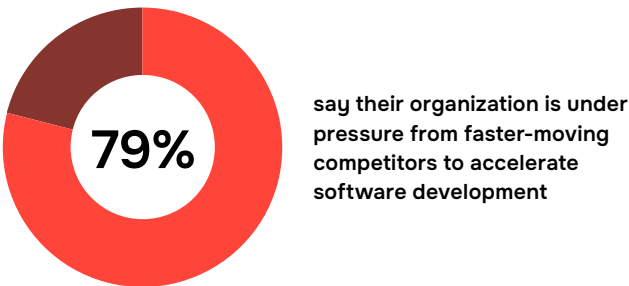
Survey participants who are vice-presidents of engineering and heads of R&D engineering are both very likely to agree that OEMs should prioritize application-layer innovation (83% of both groups agreed), demonstrating its strategic significance.



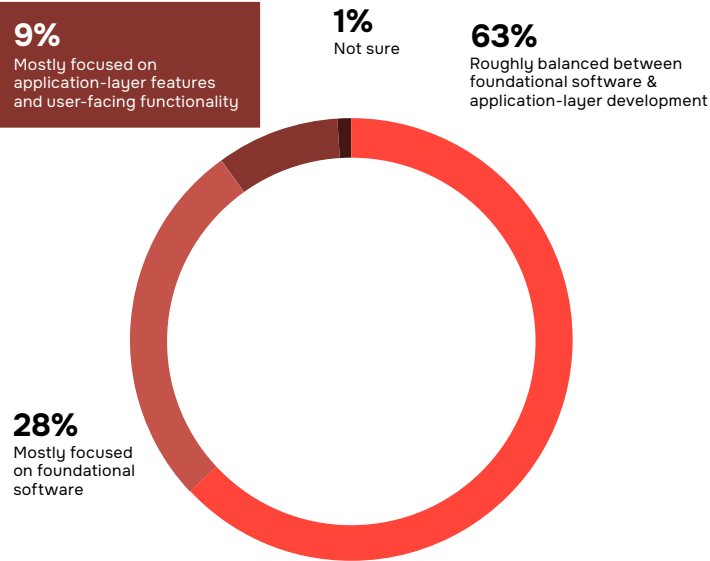
Productivity challenges are increasing

Almost eight out of ten participants (79%) say their organization is under pressure from faster-moving competitors to accelerate software development.

But participants also told us that at present more than one third of development teams' time (35%) is spent on foundational level integration tasks, such as OS to middleware stitching and system alignment and configuration, rather than being focused on the application layer.



Which, if any, of the following best describes where your teams' software development efforts are currently focused?



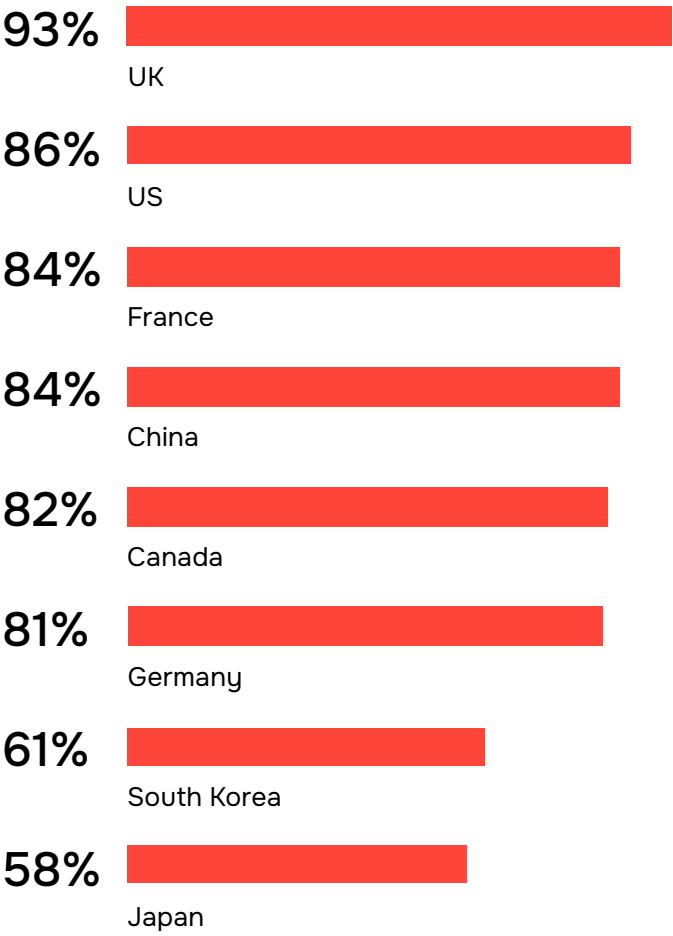
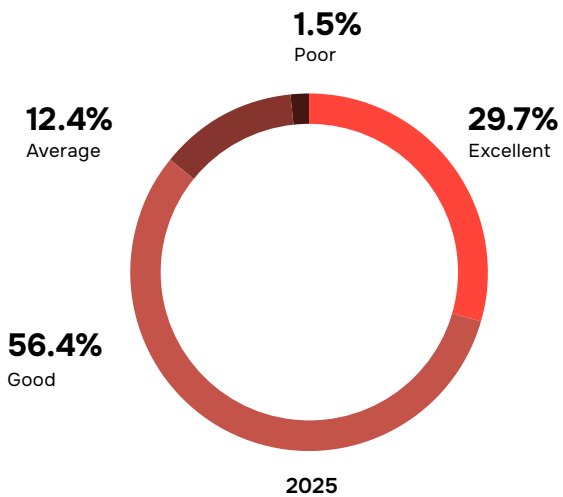
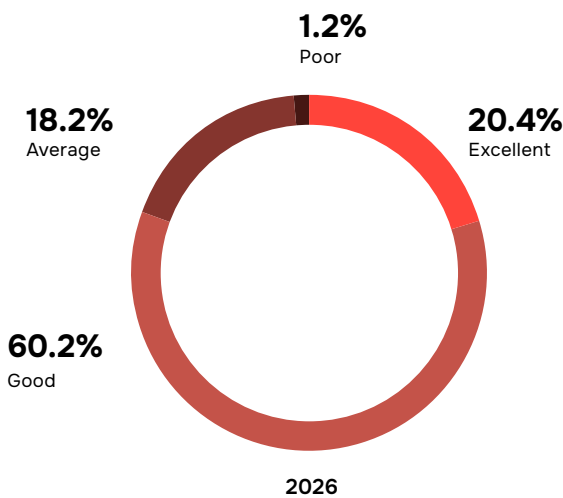
Confidence in the productivity of development environments has fallen

Belief in the effectiveness of existing development environments has dropped since 2025. While 81% of participants rated their current environment as excellent or good, that figure was 86% a year ago. This includes a fall in the number of participants who rated their development environment productivity as excellent, down from 30% to just 20%. The impacts of increased competitive pressure in the industry and the technical and regulatory challenges hampering software development could be contributing to these trends.

Highest levels of confidence in productivity were found in the UK, where 93% of participants rated their development environment productivity as excellent or good, and in the US, where participants were most likely to rate their environment as excellent. Those in Japan were least likely to claim environment productivity is either excellent or good.

How would you rate your current development environment in terms of productivity?

Developers who rate their current environment excellent or good in terms of productivity

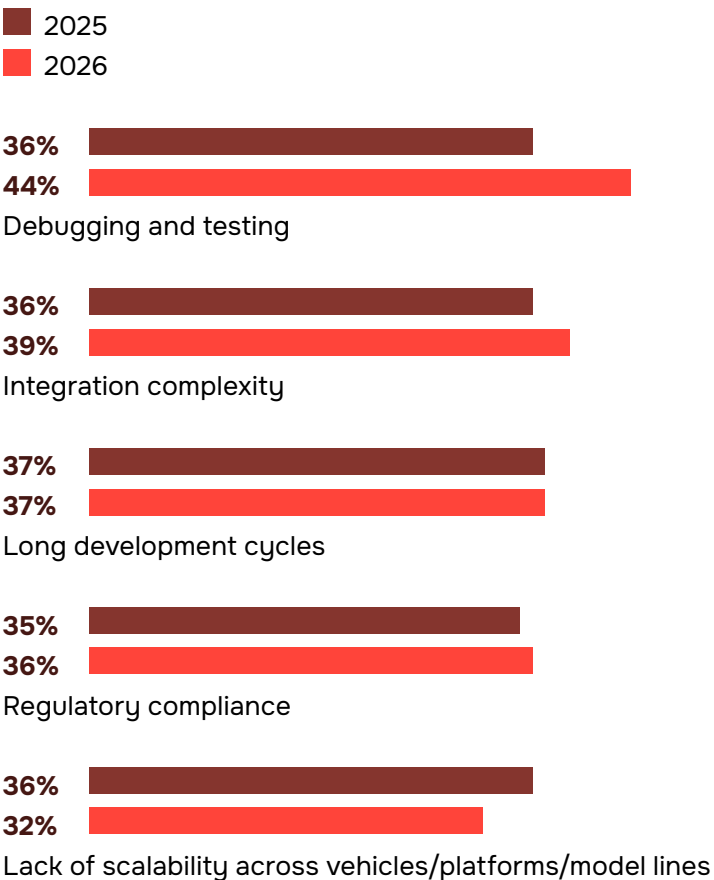


Major challenges hampering software development

Survey participants were asked to choose the five biggest challenges hampering software development. Their responses suggest a heightened sense of urgency driven by competitive and time pressures, alongside the effects of increased complexity, are strong influences on development processes.

The challenge chosen most often was debugging and testing, selected by almost half of the survey participants, 44%, up from 36% last year. Integration complexity was also chosen by more participants this year (39%, up from 36%). Long development cycles were cited as a struggle, by 37% (unchanged from last year, when this was the most cited option), ahead of regulatory compliance (36%, up from 35%).

What did developers say were the biggest challenges in the software development process?



View from the top

52%

of heads of engineering cite debugging and testing as a primary challenge in software development.

Biggest challenges in the software development process rated by vice-presidents of engineering:

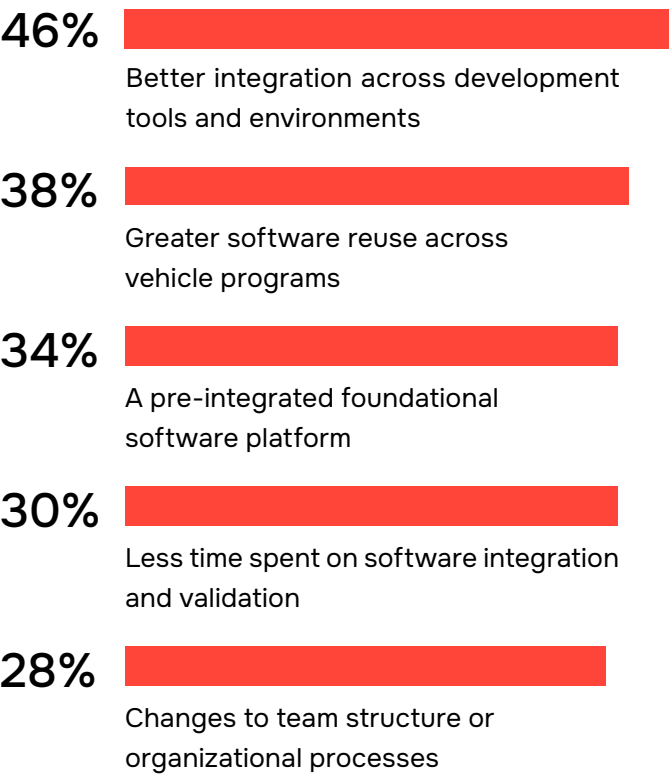
	Lack of scalability across vehicles, platforms or lines	50%
	Integration complexity	45%
	Long development cycles	43%

Ways to increase focus on application-layer innovation

Asked to choose two options from a list of actions that would enable their team to spend more time developing application-layer features and innovation, participants were most likely to choose better integration across development tools and environments (chosen by 46%), greater software reuse across vehicle programs (38%); and a pre-integrated foundational software platform (34%).

Only 22% said their organizations “extensively” reuse foundational software platforms across different vehicle programs or ECU domains. Numbers of OEMs doing this extensively are highest in the US (28%) and South Korea (27%), and lowest in China (12%). But 68% of all participants say their organizations reuse foundational software “somewhat” (meaning there is reuse for some programs while customized software is used for others), including 82% of those in China.

What would enable your team to spend more time developing application-layer features and innovations?

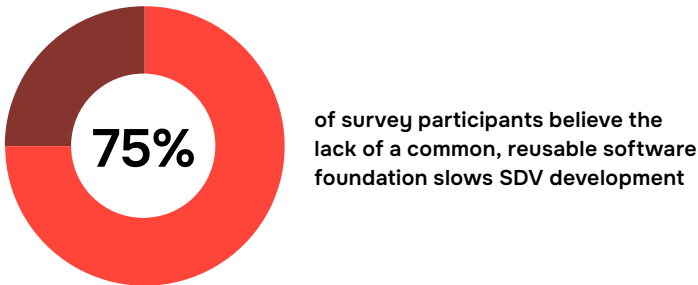


To what extent does your organization reuse the same foundational software platform across different vehicle programs or ECU domains?

	CN	UK	CA	DE	FR	JP	US	KR	Average
Extensively same platform across most programs	12%	25%	18%	17%	23%	20%	28%	27%	22%
Somewhat shared across some programs, customized for others	82%	68%	67%	73%	65%	62%	65%	68%	68%
Rarely mostly rebuilt per program	6%	6%	10%	8%	11%	14%	5%	5%	8%
Not at all each program starts fresh	0%	0%	2%	1%	2%	1%	0%	0%	1%
Not sure	0%	1%	3%	1%	0%	3%	1%	0%	1%

The urgent need for a common, reusable software foundation

There is widespread agreement across all eight countries that the lack of a common, reusable software foundation slows SDV development: three-quarters (75%) of participants agreed this is correct either “to a great extent” (21%) or “to some extent” (54%). The 75% average was exceeded among participants in the US (81%), France (79%), and in Canada, China and the UK (all 76%).



Almost all participants think platform engineering will be important over the next five years

Almost all participants (97%) said that platform engineering, involving integration of operating systems, middleware and hardware, will be important over the next five years, including 49% who said they think it will be “very important”. Belief in the importance of platform engineering was particularly strong among participants in the US, 65% of whom say it will be “very important”.

View from the top

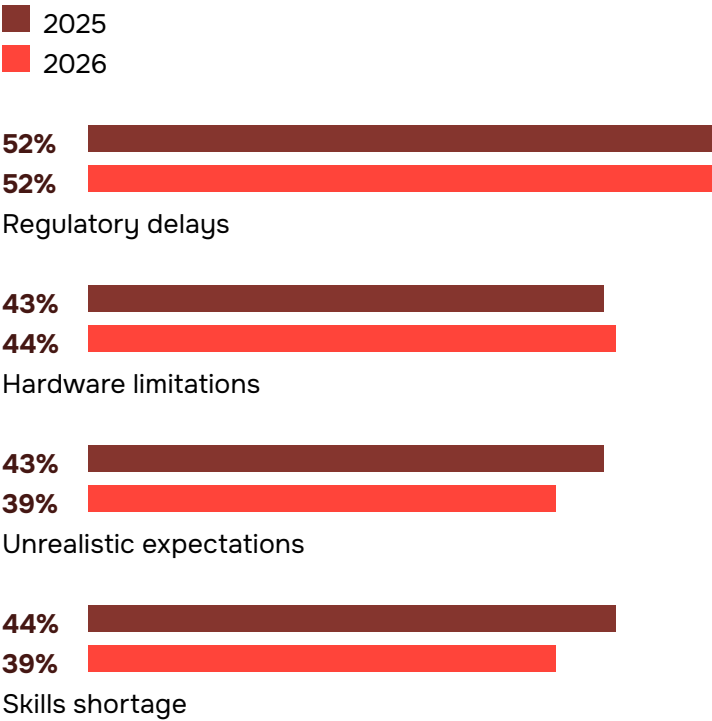
63%

of vice-presidents of engineering think that platform engineering will be very important in SDV development during the next five years, significantly more likely than participants in other job roles.

The consequences of inefficient development processes and regulatory demands

Inefficient development processes were cited by substantial numbers of participants as one of the main reasons for a disconnect between consumer expectations and software delivery timelines: 39% of the full sample cite this as a factor in these disconnects, including 60% of those in Japan. As was the case last year, the most cited reason was regulatory delays, cited by 52% of participants, just like last year.

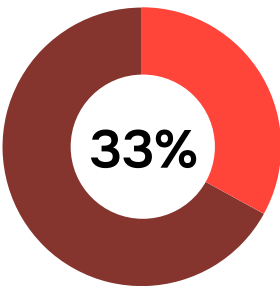
What are the main reasons developers cited for the disconnect between consumer expectations and software delivery timelines?



The regulatory requirements with which OEMs in different countries need to comply may differ in detail, but in each case the need to ensure regulatory compliance clearly presents another major challenge in the SDV development process.

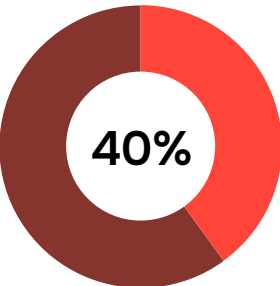
The impact of regulatory and compliance complexity on SDV software development

During 2025 more than 700 new regulations or legislative proposals that had a direct impact on the development of in-car technology were introduced globally – following the introduction of around 500 the previous year. Regulation is a particular challenge for the many OEMs that operate in multiple countries and work with suppliers based in different parts of the world.

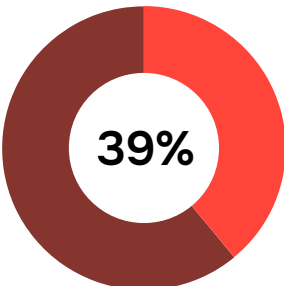


of survey participants in 2026 as well as 2025 said that new regulations or legislation had led to delays in development timelines

Developers who said that new regulations or legislation had led to accelerated timelines:



2025



2026

The split remains a demonstration of the mixed ability of OEMs to manage compliance requirements effectively.



Confidence in OEMs’ ability to keep pace with emerging regulation

As last year, participants expressed a high level of confidence in their team’s ability to remain compliant with evolving regulations, but confidence levels have dipped slightly.

In 2025 93% of participants were “very” or “fairly” confident in their team’s ability to maintain compliance, including 39% who were “very” confident. This year those figures have fallen to 91% and 30%. Confidence is highest in China (98%) and the US (97%); and lowest in Japan (74%) and South Korea (78%).

In addition, in 2025, more than half of those questioned (51%) said their confidence in their team had increased during the previous year. In 2026 the equivalent figure had fallen to 41%.

View from the top

49%

of heads of engineering say their confidence in their teams has increased during the past year.

48%

of vice-presidents of engineering say their confidence in their teams has increased during the past year.

This suggests a disconnect between leaders and those carrying out day-to-day tasks.

How confident are you in your team’s ability to keep up with and remain compliant with evolving regulations?

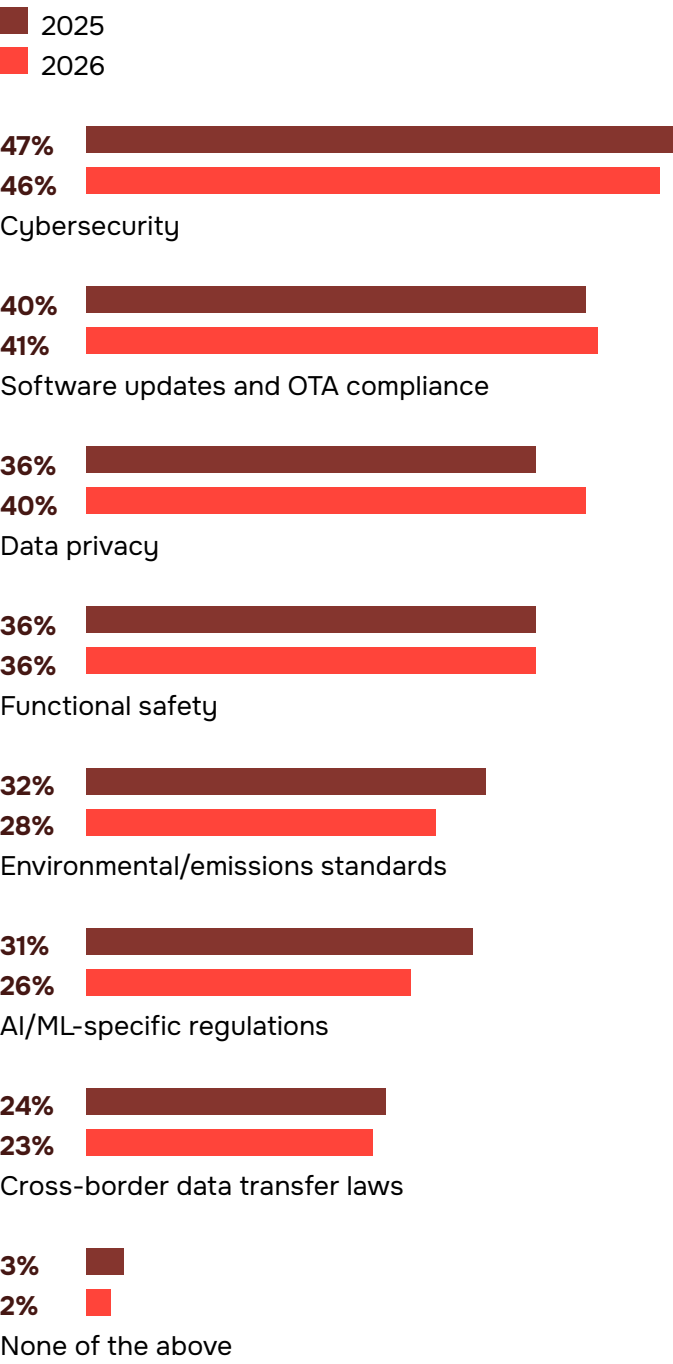
	CN	UK	CA	DE	FR	JP	US	KR	Average
Very	17%	40%	33%	27%	24%	9%	48%	9%	30%
Fairly	81%	57%	60%	63%	62%	65%	49%	69%	61%
Not very	2%	3%	5%	8%	11%	24%	3%	21%	8%
Not at all	0%	0%	1%	1%	1%	1%	0%	0%	1%
Not sure	0%	0%	1%	1%	2%	1%	0%	1%	1%

Regulations that cause the greatest difficulty for SDV development

Survey participants were also asked which regulations currently pose the most difficulties to their teams. Their responses were remarkably consistent with those we received last year, with cybersecurity regulations again cited by the largest numbers of participants: 46%, compared to 47% in 2025. Software updates/Over-the-air (OTA) compliance and data privacy were again the next two most cited types of regulation, but numbers of participants citing both had increased.



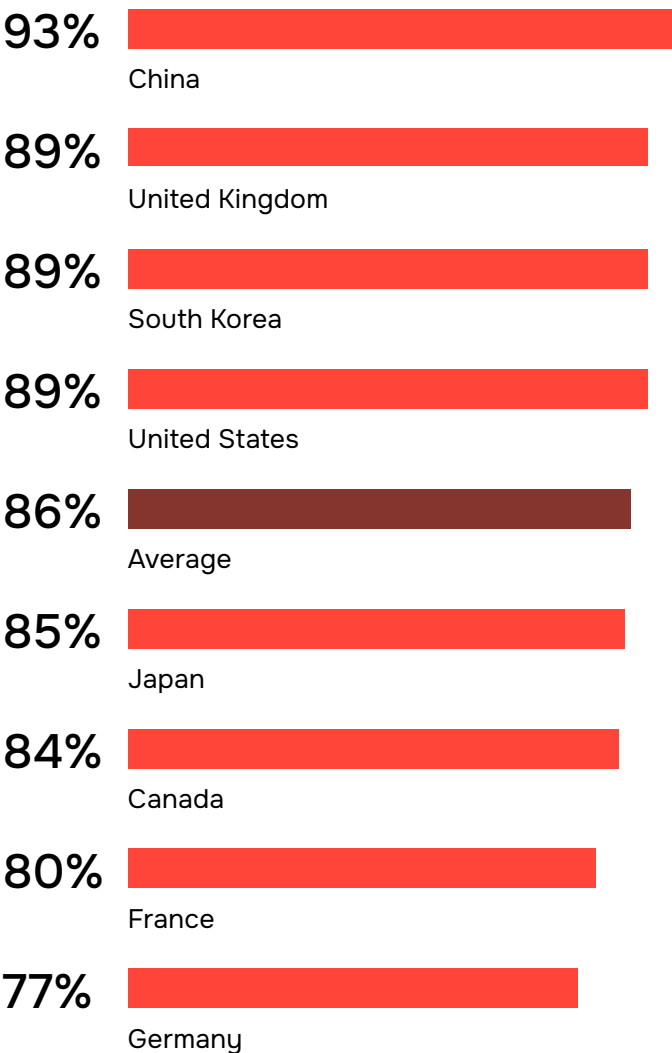
What types of regulations do developers think are currently most challenging for their team to comply with?



Can regulation keep up with innovation?

Most participants were generally confident that regulatory frameworks can evolve fast enough to keep pace with innovation and complexity in SDVs: 86% said they will either “definitely” or “possibly” keep up. But numbers saying “definitely” were down from 33% last year to 26%. Confidence in regulators is highest in China, where 93% of participants said regulators could or will definitely keep up; while about one in three participants said they can “definitely” do so in both the US (34%) and France (33%).

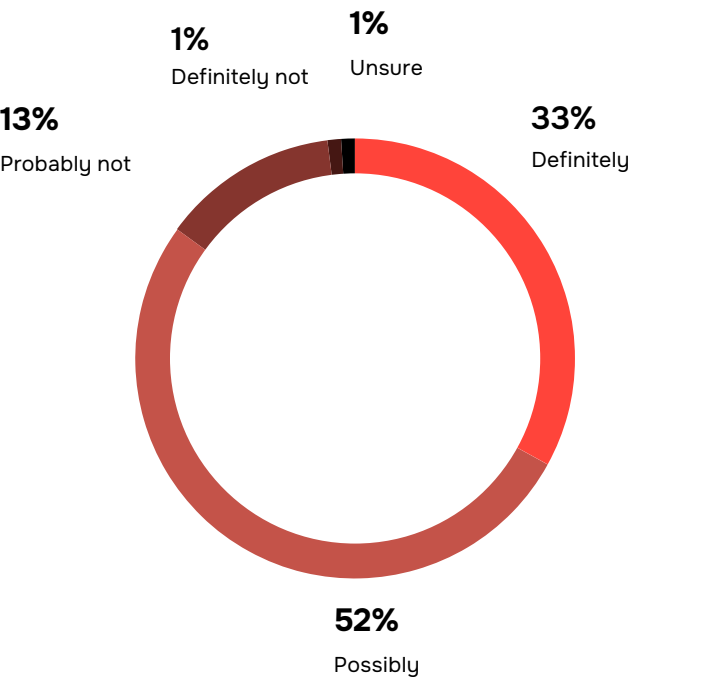
Developers who think regulatory frameworks can “definitely” or “possibly” evolve fast enough to keep up with the pace of innovation and complexity in software-defined vehicles (SDVs): 2026 answers by country



Yet despite this confidence both in their teams and, perhaps more surprisingly, in regulators’ capabilities, other findings in this survey show that participants understand they will face challenges when seeking to ensure regulatory compliance.

As noted above, regulatory delays were most likely to be seen by participants as a primary reason for a disconnect between consumer expectations and software delivery timelines. In addition, regulatory overload was one of participants’ two biggest concerns about the future of automotive software development, and regulatory uncertainty was identified as one of the three biggest risks to the successful roll-out of SDVs during the next decade. But in neither of the latter instances were problems linked to regulation seen as the biggest risks under discussion. Instead, they were both linked to the issue of security.

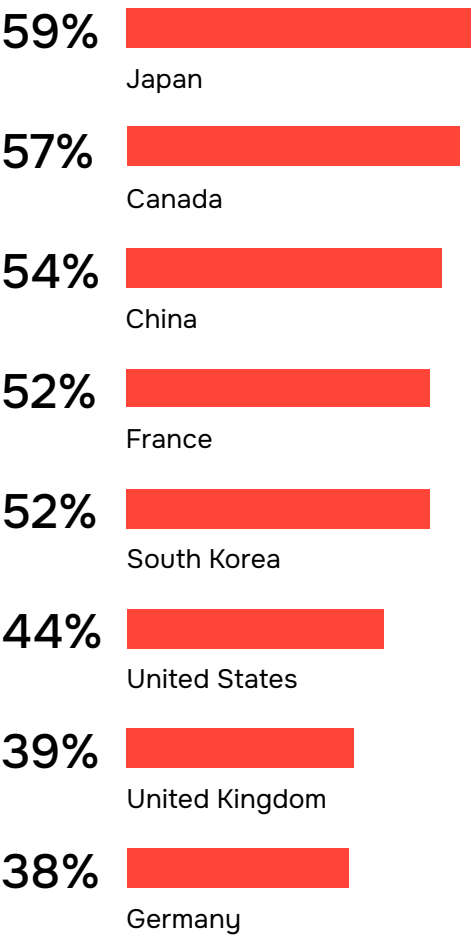
Do you think regulatory frameworks can realistically evolve fast enough to keep up with the pace of innovation and complexity in software-defined vehicles (SDVs)? 2025 answers



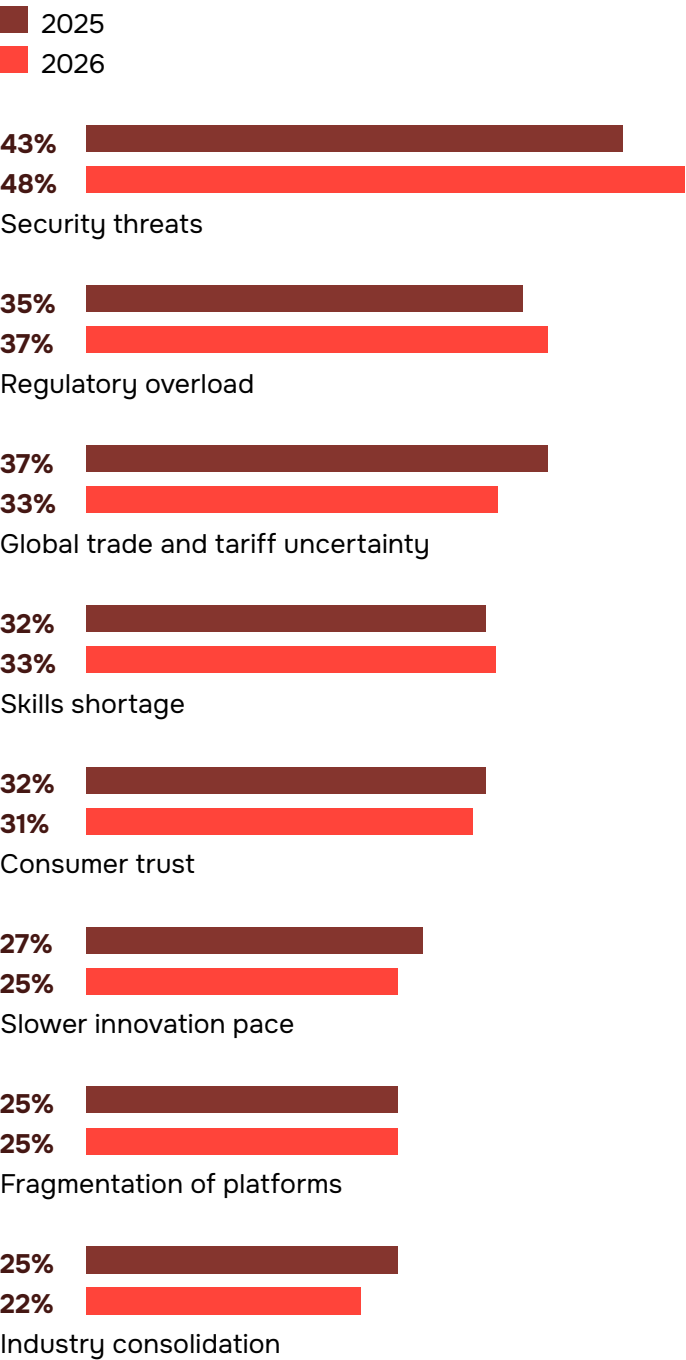
Security threats and risks

Perhaps one of the most striking trends visible in this year's results is that concerns related to security have become a significant preoccupation for many survey participants. Asked to choose their three biggest concerns about the future of automotive software development participants were most likely to cite security threats, with 48% doing so, up from 43% a year ago. More than half of participants in Japan (59%), Canada (57%), China (54%) and South Korea (52%) cited security threats as their greatest concern.

Developers who cite security threats as one of the biggest concerns for the future of automotive software development:



The biggest concerns for the future of automotive software development are:

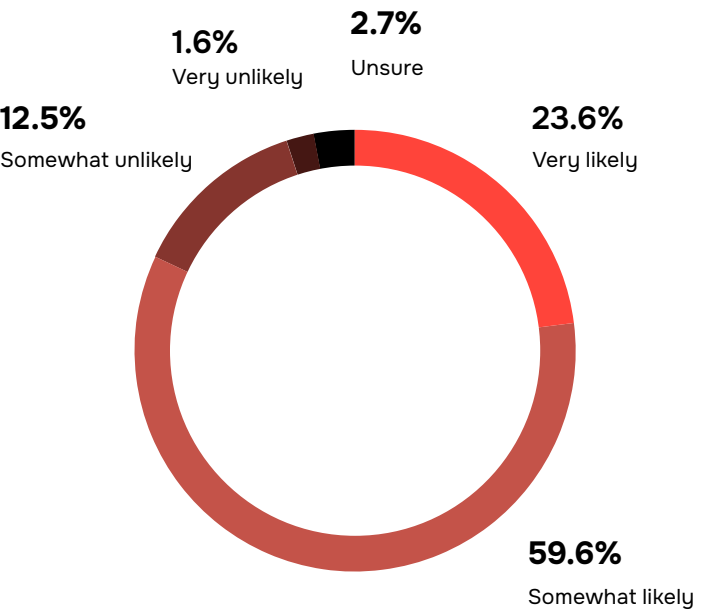


Most participants think SDVs will be a major target for cyberattacks within three years

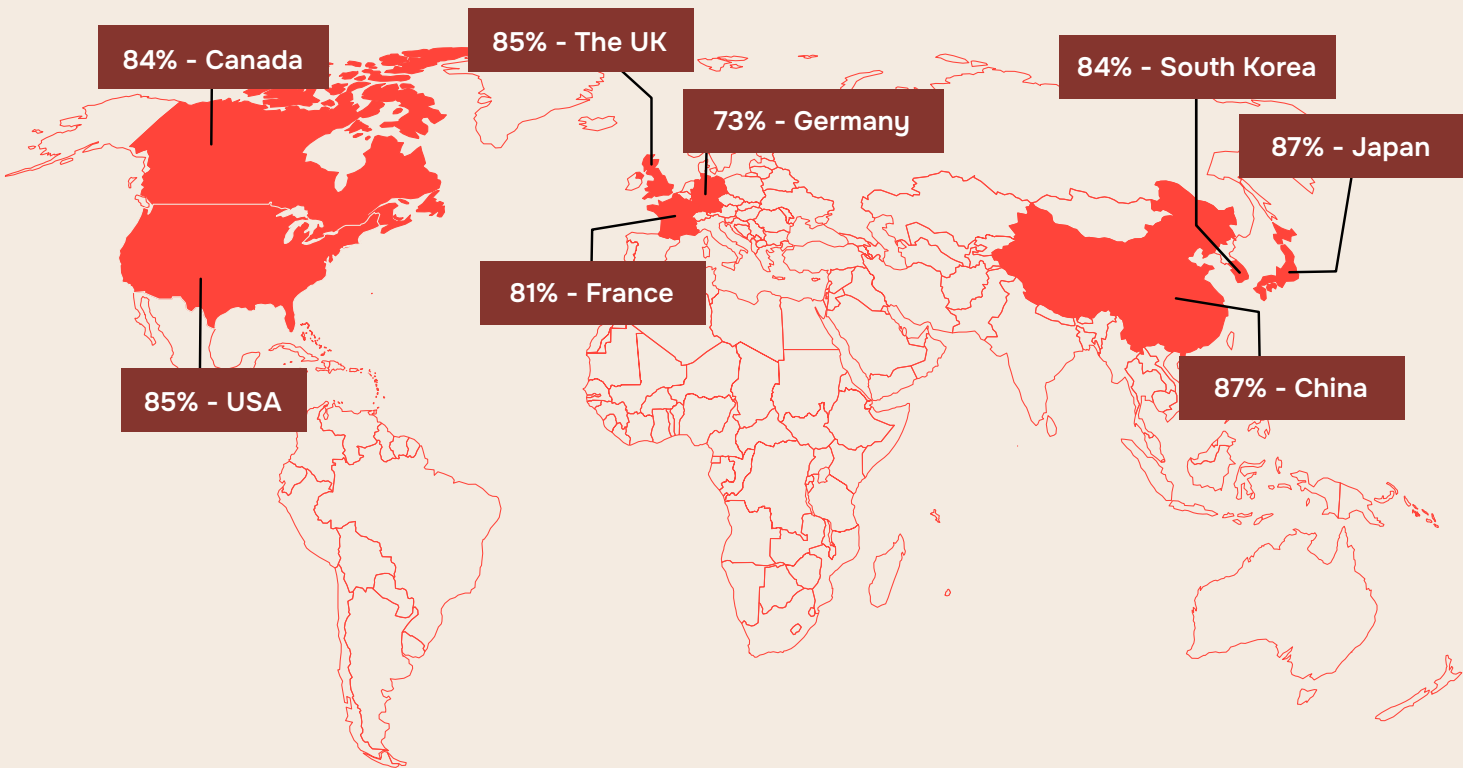
Most participants also believe that SDVs will become a major target for cyberattacks during the next three years: more than eight out of ten (83%) said they think this is likely, including nearly one in four (24%) who think it is “very likely”. This view was most prevalent in China and Japan, where 87% said SDVs are likely to be a target; and in the US, where almost one in three (31%) said they think it is “very likely”.

Cybersecurity vulnerabilities were also most likely to be seen as among the biggest threats to the successful roll-out of SDVs during the next five to ten years. 47% of participants said this, up from 44% in 2025. This headline figure hides a number of significant variations by country: it rose to 60% in Japan and 52% in China. Participants also saw cybersecurity skills as most likely to be critical for automotive software developers during the next five years.

How likely do you think it is that SDVs will become a major target for cyberattacks within the next three years?



Developers who believe that SDVs will become a major target for cyberattacks within the next three years:





Security fears and the issue of retaining consumer trust

It is also notable that the issue of lost consumer trust was identified as a major concern for the future of automotive software development, by one in three (31%) of all participants, including 43% in China and 32% in the US. There is a clear link between these issues: consumers are arguably more worried about technology-related security issues in general than ever before, and many people also feel particularly sensitive about the idea that their car might be affected in some way by security risks.

Safety problems may also have a huge negative impact on brand reputation. One of the single most damaging events that can possibly affect any vehicle manufacturer is a product recall, and in recent years software recalls and failures have become a critical challenge for the automotive industry.

But this year’s responses suggest a more measured response to software recalls than was visible in last year’s results. In 2025, almost six out of ten (58%) of participants said that recent software recalls or failure had influenced their team’s approach to software development. This year that figure fell to 53%.

While in 2025 38% of participants whose approach changed as a result of recalls/failures said this involved making major changes, the equivalent figure in 2026 is just 19%. This suggests more SDV development teams are no longer adjusting processes in a piecemeal way

following a specific incident, but are instead seeking to change development approaches during earlier stages of the process.

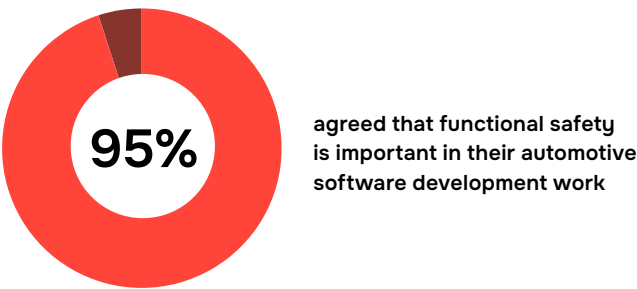
But these figures also hide some significant variation between participants in different countries. More than two-thirds (67%) of participants in France, and 59% of those in China said their teams had adapted their approach in the light of software recalls or failures, but that figure dropped to 40% in Japan and 41% in Germany.

Have developers had recent software recalls or failures influence their team’s approach to software development?

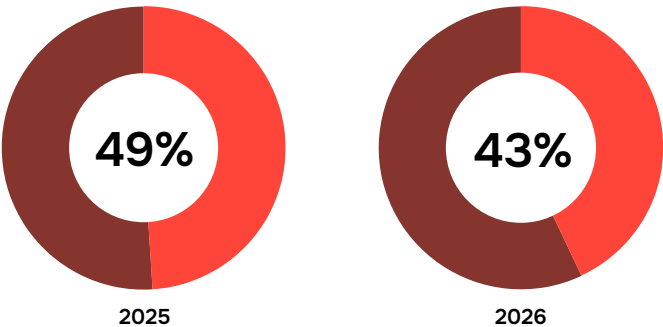
	Yes	No
CN	59%	38%
UK	53%	43%
CA	50%	46%
DE	41%	54%
FR	67%	29%
JP	40%	59%
US	53%	43%
KR	60%	39%

Functional safety: a crucial issue

Almost all participants (95% - identical to the 2025 figure) agreed that functional safety is important, including 49% who said it is “very important” (53% said this in 2025). Participants in the US are most likely to think functional safety is “very” important (66% said this), ahead of those in the UK (59%). Those in South Korea (26%) and France (32%) are least likely to think this.



Developers who said that consumer trust in advanced driver assistance systems depends on software functional safety “to a great extent”

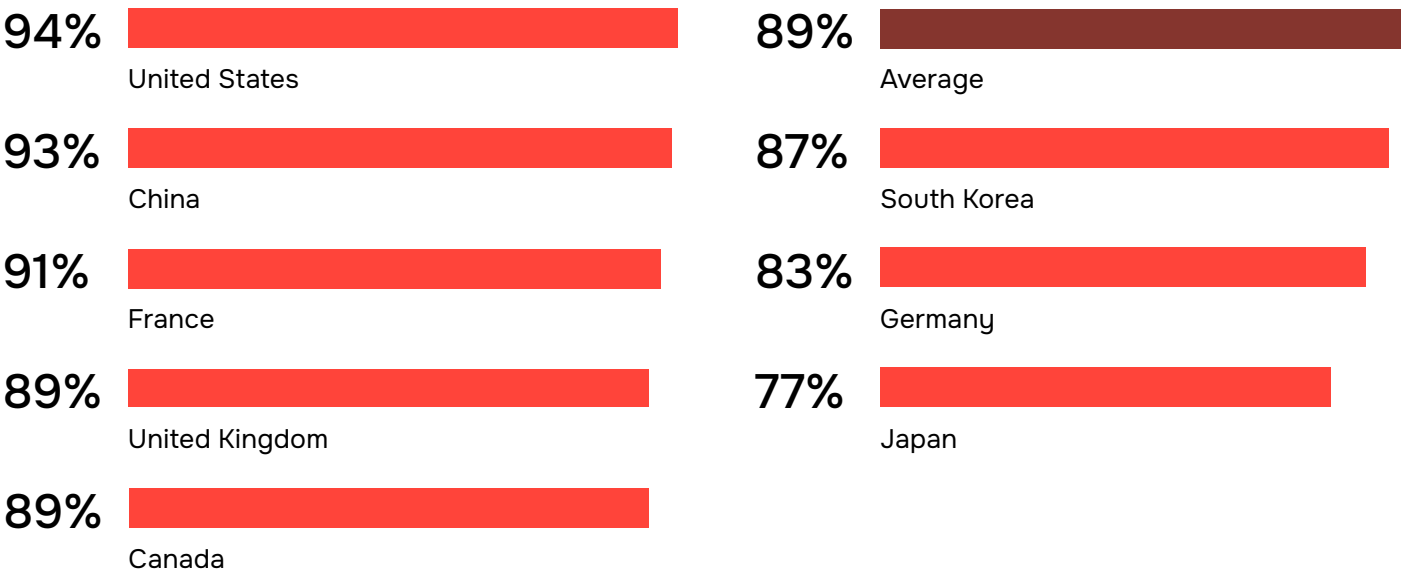


The value of collaborative approaches

Our findings also show that those working in SDV development continue to value cross-industry collaboration between OEMs, Tier 1 suppliers, and software vendors highly. More than nine out of ten participants (95% - up from 93% in 2025) said this was important to their current development projects, including 41% who said it was ‘very important’ (48% said this in 2025).

In addition, nearly nine out of ten participants (89%) agreed with the statement: “My organization supports collaborative development practices”, including 39% who strongly agreed. Those in the US and the UK were most likely to strongly agree.

Developers who agree their organization supports collaborative development practices





AI is growing and evolving influence on SDV development

The issue of consumer trust may also have been a factor influencing some participants’ responses when they considered the potential impact of AI on the SDV industry. Their responses suggest a maturing outlook on AI within the industry. Asked what role they see AI playing in automotive software development during the next three to five years, one in four (25%) said they think its impact

will be “transformational – core to future development”, down from more than one in three (36%) who gave this response last year. But the number of participants who said the impact of AI will be “significant” (integrated into development workflows) increased from 55% to 62%.

What role do developers see AI playing in automotive software development over the next 3-5 years?

	2025	2026
Transformational	36%	25%
Significant	55%	62%
Moderate	8%	12%
No role	-	1%
Unsure	1%	1%

Where might AI have the greatest impact on automotive software development?

Asked in which one area of automotive software development participants thought AI would have the greatest impact during the next three years, the most common suggestion was coding and software implementation, cited by 21%, including by 28% of US-based participants and 27% in Canada.

Software design and architecture was the next most chosen area, by 18%, including 25% of UK participants. Globally, 16% thought the greatest impact would be on in-vehicle user experience/personalization.

Which area of automotive software development do you think AI will have the greatest impact on over the next three years?

	CN	UK	CA	DE	FR	JP	US	KR
 Coding and software implemetation	19%	23%	27%	19%	15%	19%	28%	15%
 Software design and architecture	16%	25%	21%	13%	18%	16%	18%	16%
 In-vehicle user experience and personalisation	26%	13%	11%	15%	12%	26%	16%	22%
 Cybersecurity	7%	21%	13%	15%	20%	7%	10%	8%
 Functional safety	14%	8%	12%	19%	14%	14%	10%	14%

AI could replace one third or more software developers during the next decade

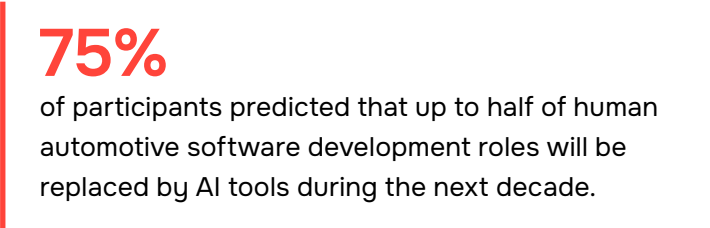
We asked what percentage of an organization’s workforce could realistically be replaced by AI tools during the next decade.

The average suggested percentage was...

Percentage of human automotive software development roles participants expect to be replaced by AI tools



Automation is already playing a significant role in software development processes. On average, 41% of participants’ organizations current automotive software development process is automated. But this is lower than the 45% average reported by participants last year.



A mixed response to AI hype

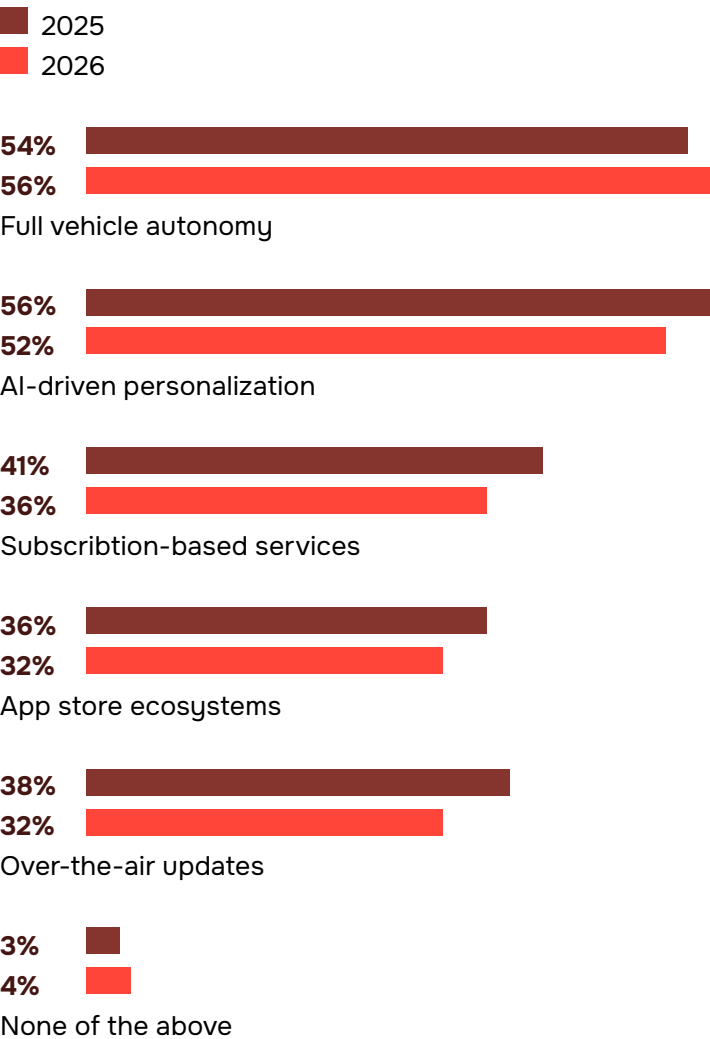
Our findings also reveal a widespread willingness to resist some examples of AI-related hype in this industry. Asked which aspects of SDV have been receiving more attention than they believe is warranted at this stage, full vehicle autonomy and AI-driven personalization are once again the two aspects most likely to be chosen. Even so, these two features were also the two most likely to be expected by participants to influence the shape of SDVs by the end of the 2020s.

Searching for the best strategic priorities

As was the case in 2025, our findings show that developers also have strong views about where the SDV industry has been making mistakes. When asked which aspects of SDVs are currently receiving more attention than they warrant, more than half of our participants picked out full vehicle autonomy (chosen by 56%) and AI-driven personalization (chosen by 52%). These were also the two areas cited most often by participants in last year’s survey, although the numbers of participants choosing them have changed slightly.

Participants based in Japan and South Korea were most likely to feel that full vehicle autonomy has received an unwarranted level of attention: 67% and 64% of participants in these countries said this. Participants in South Korea were also most likely to cite AI-driven personalization, with 65% doing so.

Aspects of SDVs that developers believe are receiving more attention than warranted at this stage



[View from the top](#)

7 of 10
vice-presidents of engineering were particularly likely to think full vehicle autonomy has been receiving more attention than has been warranted.

The future of SDV development

What will the SDV look like in 2030?

We also asked participants which features they thought are most likely to define SDVs by 2030. Even though many participants had said this was also a feature receiving more attention than it deserved, more than half (54%) suggested AI-driven personalization is the feature most likely to shape SDVs in 2030, up from 49% who said this in 2025. This suggests there may be a divide within the industry on this subject. It will be interesting to see how these opinions continue to diverge or converge over the years ahead.

Numbers of participants citing full vehicle autonomy, seamless integration with smart infrastructure, full OTA update capabilities, and centralized computing architecture as features likely to define SDVs in 2030 were very similar to the numbers of participants citing these features in last year’s survey.

What features do developers think will most shape the software-defined vehicle (SDV) by 2030?

	2025	2026
AI-driven personalization	49%	54%
Full vehicle autonomy	47%	47%
Seamless integration with smart infrastructure	42%	42%
Full over-the-air (OTA) update capability	41%	38%
Centralized computing architecture	37%	35%
App store or third-party ecosystem support	31%	25%

View from the top

68%

of vice-presidents of engineering suggest that AI-driven personalization will be a defining feature of future SDVs, compared to 54% of all participants.



Might a less tech-filled vehicle be a hit with consumers?

It may seem counterintuitive to ask people working in SDV development this question, but we also asked participants if they thought that a deliberately minimalist, low-tech vehicle, designed to limit digital features and connectivity could succeed commercially as a differentiated market offering.

This year’s participants were even more willing than those surveyed last year to say that they thought such a vehicle could succeed: 78% think so, compared to 76% of those questioned in 2025. Those in the US were most likely to think this type of low-tech vehicle was “very likely” to succeed, with one in three (34%) saying this.

SDV developers seem to understand that while many of us enjoy using technology when it makes our lives easier, we may also find some technologies very frustrating when they don’t work properly, or make processes unnecessarily complicated. It’s also the case that many people simply enjoy driving, and feeling that this is them, not a computer, who is controlling their vehicle. These findings should serve as a reminder to OEMs that they must always guard against installing technology just because they can.

The developer of the future

We also asked which skills developers think are most likely to be critical for automotive software developers during the next five years. The results were very similar to those seen last year, with the three most commonly selected skillsets once again linked to cybersecurity, functional safety, and AI or machine learning integration.

Which skills do developers think will be most critical for automotive software developers in the next 5 years?

	2025	2026
 Cybersecurity	58%	58%
 Functional safety	53%	52%
 AI/ML integration	51%	49%
 Real-time systems	48%	45%
 Cloud-native development	38%	34%

There were some interesting variations by country:

71%

of UK participants said **cybersecurity skills** will be critical skills for automotive software developers in the next five years.

69%

of Chinese participants said **functional safety skills** will be critical skills for automotive software developers in the next five years.

63%

of Japanese and South Korean participants said **AI/ML integration skills** will be critical skills for automotive software developers in the next five years.

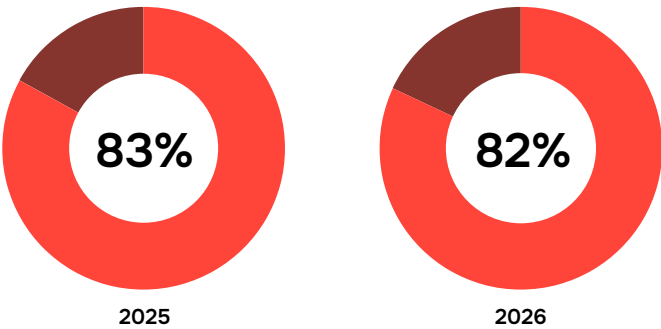
Country-specific sections

Canada

Our research reveals one of the big changes year-over-year has been the rise to prominence of debugging and testing as a major challenge in the development process. In Canada that change has been particularly noticeable: While in 2025 this issue was only the fifth most cited issue at 28%, by 2026 it was the second most cited issue at 51%. Integration complexity and regulatory compliance have also leapt up the list of challenges, now cited by 45% and 42% of Canadian participants, up from 27% and 26% respectively.

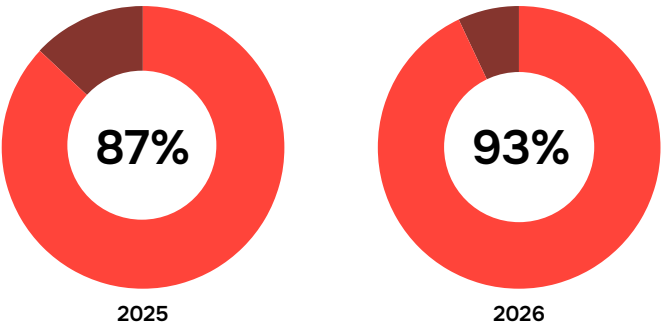
These issues may have contributed to the decrease in Canadian participants who rate the productivity of their current development environment as “excellent”: down from 36% in 2025 to 15% in 2026. However, the number who give their environment a “good” or “excellent” rating only fell slightly, from 83% to 82%.

Developers who rate their current development environment excellent or good in terms of productivity



While Canadian participants appear significantly more concerned about the impact of regulatory issues on development processes, confidence in the ability of their teams to cope with regulatory pressures has improved. 39% said new regulations and legislation have accelerated development timelines, up from 36% in 2025; while 32% said they delayed timelines, down from 36%. More than nine out of ten (93%) said they were “very” or “fairly” confident in their team’s ability to remain compliant, up from 87% in 2025.

Developers who are “very” or “fairly” confident in their team’s ability to remain compliant with evolving regulations



Safety and security concerns

57% of Canadian participants said that functional safety is “very” important in their automotive software development work, an 11% increase from 2025. This is not only above the international average (49%), but also a higher percentage compared to any country other than the UK. They were also the most likely to say that consumer trust in advanced driver assistance systems depends on software functional safety “to a great extent” at 54% compared to the international average of only 43%.

Security issues have also become a more urgent preoccupation. Security threats were already the most widely cited concern for the future of automotive software development in Canada, but numbers citing this have increased from 42% to 57% - well ahead of any other concerns and the second highest across all countries surveyed. Cybersecurity vulnerabilities were the most cited factor posing a major risk to successful SDV rollout during the next five to ten years, cited by 44% of participants, up from 33% in 2025.

Our 2026 findings suggest that China’s SDV industry is entering a new phase of development, as rapid feature evolution gives way to greater complexity and the challenge of scaling. As elsewhere, this transition can only be achieved if the industry overcomes a range of practical and technical challenges – but Chinese SDV developers appear notably less likely than their international peers to see regulatory compliance as a major source of difficulty.

However, Chinese participants are more concerned than was the case in 2025 by each of several different challenges. This year debugging and testing was cited as a major challenge by 52%, up from 29% in 2025, while there was also greater concern about long development cycles (49%, up from 31%), a lack of scalability across vehicles/platforms/model lines (47%, up from 32%), and a reliance on scarce hardware (40%, up from 34%).

Taken together, these results suggest the industry now has a greater collective focus on issues linked to software validation, scalability and the challenges of delivering ever more complex solutions.

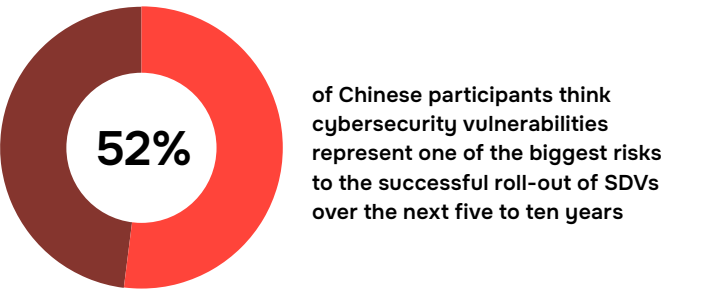
Biggest challenges in the software development process in China:

	2025	2026
 Debugging and testing processes	29%	52%
 Long development cycles	31%	49%
 A lack of scalability across vehicle, platform, or model lines	32%	47%
 Reliance on scarce hardware	34%	40%
 Integration complexity	30%	38%
 Oversaturated market for solutions	27%	31%
 Toolchain fragmentation	25%	28%

Regulatory burdens feel lighter in China, but security is still a big concern

Regulatory compliance is seen as a concern by only 16% of Chinese participants, down from 21% in 2025, and well below the international average (36%), reflecting the unique commercial environments within which Chinese SDV OEMs operate.

But more than half of Chinese participants (54%) saw security threats as one of the biggest challenges to the future of automotive software development, up from 39% in 2025. 52% also think that cybersecurity vulnerabilities represent the biggest risks to the successful roll-out of SDVs over the next five to ten years, up from 29% in 2025. 87% said they think SDVs will be a major cyberattack target within the next three years, the joint highest percentage (with Japan) across all eight countries surveyed.



These findings suggest a growing awareness within the Chinese industry of the need for ever stronger security controls to protect automotive software development and deployments. The proportion of Chinese participants citing cybersecurity skills as among the most critical for automotive software developers over the next five years has risen from 43% to 64%, joint highest with Japan. Functional safety skills ranked even higher in China, cited by 69% of participants. This is higher than in any other country, reflecting a strong emphasis on safety, alongside security, even as competitive pressures intensify in an incredibly fast-moving industry.

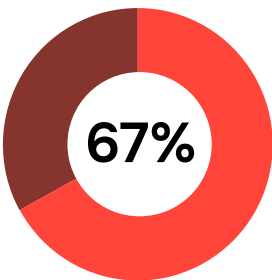
France was the only country where survey participants put regulatory compliance at the top of their list of software development challenges. 43% gave this answer, more than in any country except the UK.

French participants were also much more likely than those elsewhere to cite compliance with AI and machine learning-specific regulations and environmental/emissions standards as posing difficulties to their teams. Like their counterparts elsewhere they were most likely to cite compliance with cybersecurity regulations as a challenge but they did so in smaller numbers.

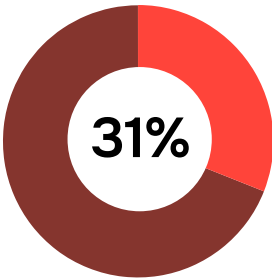
Which types of regulations are currently the most challenging for your team to comply with?

	FR	Average
Cybersecurity	39%	46%
Environmental/emissions standards	37%	28%
AI/ML-specific regulations	38%	26%

French participants were more likely than participants elsewhere to say that recent software recalls or failures have influenced their team’s approach to software development: just over two-thirds (67%) said this has been the case. Their organizations were also more likely than those elsewhere to have implemented major changes following these recalls or failures.



say that recent software recalls or failures have influenced their team's approach to software development



have implemented major changes following these recalls or failures

SDV industry AI sceptics may be most numerous in France

Participants in France were among those least likely to think that AI will play a “transformational” role, core to future development, for automotive software over the next three to five years: only 23% thought this would happen, down from 38% who said this in 2025. However, more than two in three (67%) said they think AI will play a “significant” role, integrated into development workflows, a notable increase from 56% a year ago.

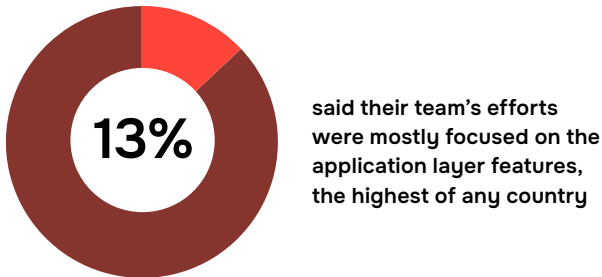
French participants estimated that, on average, 28.2% of their current software development workforce could be replaced by AI tools over the next decade – the smallest estimate made by participants in any country.

What percentage of your current software development workforce do you think could realistically be replaced by AI tools over the next decade?



Participants in France were less likely than those in any other country to believe that a deliberately minimalist, low-tech vehicle could succeed commercially as a differentiated market offering. Even so, almost seven out of ten (69%) said they thought such a vehicle could be commercially successful.

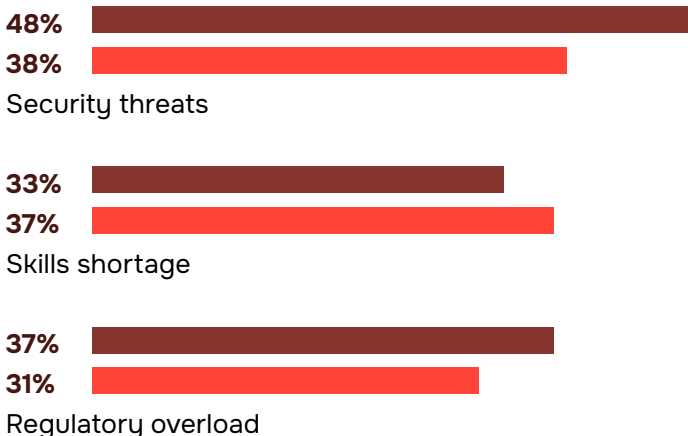
German SDV development teams are more likely to spend time focused on application layer features and user-facing functionality than any other country – but even so, only 13% said their team’s efforts were mostly focused on the application layer.



German participants have relatively little faith in the ability of the regulators keep up with the pace of innovation and complexity in SDV development. Fewer than one in five (19%) believe they can “definitely” keep up, compared to an international average of 26%. 18% said they think regulators will “probably not” be able to keep up: a higher number than in any other country. Both these findings show a notable loss of faith in regulators’ capabilities since last year, when 38% of German participants thought regulators could definitely keep up with innovation and only 11% thought they would probably fail to do so.

German developers biggest concerns for the future of automotive software development:

■ Average
■ German developers



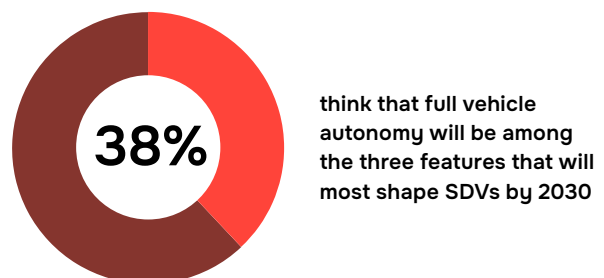
Technical complexity and skills shortages are major concerns for German OEMs

Only 37% of German participants cited cybersecurity vulnerabilities as a top risk for the successful roll-out of SDVs over the next five to ten years. This made Germany the only country whose participants did not rank it as the top risk for SDV success. Instead, German participants were most likely to suggest technical complexity and integration was most likely to be among these risks.

Their second most cited concern for the future was a skills shortage, cited by 37% of participants. German participants were more likely than those in any other market to identify real-time systems skills as the most critical skill for automotive software developers over the next five years, with 52% selecting this option.

German participants were among the least likely to see AI playing a “transformational” role in automotive software development during the next three to five years. Only 22% said this, making Germany the 2nd lowest percentage for this question next to China, which was also a significant drop from 39% a year ago. They were also least likely to think that full vehicle autonomy will be among the three features that will most shape SDVs by 2030, with 38% saying this, well below the international average of 47%.

These responses portray a German SDV industry focused on technical and practical challenges, resisting the temptation to get over-excited about the potential uses of AI.



Japanese participants have a noticeably different view of the biggest challenges in the SDV software development process from participants elsewhere. While debugging and testing is the most cited challenge in almost every other country, in Japan this was only the seventh most cited concern, cited by 29% of participants, fewer than anywhere else. Instead, Japanese participants were most likely to cite integration complexity and long development cycles among their greatest challenges, followed by procurement and licensing delays, which were cited more often in Japan than in any other country.

Biggest challenges in the software development process:

	JP	Average
 Debugging and testing processes	29%	44%
 Integration complexity	45%	39%
 Long development cycles	45%	37%
 Regulatory compliance	32%	36%
 A lack of scalability across vehicle, platform, or model lines	36%	32%

Our findings suggest Japanese OEMs are the least likely to focus most of their software development efforts on the application layer, but are also among the most likely to agree that there should be a greater focus on the application layer. Asked what would enable their team to spend more time working on the application layer they were more likely than participants in any other country to suggest more work on better integration across development tools and environments.

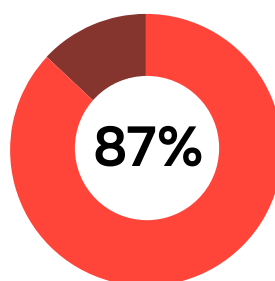
Japanese participants were the second most likely (behind only South Korea) to say that the impact of new regulations and legislation has led to them accelerating development timelines, and least likely to say it has led to delayed timelines, as OEMs battle to ensure the regulatory burden does not hamper productivity. But they are also least likely to rate the productivity of their

current development environments as “excellent”, with just 4% doing so, compared to an international average of 20%. More than one in three (34%) rate their development environment productivity as “average”, a figure exceeded only in South Korea.

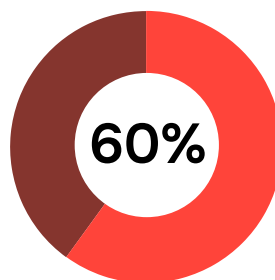
Each of these four figures were the highest for any country. The good news, one might hope, is that this heightened awareness of security-related threats and risks should remove any risk of complacency among Japanese SDV OEMs about protecting the integrity of their organizations and products.

Finally, Japanese participants were also more concerned about future skills shortages than their counterparts elsewhere: 49% cited this as one of their three biggest concerns for the future of automotive software development, more than in any other country.

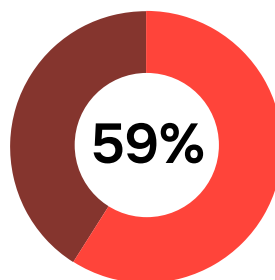
Security concerns are a major priority in Japan



said it is either “very” or “somewhat” likely that SDVs will become a major target for cyber attacks within the next three years



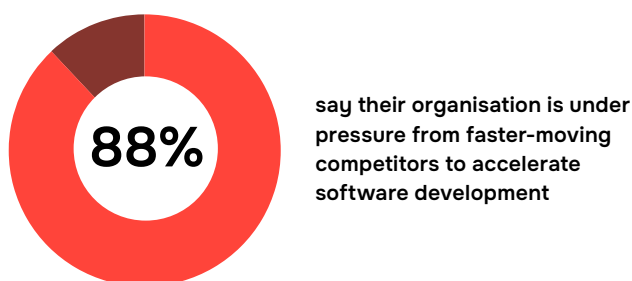
also said cybersecurity vulnerabilities represented the biggest risks to the successful rollout of SDVs during the next five to ten years



say security threats are one of their greatest concerns for the future of automotive software development

South Korea

Survey participants based in South Korea were the most likely to report that their organization felt under pressure from faster-moving competitors, with almost nine out of ten (88%) saying this, compared to an international average of 79%. Unfortunately, they were also among the least likely to rate the productivity of their current development environments as either excellent or good: just 61% said this (international average: 81%).



South Korean participants gave the highest average figure for the percentage of their organizations' software development efforts dedicated to foundational and integrational work (41.6%, compared to an international average of 34.8%). They were more likely than participants in any other country except China to say their teams' software development efforts were primarily focused on foundational software.

Yet South Korean participants were more likely than those in any other country to agree that OEMs should focus more on application-layer innovation and less on software infrastructure: 85% said this, compared to an international average of 76%. They were also the most likely to say that greater software reuse across vehicle programs would enable their teams to spend more time working on the application layer: 47% said this.

How would you rate your current development environment in terms of productivity?

	KR	Average
Excellent	14%	20%
Good	47%	60%
Average	39%	18%
Poor	0%	1%

Regulation and AI are both strong influences on South Korean SDV OEM activity

South Korean OEMs are most likely to have seen the introduction of regulation or legislation result in accelerated development times, with 46% claiming this was the case, compared to an international average of 39%. They were equally likely to rate both cybersecurity regulations and rules linked to functional safety as posing the most difficult compliance challenges, with AI/machine learning regulations only just behind – only Japanese participants were more likely to cite the latter.

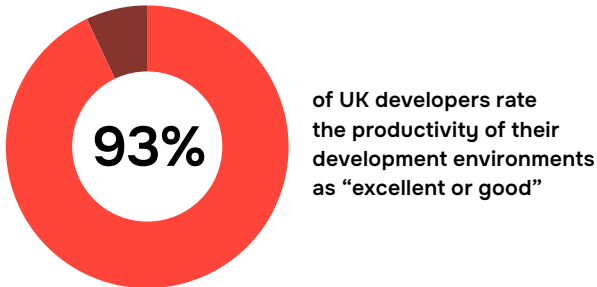
They were also the joint least likely (alongside Japanese participants) to say they were “very” confident in their team's ability to remain compliant with evolving regulations, with only 9% saying this, far below the international average of 30%.

As was the case in many countries, South Korean participants seem to have divided opinions on AI. They were the most likely to say that AI-driven personalization has been receiving more attention than is currently warranted, with almost two-thirds (65%) saying this, compared to an international average of 52%. They were also the second most likely (behind Japan) to say full vehicle autonomy has been given unwarranted attention, with 64% saying this (international average: 56%). But they were also most likely to say that AI-driven personalization is one of the three features that will most shape SDVs by 2030, with 58% saying this.

They were the least likely to say a skills shortage was one of their three biggest concerns for the future of automotive software development, with only 13% choosing this, compared to an international average of 33%. This may be linked in part to the fact that, on average, almost half (46.8%) of their current automotive software development process is automated, a figure exceeded only in China (47.5%).

They also offered the highest estimate when asked what percentage of their current software development workforce could realistically be replaced by AI tools over the next decade (43.1%, compared to an international average of 33.6%).

SDV software developers in the UK are more positive about the productivity of their development environments than participants in any other country surveyed. More than nine out of ten participants (93%) rate current software development environment productivity as either “excellent” (26% - second only to the US) or good (67% - second only to China), both higher than responses recorded in 2025.



UK participants also acknowledge some major, evolving challenges in the software development process, similar to most other countries surveyed. They are now most likely to say debugging and testing is a major challenger in development processes (52%), a big jump from 39% of UK participants who said this in 2025.

UK participants are the second most likely (behind South Korea) to either “strongly” or “somewhat” agree that OEMs should focus more on application layer innovation than software infrastructure, with eight out of ten (81%) saying this. But only 7% say their team’s software development efforts are primarily focused on the application layer, which is one of the lowest percentages in any country.

Biggest concerns for the future of automotive software development:

	UK	Average
Regulatory overload	42%	37%
Security threats	39%	48%
Global trade & tariff uncertainty	37%	33%

Regulatory, security and technology concerns

Regulatory overload remains a major concern in the UK, cited as the second biggest challenge to software development and also most likely to be cited as a major concern in relation to the future of automotive software development. 42% cited the latter, more than in any other country.

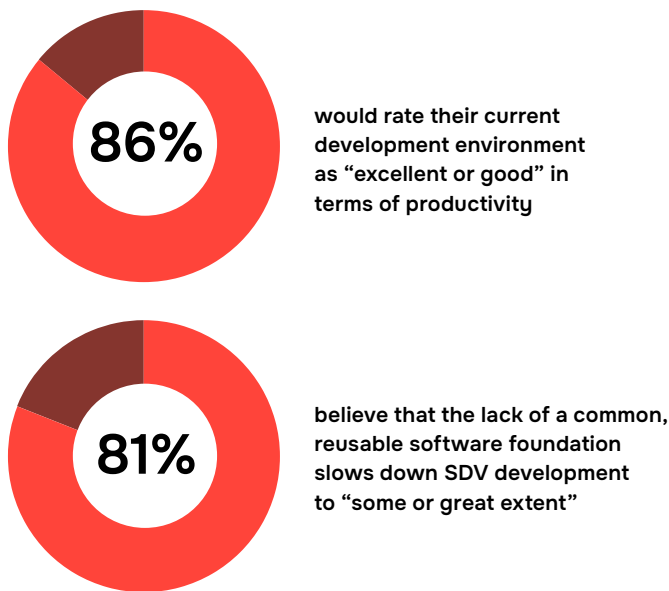
UK participants said cybersecurity regulations were most challenging for their team. This was also the case in 2025, but numbers giving this response in 2026 were up by eight percentage points to 55%, the second highest number in any country. Concerns about cybersecurity in the UK were also visible in seven out of ten UK participants (71%) saying cybersecurity skills would be among the most critical for automotive software developers during the next five years – a higher figure than in any other country.

Nine out of ten (91%) UK participants said they thought AI would play either a “transformational” or a “significant” role in automotive software development over the next three to five years. This is higher than the equivalent combined figure in any other country. It includes 31% who think AI will play a transformational role, also the highest figure anywhere.

Yet UK participants were equal most likely (along with those in Japan) to think it is either “somewhat” or “very” likely that a deliberately minimalist, low-tech vehicle could succeed commercially as a differentiated market offering. Almost one in three (32%) of UK participants said they thought commercial success would be ‘very’ likely, up from 20% in 2025. This suggests that as SDV capabilities continue to advance there is a growing belief in the UK industry that competitive differentiation could also be driven by the more selective use of software to deliver reliable and enjoyable driving experiences.

As elsewhere, debugging and testing was most likely to be seen as a major challenge in the software development process. With 51% of US participants saying this, it was the second-highest response to this question across all eight countries. The major challenges cited most often besides this were integration complexity (by 41% of US participants), long development cycles (39%) and regulatory compliance (38%).

Despite these challenges, US participants were bullish about the quality of their development environments, with 31% saying productivity was “excellent”. This was more than any other country, even despite being a drop from 38% in 2025. This fall suggests a greater awareness of how those challenges in the development process might impact processes.



US participants were more likely than their counterparts elsewhere to “strongly” agree that OEMs should focus more on application layer innovation and less on software infrastructure, with 22% saying this. They were the second most likely to say that both greater software reuse across vehicle programs and better integration across development tools and environments would help their teams spend more time working on the application layer. They were also most likely to say that the lack of a common, reusable software foundation slows down SDV development, and most likely to believe it slows development “to a great extent”.

US OEMs retain a focus on consumer sentiment, in the face of technical challenges

48% of US participants feel “very” confident in the ability of their teams to keep up and ensure compliance with evolving regulations the highest figure by some distance. A total of 97% claimed they were either “very” or “fairly” confident, the second highest response of joint confidence figure of all countries. Yet both of these figures are lower than in 2025, when they were 99% and 53% respectively.

Asked what they feel are the biggest risks to the successful roll-out of SDVs during the next five to ten years, US participants’ responses largely mirror those of their counterparts elsewhere. Cybersecurity vulnerabilities, technical complexity/integration and regulatory uncertainty were all featured responses - but 39% highlighted the issue of consumer trust, more than in any other country.

Two-thirds (66%) of US participants also say functional safety is “very important” in their automotive software development work, the highest figure for participants in any country. 52% say consumer trust in advanced driver assistance systems depends on software functional safety, a figure exceeded only, and narrowly, in Canada.

Finally, US participants were more likely than those anywhere else to think that a deliberately minimalist low-tech vehicle, designed to limit digital features and connectivity could succeed commercially. More than one in three (34%) said this was “very likely”, compared to an international average of 24%.

Collectively, these responses suggest that the increasingly practical and technical difficulties faced by US SDV developers are creating some notable problems in development processes. Yet they remain acutely aware of the importance of pleasing their customers, as expressed both in their acknowledgement of both the importance of retaining consumer trust in these vehicles, and the possibility that vehicles which make much more selective use of technology in driver-facing functions will appeal to some consumers.



Methodology

This report is based on research conducted on behalf of QNX by OnePoll in July and August 2026. Surveys were conducted of 1,100 embedded software developers working for automotive businesses based in Canada, China, France, Germany, Japan, Korea, the UK and the US.

About QNX

QNX, a division of BlackBerry Limited (NYSE: BB; TSX: BB), provides the trusted foundation that software-defined and physical AI systems depend on to operate safely and predictably in the real world. For nearly half a century, QNX has powered safety-critical applications where failure is not an option. The business leads the way in delivering safe and secure operating systems, hypervisors, middleware, solutions, and development tools, along with support and services delivered by trusted embedded software experts. Today, QNX® technology underpins hundreds of millions of vehicles on the road and a wide range of mission-critical systems across industrial controls, robotics, medical devices, commercial transportation, rail, aerospace and defense. QNX is headquartered in Ottawa, Canada.

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