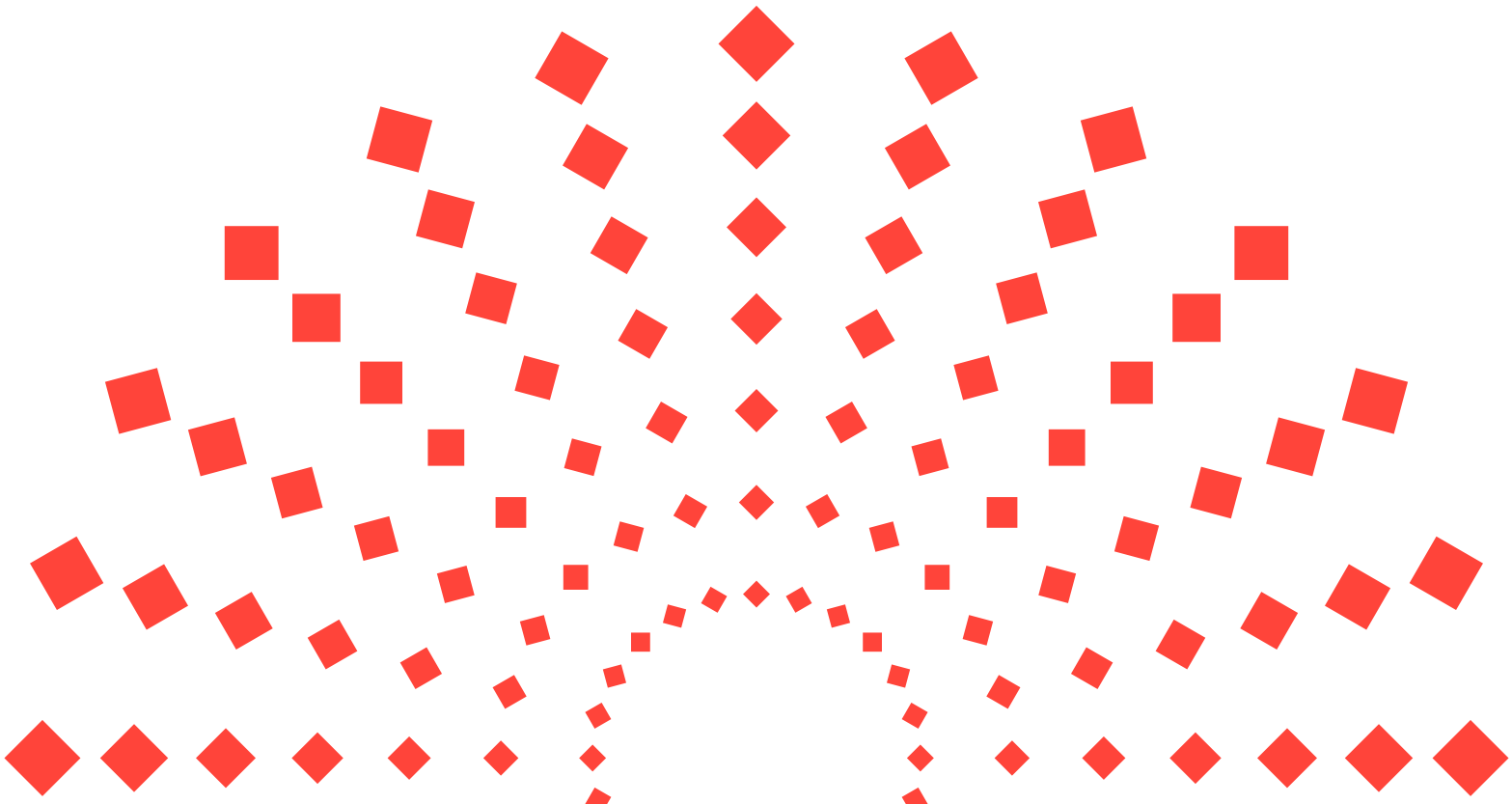
QNX

Report

Under The Hood

SDV Developer Report



Foreword

The technology that underpins the automotive industry has come a very long way in a very short time - and is still evolving at extraordinary speed. More than ever before, the success of the industry rests on the capabilities of software-defined vehicles (SDVs) and the software developers who build and refine the products and services upon which they depend.

Today, the industry is operating under immense and complex pressures created by economic forces and by the need for these remarkably complex vehicles to be driven as safely as possible. With AI and other emerging technologies about to drive yet more change, we felt it was a good time to talk to embedded software developers about the state of play in the SDV world.

We surveyed 1,100 embedded automotive software developers across North America, Europe, and Asia. We asked them how new regulations and software recalls have affected development processes, which regulations are causing them the most difficulty, how they think AI will change the industry over the next few years, what SDVs will look like by 2030, and much more.

Our findings show that while these and other factors are creating huge challenges, it remains a resilient, endlessly creative, and adaptable industry. There are some interesting and instructive differences in the ways that developers in different countries see their role within the broader automotive ecosystem, but it remains true that OEMs that harness the right mix of technologies and collective, collaborative capabilities can succeed in this incredibly competitive environment.

Justin Moon
VP, Core Product Engineering, QNX

Key findings

80% of automotive software developers 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.

Only 30% of developers rated their working environment as excellent – a shortfall in quality that poses a clear risk to productivity, retention, and innovation.

91% said AI will play a major role in automotive software development during the next three to five years, and AI tools could replace more than a third (35%) of human software development roles.

Major challenges hampering software development processes included long development cycles (cited by 37%), debugging and testing processes (36%), integration complexity (36%), a lack of scalability across vehicle, platform, or model lines (36%), and regulatory compliance (35%).

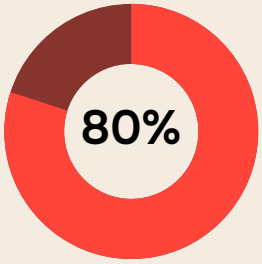
58% of developers say recent software recalls have significantly changed their approach, with nearly 40% calling these changes “major.”

Major challenges hampering software development processes include:

Long development cycles	37%
Debugging and testing processes	36%
Integration complexity	36%
A lack of scalability across vehicle, platform, or model lines	36%
Regulatory compliance	35%

Development and productivity challenges

Eight out of ten automotive software developers (80%) said their businesses should be focusing on innovation in the application layer, rather than foundational software infrastructure, in order to bring innovative features and capabilities to market more quickly and to better differentiate end user experiences. Vice-presidents of engineering – often the budget holders and final decision-makers – are particularly likely to hold this view: 94% agree such a shift is a good idea, including 39% who "strongly agree".

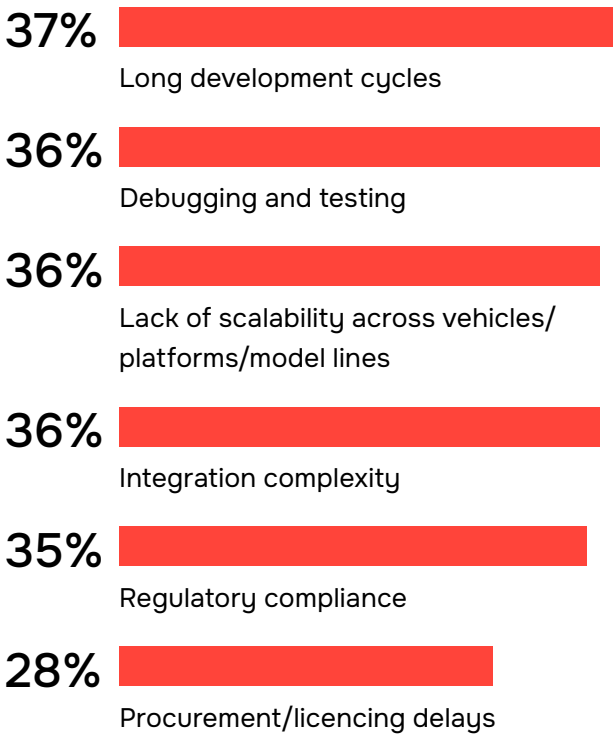


of automotive software developers said their businesses should focus on innovation in the application layer

The biggest challenges hampering software development

Participants were asked to choose up to five issues from a list of the biggest challenges hampering software development. Those most frequently cited included long development cycles (by 37% of developers), debugging and testing processes (36%), integration complexity and a lack of scalability across vehicle, platform or model lines (both also 36%), and regulatory compliance (35%).

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



Notably, VPs of engineering cite integration complexity as one of the five biggest challenges they face, with 52% saying this, compared to 36% of all developers.

A disconnect between consumer expectations and software delivery timelines

We also asked respondents to identify up to three main reasons for the disconnect between consumer expectations and software delivery timelines. The most commonly reported factors were regulatory delays, inefficient development processes, and a shortage of skilled talent.

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

Development environments are a potential barrier to innovation

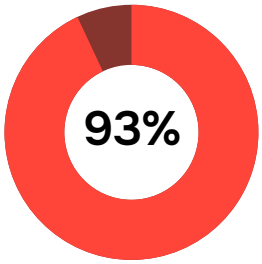
Just three out of ten developers said their current development environment was 'excellent'. Working in a lower quality environment undermines productivity, reduces opportunities to nurture innovation, and can make retention of key personnel more difficult. Developers in Japan were the least satisfied with their working environment: only 14% rated it as excellent. Even in the US, where 38% were working in an excellent environment, more than six out of ten were not.

How do developers in each country rate their current environment in terms of productivity?

	CN	GB	CA	DE	FR	JP	US	IN	Average
Excellent	28%	25%	36%	33%	25%	14%	38%	31%	30%
Good	66%	63%	47%	53%	61%	44%	52%	65%	56%
Average	6%	11%	16%	14%	13%	28%	10%	4%	12%
Poor	0%	1%	1%	0%	1%	13%	0%	0%	1%
Very poor	0%	0%	0%	0%	0%	1%	0%	0%	0%

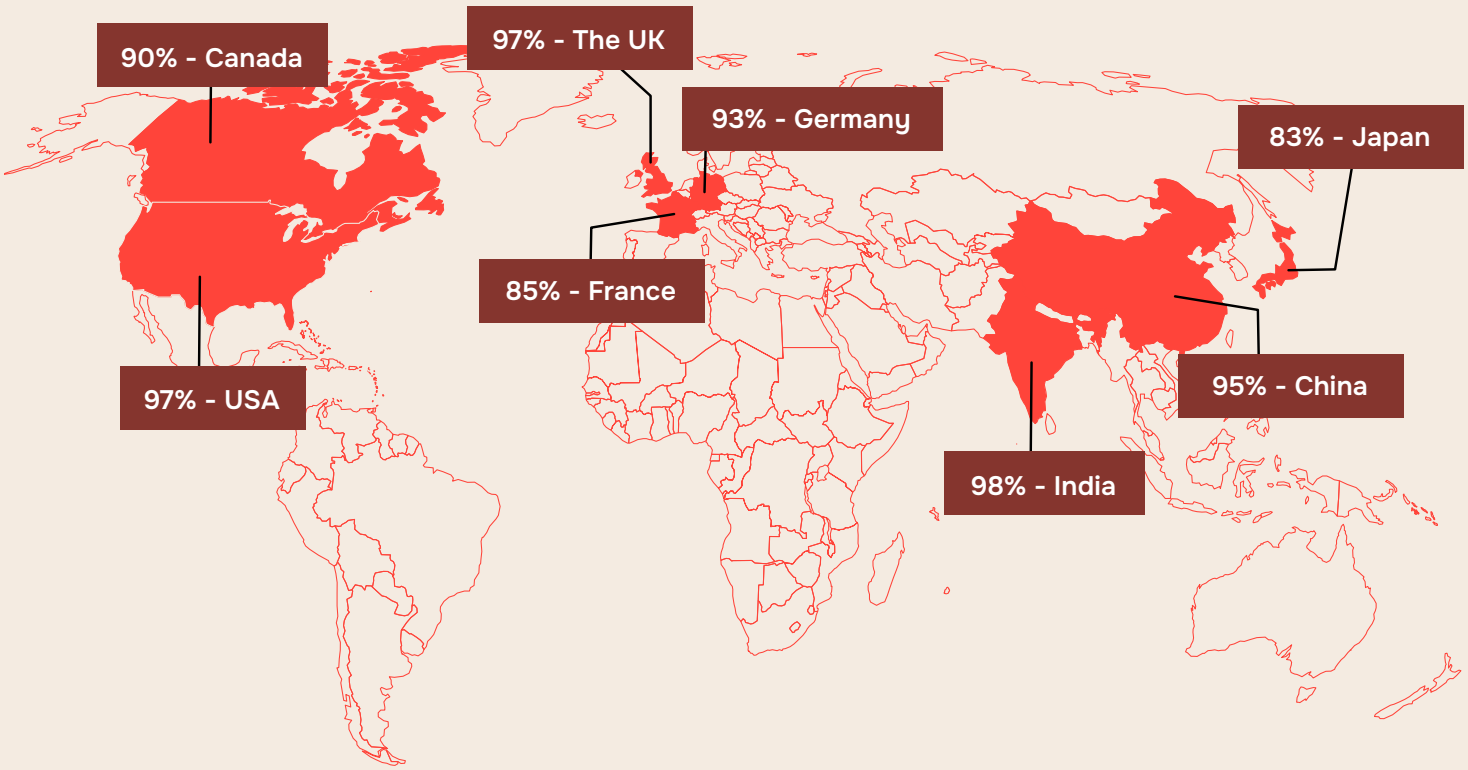
The value of collaborative approaches

The findings show that those working in the automotive industry understand the value and potential benefits of cross-industry collaboration between OEMs, Tier 1 suppliers, and software vendors. More than nine out of ten developers (93%) said this was important in their current development projects, including 48% who said it was ‘very important’. Collaboration was particularly highly prized in India, the UK, and the US, where almost every respondent says this kind of collaboration is critical.



said cross-industry collaboration between OEMs, Tier 1 suppliers, and software vendors is important

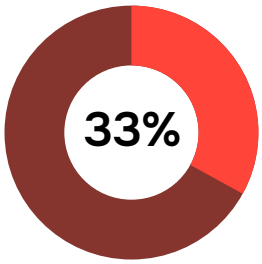
What percentage of developers think cross-industry collaboration is important?



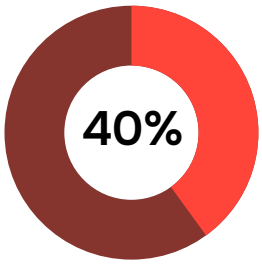
Regulatory and compliance complexity, and its impact on development

The work needed to attain and maintain is complex – but so is the effect of that work on the SDV industry. During 2024, more than 500 new regulations and legislative proposals that had a direct impact on the development of in-car technology were introduced globally. Because this is a highly international industry, with many OEMs operating across multiple jurisdictions and working with globally based suppliers, it faces an enormous additional regulatory burden. One in three respondents (33%) say new regulations and legislative proposals introduced during 2024 led to delays in development timelines.

However, 40% said these changes had resulted in accelerated timelines – a demonstration of the industry's commitment to finding a way to operate effectively. Most developers expressed confidence in their team's ability to keep up with evolving regulations and remain compliant: 93% agreed, including 99% of those in India and the US.



say new regulations and legislative proposals introduced during 2024 led to delays in development timelines

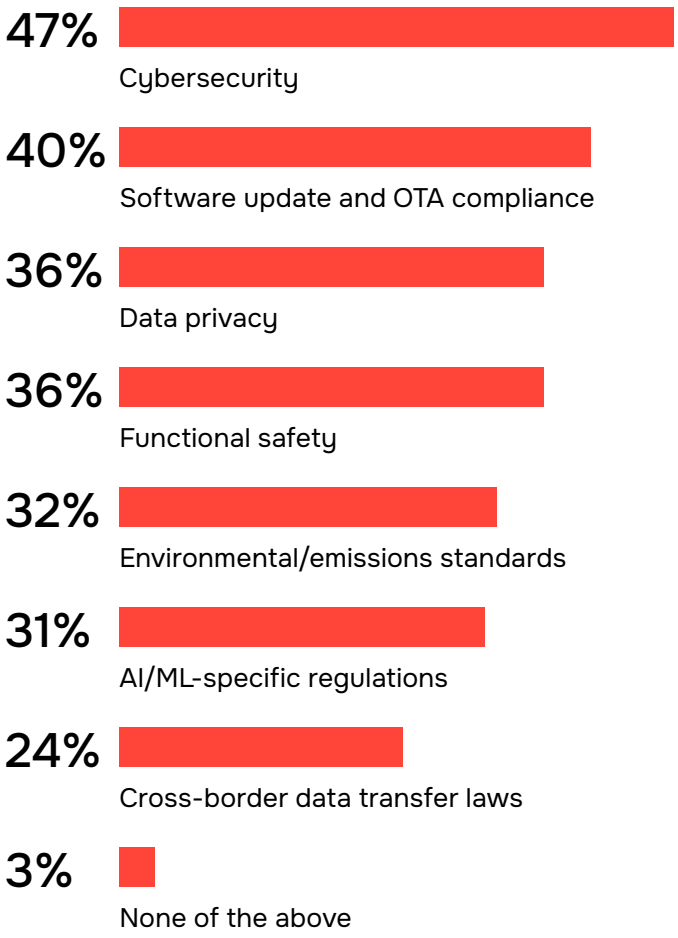


said changes to regulations and legislation had resulted in accelerated timelines

The most challenging regulations

We asked respondents to tell us which regulations currently present the biggest challenges to their teams. Almost half of all respondents (47%) cited cybersecurity as the biggest challenge. Software update and over-the-air (OTA) compliance, data privacy, and functional safety regulations were also cited by substantial numbers of respondents in each country.

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



Can regulation keep up with innovation?

One perennial question for anyone working in the software world is whether regulation can keep pace with innovation. There was a reasonable amount of confidence among developers about the likelihood of regulatory frameworks being able to evolve fast enough to keep up with the pace of innovation and complexity of SDVs, particularly among those in India, the US, and China. But while more than eight out of ten (85%) said this will either 'definitely' or 'possibly' be the case, only one in three said it will 'definitely' happen.

Finally, while these answers revealed relatively strong confidence about businesses' ability to cope with seemingly endless regulatory change, and about regulation being able to keep up with innovation, alternative findings suggested a more nuanced view. As we will see below, more than one in three said both that the potential impact of regulatory overload was one of the biggest concerns they had about the future of automotive software development, and that this will also be one of the biggest risks to the successful roll-out of SDVs in the next five to ten years.

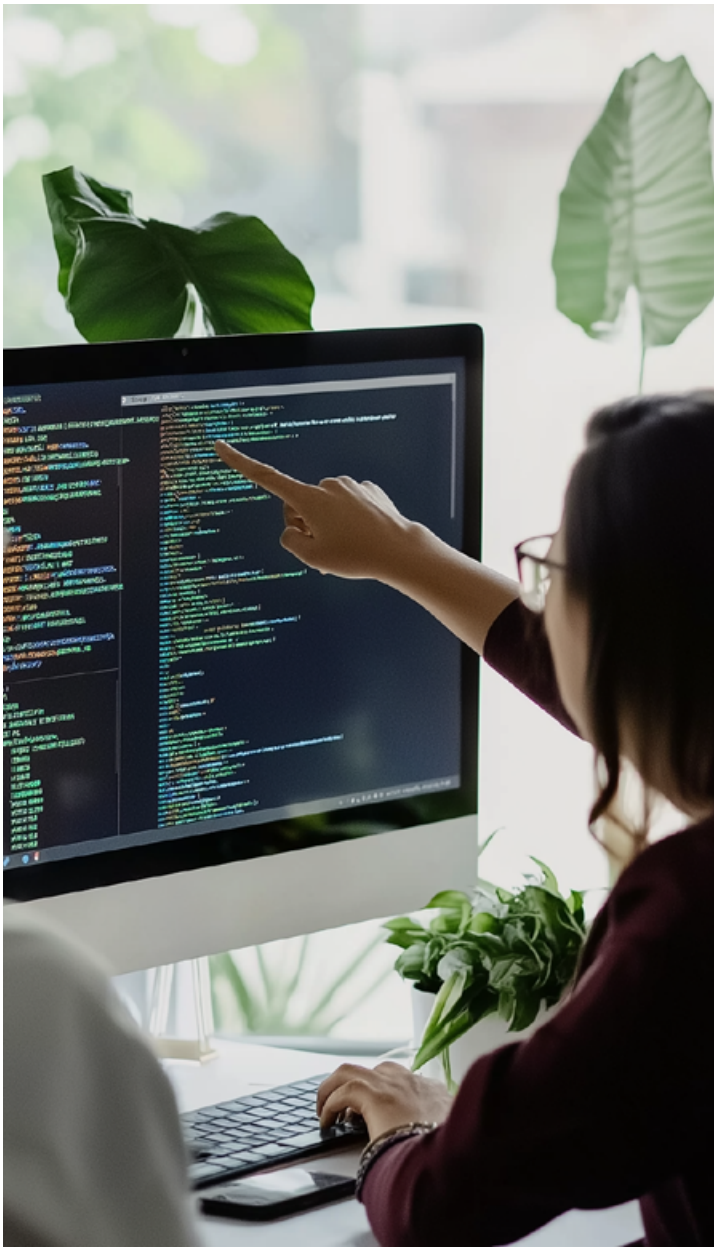
How do developers in each country think their confidence in their team's ability to stay compliant with evolving regulations has changed over the past 12 months?

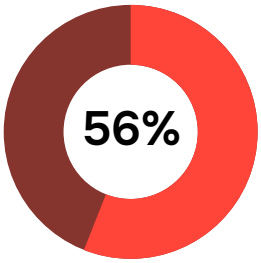
	CN	GB	CA	DE	FR	JP	US	IN	Average
Increased	55%	55%	32%	41%	40%	41%	61%	73%	51%
Stayed the same	43%	41%	59%	55%	56%	44%	38%	25%	45%
Decreased	2%	3%	9%	3%	3%	7%	1%	2%	3%
Not sure	0%	1%	0%	1%	1%	8%	0%	0%	1%

View from the top: The VP of engineering's perspective

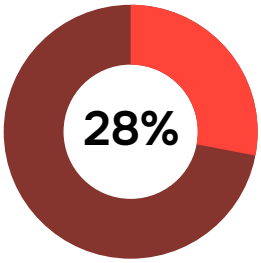
Responses provided by the vice presidents of engineering tended to offer a more sober view of challenges facing the industry, revealing the unique insights they bring as influential evaluators and decision-makers. For instance, they were more likely than respondents in any other role to identify integration complexity as one of the biggest challenges in software development.

A more measured, even sceptical view was evident when asked about the ability of regulatory frameworks to keep up with innovation in SDVs. VPs of engineering were almost twice as likely as many of their colleagues to say that they didn't think regulatory frameworks will keep pace with innovation – with 24% saying this, compared to an average of 14% across the full sample.





of OEM business executives felt ill-prepared to meet future requirements



of people working in their technical departments felt ill-prepared to meet future requirements

This outlook is in line with recent research published by Deloitte, which found that 56% of OEM business executives felt ill-prepared to meet future requirements, compared to only 28% of people working in their technical departments [1].

These findings suggest that senior leaders approach these questions with a broader perspective, informed by a deeper understanding of organisational dependencies, risks, and regulatory obligations than respondents in other roles. This strategic vantage point strongly influences how these executives assess risk, evaluate capabilities within the business, and make software-related decisions.

Industry outlook, innovation, and future skills

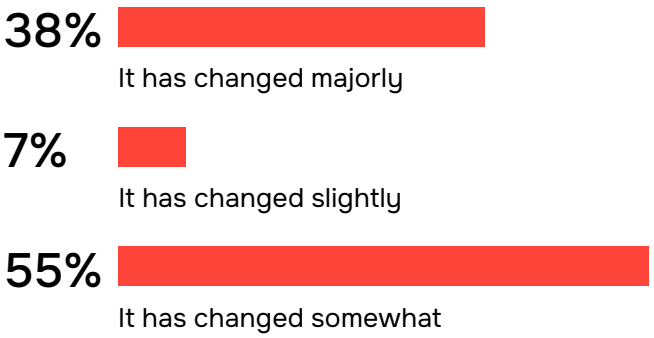
In recent years, software recalls and failures have become a critical challenge for the SDV industry. In the US, software-related recalls rose 80% in 2024, reaching 202 cases compared with 112 in 2023, and software-related issues accounted for 44% of all recalls, according to JD Power's US Initial Quality Study 2025 [2].

Almost six out of ten developers reported experiencing an impact on software development process as a result of software recalls. However, responses varied considerably dependent on country, with businesses in India, France, the US, and Japan experiencing a greater impact than those elsewhere.

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

	Yes	No
CN	33%	65%
GB	57%	39%
CA	45%	53%
DE	42%	51%
FR	69%	29%
JP	65%	22%
US	66%	32%
IN	72%	28%

How do developers believe their teams' approach has changed in response to software recalls or failures?



38% of the developers who said software recalls and failures have led to changes in their team's approach to development said the approach has changed 'majorly', with those in the US most likely to say this.

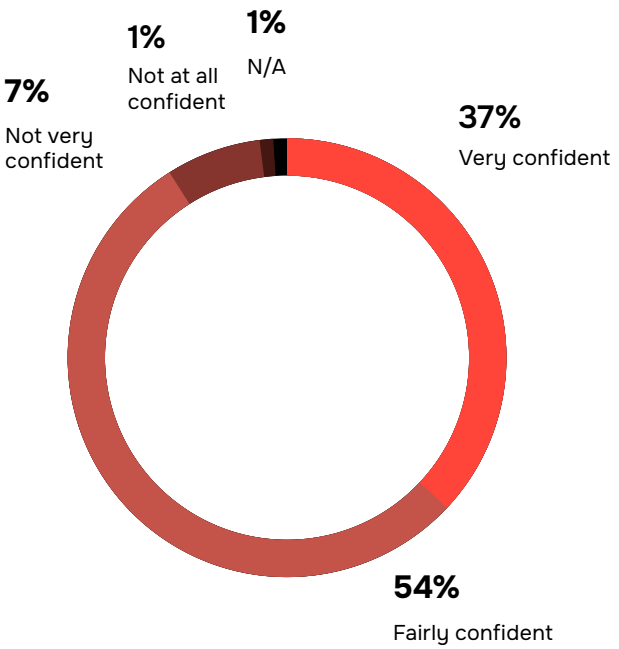
Safety and security

Asked how important functional safety is to their work, 95% of developers said it is important, including 53% who said it is 'very important'. When asked to what extent consumer trust in advanced driver-assistance systems depends on the software's functional safety, 96% of developers said this is true to at least some extent, including 49% who said it is true 'to a great extent'.

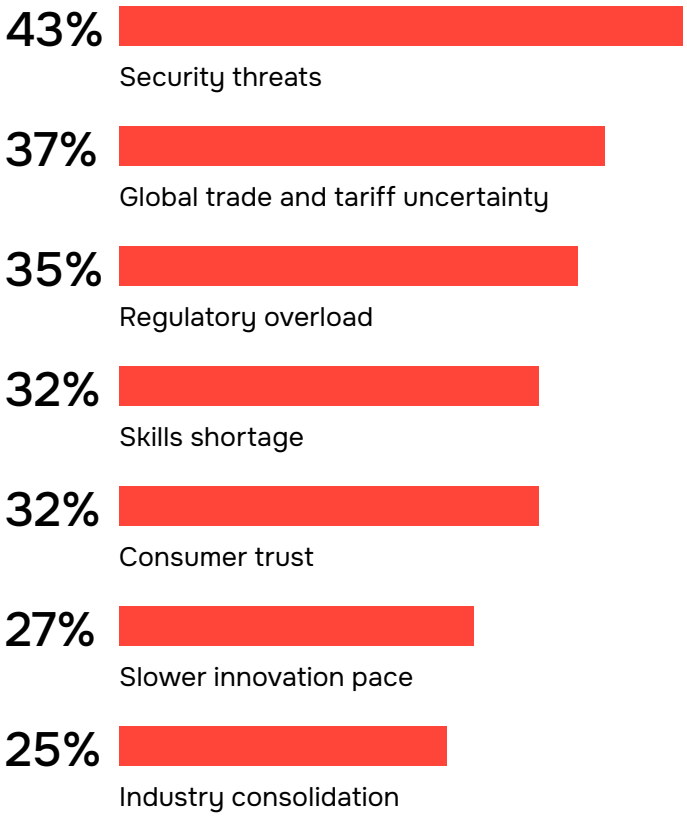
We also asked how confident developers were about the security within their software. Nine out of ten (91%) said they were confident about this, including 37% who were 'very confident'. Those in India and the US were most confident, with 60% of developers in India 'very confident'.

This confidence in the security within the software was reassuring, but developers were not naïve about the potential for security threats and risks to affect the industry. When we asked which were their three biggest concerns about the future of automotive software development, more of them (43%) cited security threats than any other potential threat. It was also notable that, as well as ongoing uncertainty around global trade, along with worries about regulation and skills shortages reflected elsewhere in our findings, consumer trust in their vehicles and software was also a major concern, cited by almost one in three developers.

How confident are developers in the security in the software in the vehicles their organization produces?



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



What will the SDV look like in 2030?

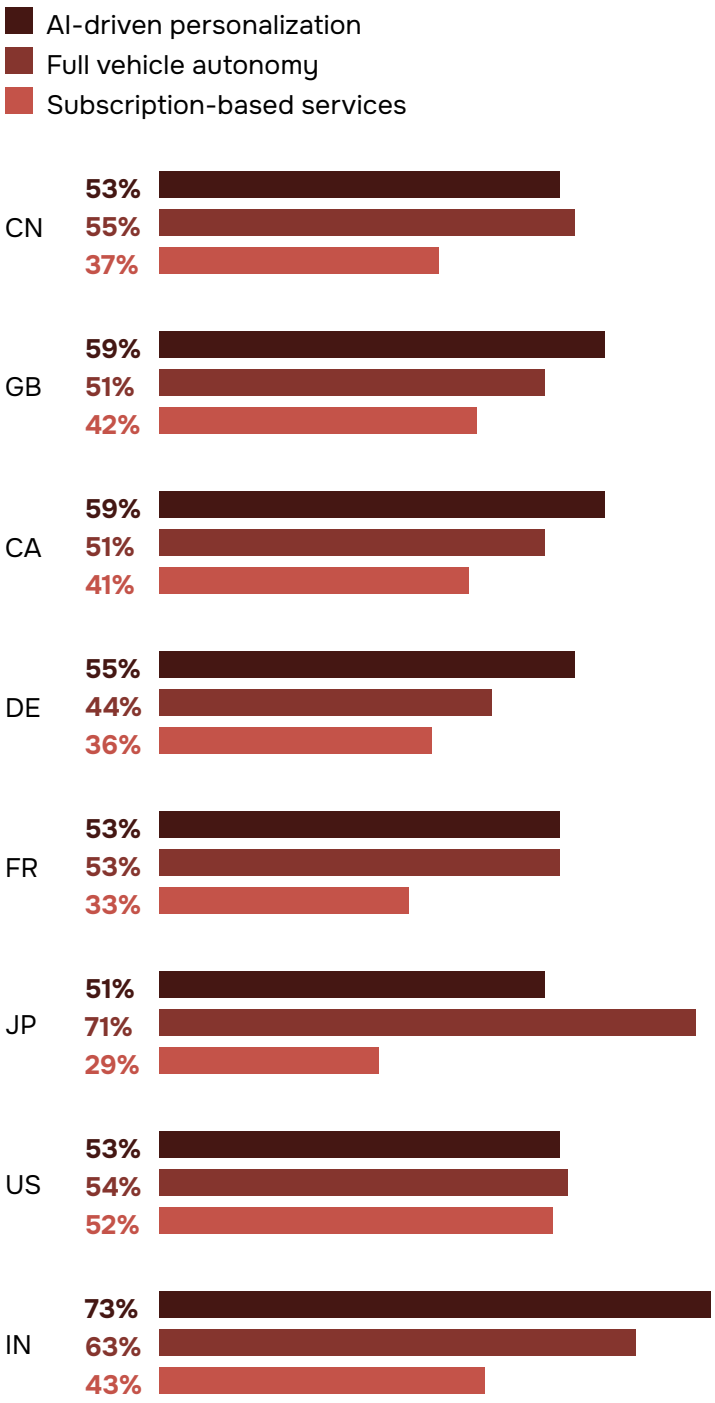
Developers also identified the features most likely to define SDVs by 2030, with nearly half highlighting AI-driven personalisation and full vehicle autonomy – perhaps reflecting the same respondents who felt these areas currently receive excessive attention. Additionally, more than four in ten predicted that 'seamless integration with smart infrastructure' and full OTA update capabilities will be key components in shaping the future of the SDV.

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

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

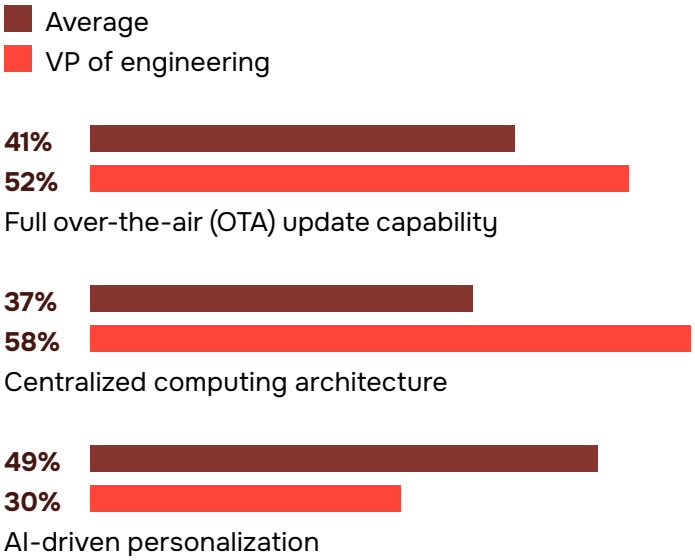
Developers have strong views about where the SDV industry has been making mistakes. When asked which aspects of SDVs are currently receiving more attention than they warrant, over half of respondents pointed to both AI-driven personalisation and full vehicle autonomy. Large minorities also cited subscription-based services and OTA updates as being overemphasised. Respondents in India were particularly critical of the attention given to AI-driven personalisation and full vehicle autonomy, while those in Japan were most likely to single out the latter.

Which aspects of software-defined vehicles (SDVs) do developers believe receive more attention than warranted at this stage?



A notable role-specific insight emerged from vice presidents of engineering. While their views largely aligned with other respondents on many features, VPs of engineering were significantly more likely to highlight OTA updating and centralised computing architecture as defining features of future SDVs, and less likely to prioritise AI-driven personalisation.

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



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

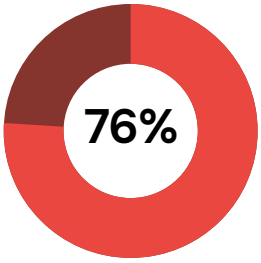
Most of us love technology if it makes our lives easier, but many of us also find some technological features of the modern world frustrating when they create unnecessary complications, or information overload. Sometimes people respond very well to machines that are less hi-tech: simple but effective. When driving, many people also enjoy the physical feeling of being behind the wheel, and the feeling that it is them, not a computer, controlling the vehicle.

For that reason, we asked developers whether a deliberately minimalist, low-tech vehicle, designed to limit digital features and connectivity, could succeed commercially as a differentiated market offering.

The responses were surprising. More than three-quarters (76%) agreed that the commercial success of a low-tech vehicle would be very or somewhat likely, including more than a quarter (27%) who said it would very likely succeed in the market. Of these respondents, those in India, the US, China, and the UK were most optimistic about its chances of commercial success.

National differences in these responses likely reflect developers' awareness of market conditions in their respective countries. Overall, however, the findings are unsurprising. They highlight not only frustration with technology overload in some products, but also the impact of cost-of-living pressures. Many consumers may feel they simply can't justify buying a car stuffed with technology they don't truly need.

While it is understandable that OEMs focus on higher-end models that offer better margins, these findings should serve as a reminder to not neglect other segments of vehicle markets.



agreed that the commercial success of a low-tech vehicle would be very or somewhat likely

How likely do developers think is it that a deliberately minimalist, low-tech vehicle – designed to limit digital features and connectivity – could succeed commercially as a differentiated market offering?

	CN	GB	CA	DE	FR	JP	US	IN	Average
Very likely	29%	20%	17%	24%	22%	15%	38%	46%	27%
Somewhat likely	56%	62%	51%	43%	44%	48%	47%	42%	49%
Somewhat unlikely	14%	15%	17%	20%	27%	27%	12%	9%	17%
Very unlikely	0%	3%	7%	9%	7%	5%	2%	2%	4%

The developer of the future

Whatever the SDV looks like in 2030, we wanted to know which skills developers think are most likely to be critical for automotive software developers during the next five years. The three most commonly selected skillsets reflected concerns with 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?

Cybersecurity	58%
Functional safety	53%
AI/ML integration	51%
Real-time systems	48%
Cloud-native development	38%

AI, automation and cyber security

We asked developers about alternative ways emerging technologies will shape the future of the SDV. On average, respondents reported that about 45% of their current automotive software development process was already automated. Responses were fairly consistent across all the markets surveyed, with automation levels a little higher (51%) in India, and a little lower (39%) in Canada. Responses reflected a variation due to the size of business, notably, the more employees a business has, the higher likelihood of automation to be used in the software development process. In businesses with over 500 employees, this level reached about 48%, compared with 39% in businesses with fewer than 50 employees.

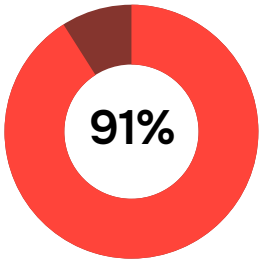
How much of your current automotive software development process is automated? (Results shown by organisation size)

	1-49	50-249	250-499	500-999	1000+	All
1-25%	28%	18%	12%	11%	12%	14%
26-50%	35%	56%	56%	46%	43%	49%
51–75%	20%	20%	28%	35%	36%	30%
76-100%	10%	4%	3%	7%	7%	6%
Unsure	1%	1%	0%	1%	2%	1%
None	6%	0%	0%	0%	0%	1%

The impact of AI on SDVs

As is the case in virtually every other industry, AI technologies will play an important role in the future of the SDV.

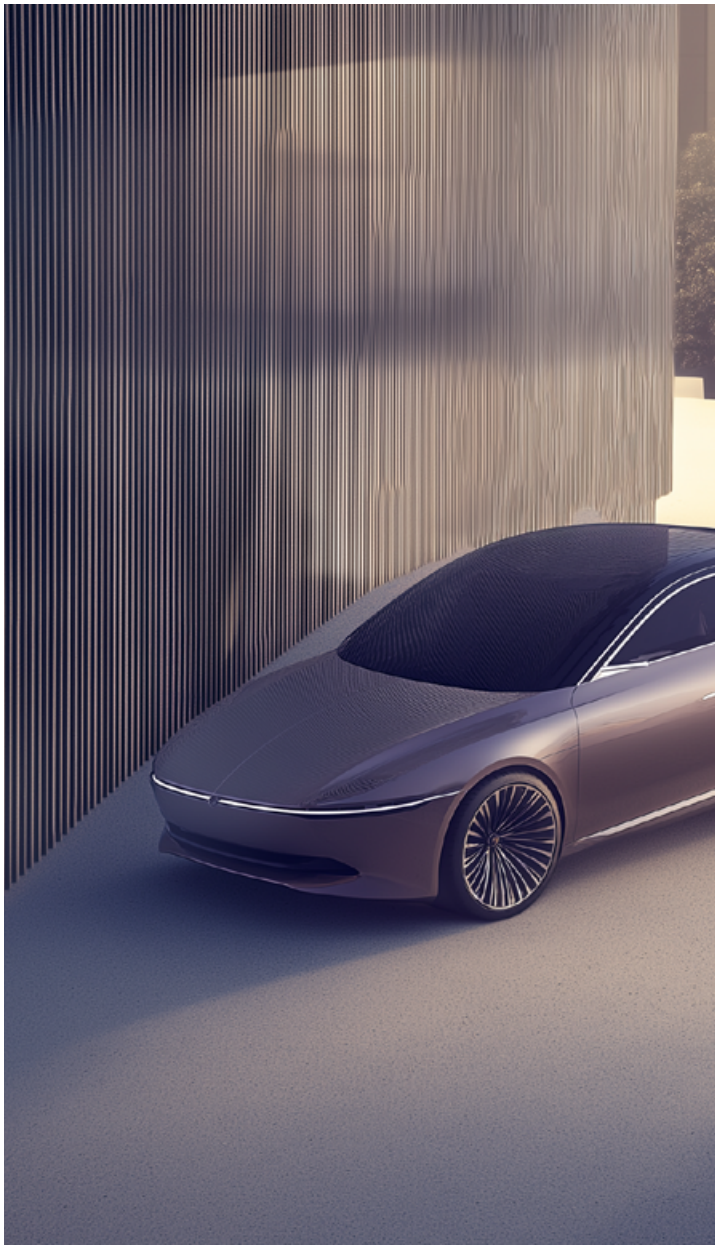
More than nine out of ten (91%) of developers cited that AI will play a major role in automotive software development during the next three to five years.



of developers cited that AI will play a major role in automotive software development during the next three to five years

That figure comprised 55% who expected AI to play a 'significant' role, integrated into development workflows; and 36% who said its role will be 'transformational' and at the heart of future development processes. Developers in India were most likely to say AI will play a transformational role, with 51% predicting this.

We also asked developers what percentage of software development workforces within their businesses might realistically be replaced by AI tools during the next decade.



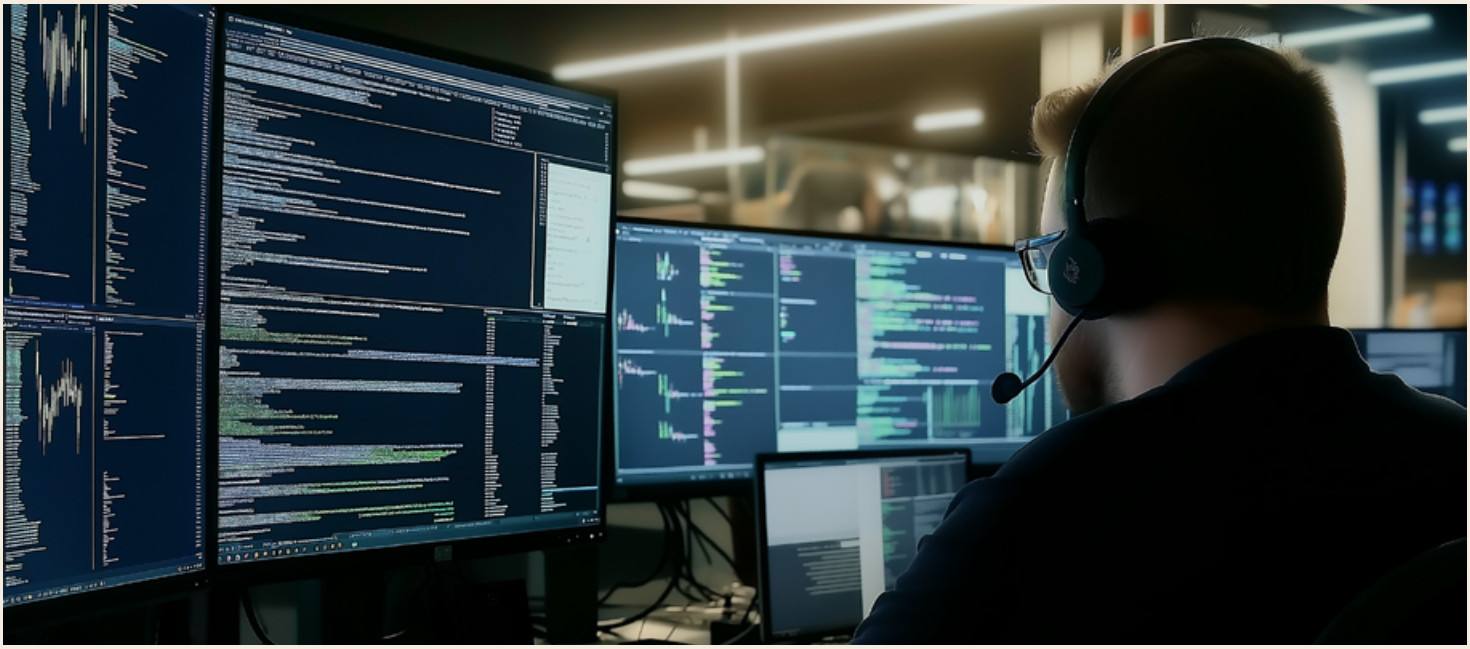
What role do you see AI playing in automotive software development over the next 3–5 years in India?

Transformational	51%
Significant	42%
Moderate	7%

On average, developers said they expected AI tools to replace more than a third (35%) of human software development roles.

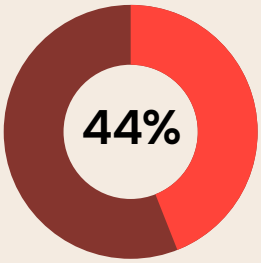
Three-quarters of developers (75%) predicted that up to half of software development roles will be replaced by AI tools.

The average share of development roles that developers in India expected would be replaced by AI tools was 43%.



Future risks

As noted above, developers identified cybersecurity vulnerabilities as the greatest risk to successful SDV roll-out over the next five to ten years, with 44% citing this concern. Other major risks, each noted by at least one-third of respondents, included technical complexity and integration, regulatory uncertainty, cost and return on investment issues, global trade and tariff uncertainty, and consumer trust.



cited cybersecurity vulnerabilities as the greatest risk to successful SDV roll-out over the next five to ten years

What do developers think are the biggest risks to the successful rollout of software-defined vehicles (SDVs) in the next 5–10 years?

Cybersecurity vulnerabilities	44%
Technical complexity and integration	37%
Regulatory uncertainty	36%
Cost and ROI concerns	36%
Global trade and tariff uncertainty	33%

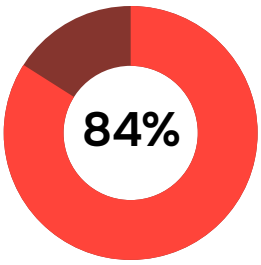
Regional-specific sections

North America

Developers in the US were among those most likely to agree that OEMs should focus more on application-layer innovation and less on software infrastructure, with 84% saying they agreed, including more than one in three (36%) of developers who 'strongly agree'. More than seven out of ten Canadian developers (71%) also agree.

Across all developers surveyed, the skills thought to be most critical for automotive software developers during the next five years are cybersecurity skills, and developers in the US were the second most likely to say this: 62% do, compared to 58% across all markets. American developers see functional safety skills as second most important, with 53% citing them.

Canadian developers said real time systems skills will be the most important, with 53% picking them, the second highest national figure for this skillset, just behind India. Canadians rated cybersecurity skills as second most critical, with 52% choosing them, just ahead of functional safety (51%).



of developers in the US agree that OEMs should focus more on application-layer innovation and less on software infrastructure

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

	CN	GB	CA	DE	FR	JP	US	IN	Average
Cybersecurity	43%	68%	52%	58%	56%	53%	62%	61%	58%
Functional safety	57%	50%	51%	49%	51%	57%	53%	57%	53%
AI/ML integration	56%	50%	41%	46%	46%	59%	52%	57%	51%
Real-time systems	41%	47%	53%	51%	47%	35%	50%	55%	48%
Cloud-native development	42%	37%	43%	39%	32%	34%	38%	47%	38%

Developers in the US were among those most likely to believe that a deliberately minimalist, low-tech vehicle with limited digital features and connectivity could succeed commercially: 85% said this, a figure equalled among those in China and exceeded only by those in India. 38% of US developers said such a vehicle would be 'very likely' to succeed – again, only in India did a larger share (46%) think this.

Canadian developers were considerably less likely to think such a vehicle would succeed there. While more than two-thirds (68%) said it would, that included only 17% who said this would be 'very likely' – the second lowest figure among all countries surveyed.

The UK

Three quarters of developers in the UK said they agreed that OEMs should focus more on application-layer innovation and less on software infrastructure. They were also among those most likely to pick out long development cycles as among the biggest challenges they faced in the software development process, with 41% saying this, compared to 37% of developers across all countries surveyed.

But developers in the UK were more likely than those almost anywhere else to say that regulatory compliance was one of their biggest challenges in the software development process: 43% said this, compared to a 35% average across the full survey, and no other challenge was cited so often by UK developers. Only in India did more (45%) say regulatory compliance was one of their greatest challenges.

A visible divide across the whole sample between developers who said that new regulations and legislative proposals had either accelerated or delayed development timelines was a very even split in the UK, with 39% choosing each of the two options.

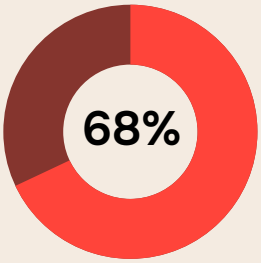
How do UK developers think new regulations and legislative proposals have impacted their development timelines?

	UK	Average
Accelerated timelines	39%	40%
No impact	18%	25%
Delayed timelines	39%	33%
Not sure yet	4%	2%

58% of UK developers said regulatory delays were one of the main reasons for a disconnect between consumer expectations and software delivery timelines, more than cited any other reason. Only in India did more developers (60%) say this. UK developers were also the joint most likely to say that unrealistic expectations was one of the main reasons for a disconnect: 51% said this in the UK, the same percentage as among Indian developers.

UK developers were also among those most likely to see AI playing a major role in software development during the next three to five years: 93% said this – a total equalled in India and outstripped only by 94% of developers in China and France. Just over one in three UK developers said AI will have a 'transformational' impact.

UK developers were also most likely to say that cybersecurity skills are among the top three skillsets that will be critical to automotive software developers during the next five years. 68% said this will be the case, compared to 58% of all respondents.



of say that cybersecurity skills are among the top three skillsets that will be critical to automotive software developers during the next five years

France

More than eight out of ten French developers (81%) agreed that OEMs should focus more on application-layer innovation and less on software infrastructure. They were most likely to cite regulatory compliance as the biggest challenge faced in the software development process, with 38% doing so, ahead of long development cycles and integration complexity (both cited by 32%).

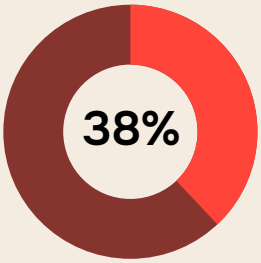
French developers were more likely to say that the introduction of new regulations and legislative proposals during 2024 had accelerated timelines (39% said this) than to say they had delayed timelines (32%). But almost as many (29%) said they had no impact – more than in any other country except China.

How do French developers think new regulations and legislative proposals have impacted their development timelines?

	France	Average
Accelerated timelines	39%	40%
No impact	29%	25%
Delayed timelines	32%	33%
Not sure yet	0%	2%

French developers were the second most likely in the world to say that recent software recalls or failures have influenced their team's approach to software development, with almost seven out of ten (69%) saying this, a total exceeded only by India (72%).

French developers were also among those most likely to think that AI will play a major role in software development during the next three to five years: 94% said this – a total equalled only by developers in China. 38% of French respondents said AI will have a 'transformational' impact on automotive software development.



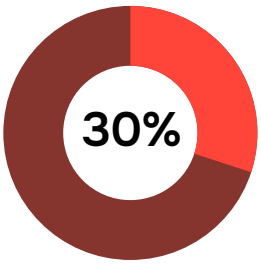
of French respondents said AI will have a 'transformational' impact on automotive software development

Germany

More than three quarters (76%) of developers in Germany said they agreed that OEMs should focus more on application-layer innovation and less on software infrastructure. Developers in Germany were also among the most likely to say that the introduction of new regulations and legislative proposals during 2024 had led to delays in development timelines: 39% said this, the same percentage as among UK developers. However, almost one in three (32%) of those in Germany said these changes had led to an acceleration of development timelines.

As is the case in most countries, developers in Germany were most likely to say that cybersecurity regulations are the most challenging for their team to comply with. But the second most common type of regulation cited as a challenge in this country was data privacy, cited by 40% of developers, a total only equalled by those in the US and exceeded only by those in India (44%).

German developers were less likely than those elsewhere to cite software update and OTA compliance as a challenge – 30% did so, compared to an average of 40% across the full sample.



of German developers cited software update and OTA compliance as a challenge

They were also among those most confident that regulatory frameworks can keep pace with the innovation seen in and complexity of SDVs: 85% said this will definitely or possibly be the case, a similar number as in most other countries – but this included 38% who said this will 'definitely' be the case, a figure beaten only in India (42%) and China (39%).

India

Indian developers are even more likely than those in the other countries surveyed to agree that OEMs should focus more on application-layer innovation and less on software infrastructure, with 85% agreeing, including 41% who said they 'strongly agree'.

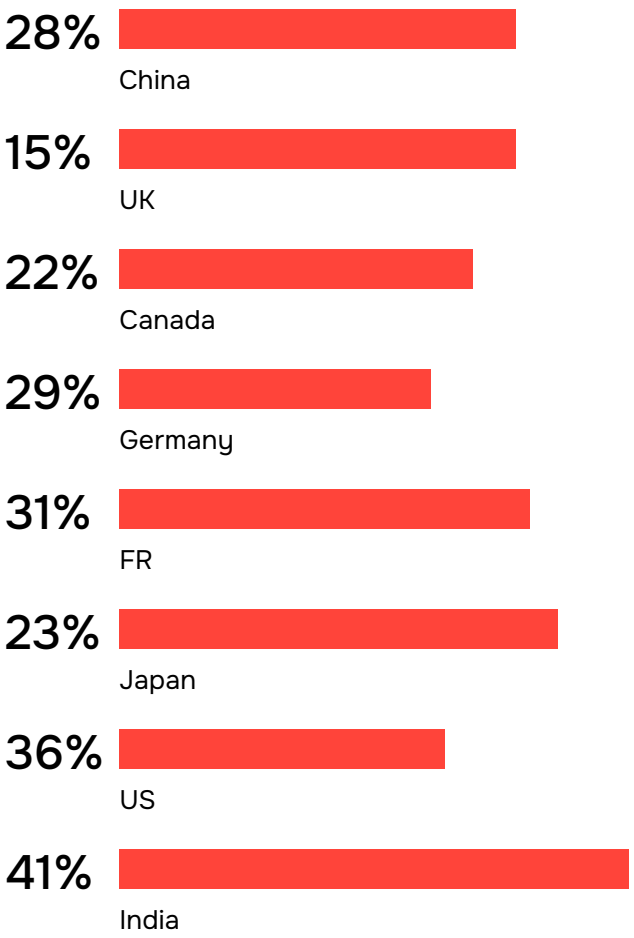
Developers in India were also more likely than those in any other country to cite long development cycles (cited by 49%), integration complexity (47%), regulatory compliance (45%), and a lack of scalability across vehicles, platforms, and model lines (45%) among the biggest challenges faced in the software development process.

Indian developers picked out software updates and OTA compliance, cybersecurity regulations, and data privacy regulations as being among the biggest regulatory challenges faced by their teams.

However, our findings reveal an industry confident in its ability to tackle these problems. 57% of Indian developers said that new regulations introduced in 2024 led to them accelerating development timelines – more than in any other country. 72% said recent software recalls had influenced their approach to software development, again, a higher figure than in any other country, suggesting a useful degree of adaptability in their approach.

Virtually all (99%) of Indian developers said they were confident in their team's ability to remain compliant with evolving regulations, including 65% who were 'very confident' about this. 73% said their confidence in their teams had increased during the past year. All three figures were higher than in any other country.

What percentage of developers strongly agree OEMs should focus more on application-layer innovation and less on software infrastructure?



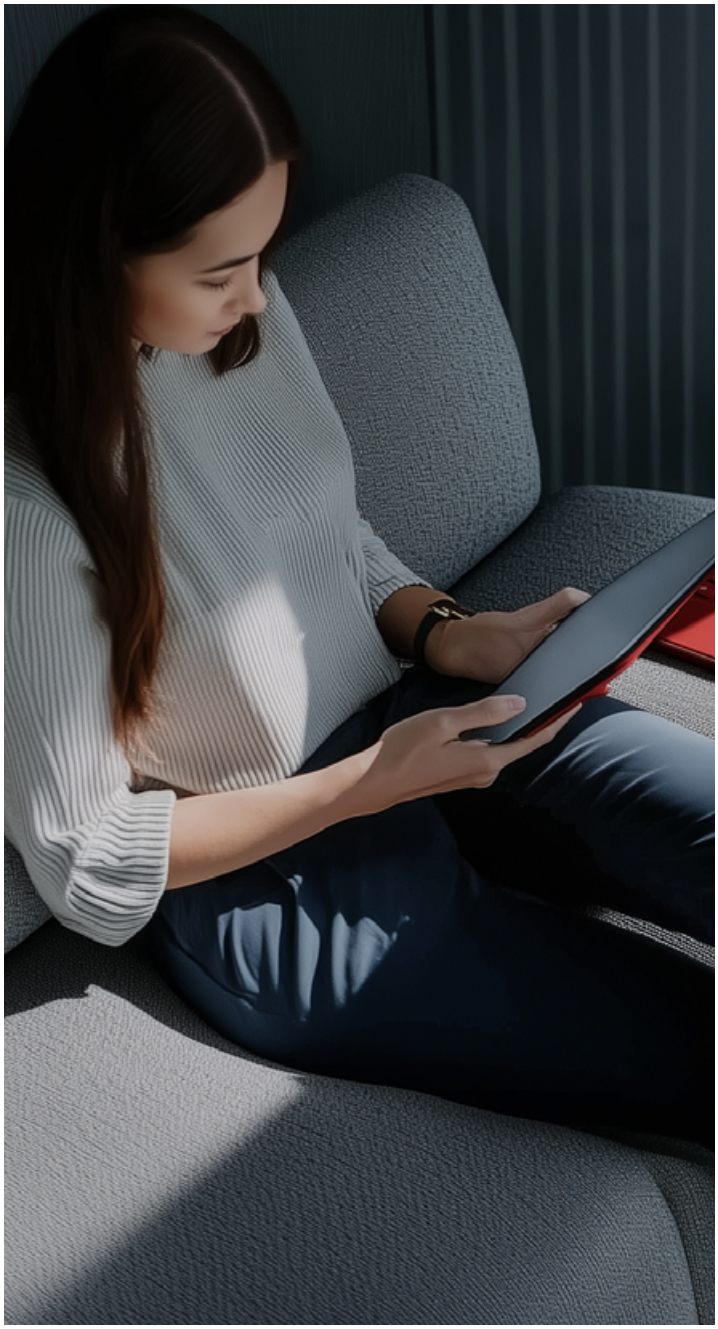
China

Chinese developers were the second most likely to agree that OEMs should focus more on application-layer innovation and less on software infrastructure.

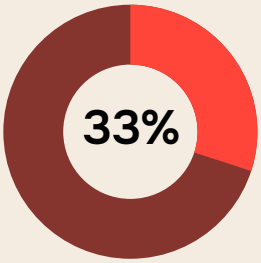
Our findings show that businesses in the Chinese SDV industry experienced much less impact from the introduction of new regulations and legislative proposals during 2024 than did those in other countries.

What impact do developers think new regulations and legislative proposals during 2024 have had on businesses?

Only 14% of Chinese businesses experienced delayed timelines as a result of these changes, compared to an average of 33% across all developers surveyed; while 51% of Chinese businesses experienced no impact at all, compared to an average of 25% across the full sample.



Chinese developers were also less likely to say their businesses had been affected by recent software recalls or failures than were those in other countries: only 33% said this issue had influenced their team's approach to software development, compared to 58% of all respondents.



of Chinese developers said their businesses had been affected by recent software recalls or failures

Alongside France, China is where developers were most likely to see AI playing a major role in automotive software development during the next three to five years: 94% said this. This total comprised 70% who expected AI's role to be 'significant', with it integrated into development workflows, and 24% who said the role of AI will be 'transformational' and core to future development – fewer than in any other country.

These findings perhaps suggest a stability characterising the progress being made by the SDV industry in China, and perhaps a reluctance to be swept up in the hype that is present around the use of AI in many other industries and markets.

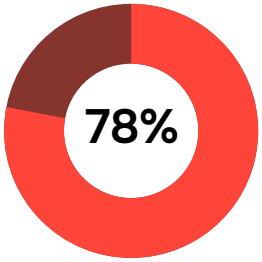
What role do developers see AI playing in automotive software development over the next 3–5 years?

	CN	GB	CA	DE	FR	JP	US	IN	Average
Transformational – core to future development	24%	34%	27%	39%	38%	30%	38%	51%	36%
Significant – integrated into development workflows	70%	59%	60%	53%	56%	50%	54%	42%	55%
Moderate – used in testing and diagnostics	6%	7%	11%	7%	5%	13%	8%	7%	8%
Unsure	0%	0%	2%	1%	1%	7%	1%	0%	1%

Japan

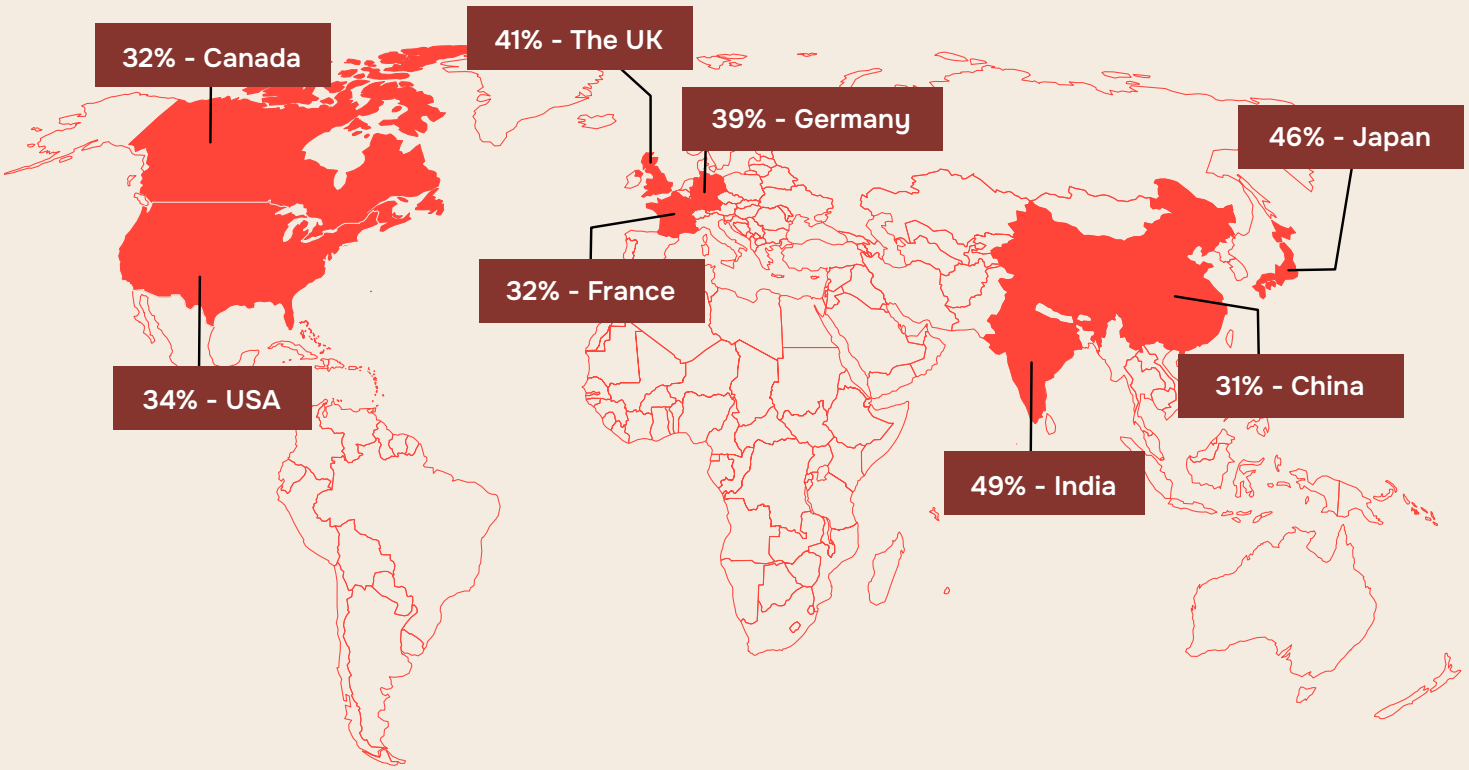
Almost eight out of ten Japanese developers (78%) agreed that OEMs should focus more on application-layer innovation and less on software infrastructure.

Japanese developers were the most likely to cite long development cycles as one of the biggest challenges in the software development process, with 46% saying this, compared to an average of 37% across the full sample.



of Japanese developers agreed that OEMs should focus more on application-layer innovation and less on software infrastructure

What percentage of developers see long development cycles as one of the biggest challenges in the software development process?



Our findings revealed some significant differences between the SDV industry in Japan and those elsewhere that could have some negative consequences. While half of all developers surveyed for this report said their businesses supported collaborative development practices 'to a great extent', that figure dropped to just 33% among those in Japan.

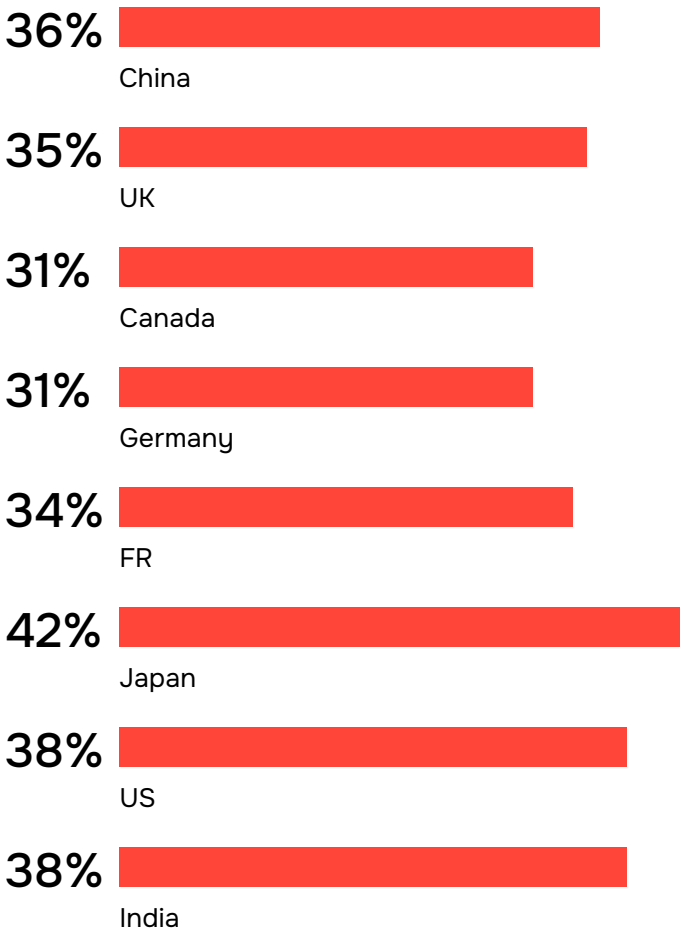
Answers from Japan-based participants in the study also revealed a relative lack of confidence in their businesses' abilities to keep up with and remain compliant with evolving regulations. 78% said they have some confidence in their team's ability to do this, but was lower than the equivalent figure for any other country and included only 16% who said they were 'very confident' about this, compared to an average of 39% across all countries.

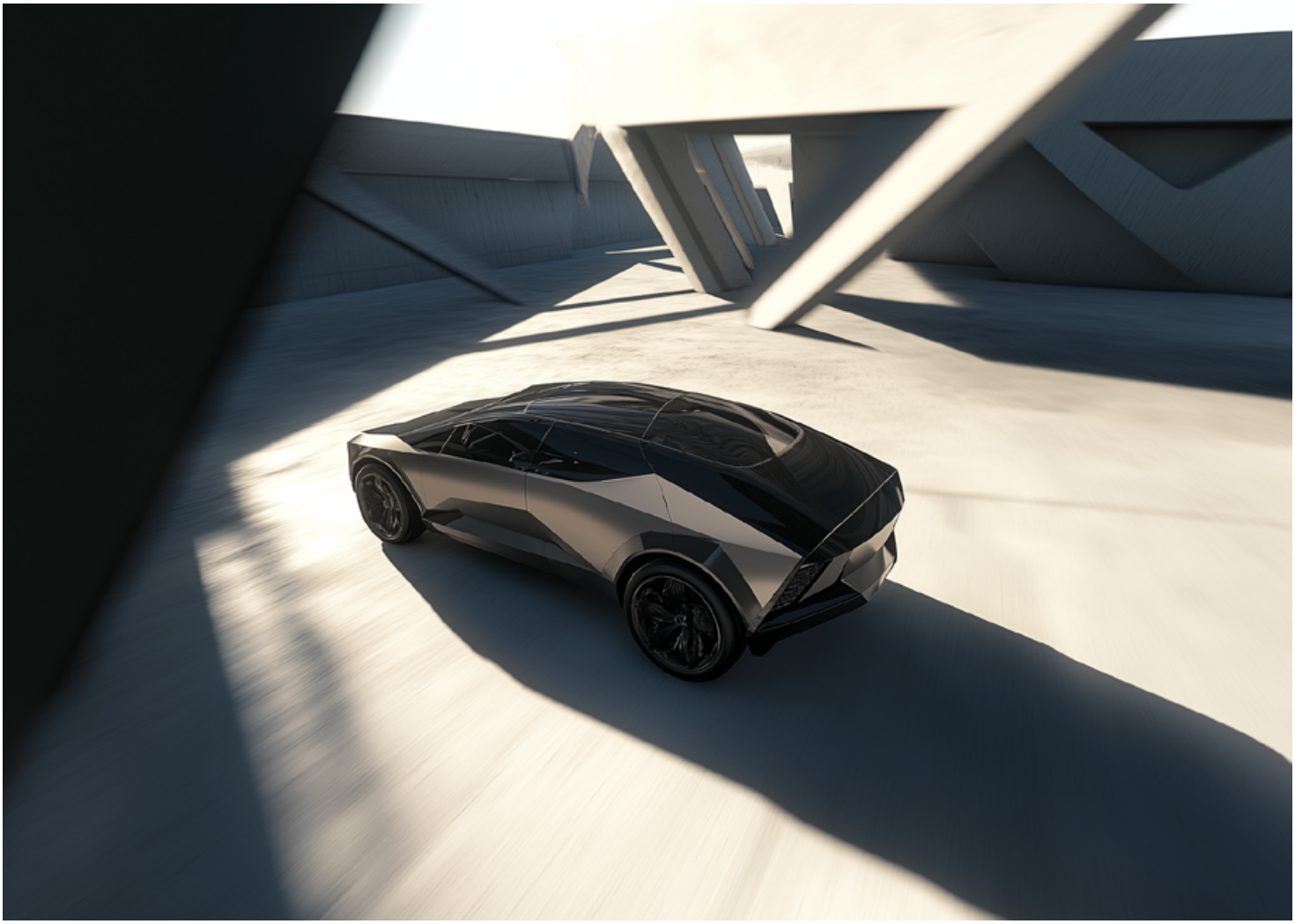
Japanese developers were also the most likely to see functional safety regulations as presenting the biggest challenge to comply with: 42% said this, compared to 36% of all developers surveyed.

One might detect a theme of caution and diligence here – and this also seems to align well with a pragmatic and sceptical attitude towards some of the automotive technologies that have received the most publicity in recent years. Japanese developers were considerably more likely than any others to say that full vehicle autonomy has been receiving more attention than it should: 71% said this, compared to 54% of all developers.

Taken as a whole, our findings highlight the pros and cons of widespread working methods in Japan's SDV industry. Pragmatism and a risk-aware approach to innovation may both be hampered by relatively slow development cycles and by less willingness to try to benefit from cross-industry collaboration than is visible in some other countries' SDV industries.

What percentage of developers said it was challenging for their team to comply with Functional safety (e.g., ISO 26262)?





Methodology

This report is based on research conducted on behalf of QNX by OnePoll in July and August 2025. Surveys were conducted of 1,100 embedded software developers working for automotive businesses based in China, France, Germany, India, Japan, North America (Canada and the US), and the UK.

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QNX

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QNX, a division of BlackBerry Limited (NYSE: BB; TSX: BB), enhances the human experience and amplifies technology-driven industries, providing a trusted foundation for software-defined businesses to thrive. 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. QNX® technology has been deployed in the world's most critical embedded systems, including more than 255 million vehicles on the road today. QNX® software is trusted across industries including automotive, medical devices, industrial controls, robotics, commercial vehicles, rail, and aerospace and defense. Founded in 1980, QNX is headquartered in Ottawa, Canada.

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