Financial Times 번역요약본 (‘25. 9/3)

1. Wall Street’s September Fed rate cut bets still hinge on next data : 월가의 9월 연준 금리 인하 기대, 여전히 다음 경제 지표에 달려 (‘25. 8/25)

- 미 연방준비제도 의장 제이 파월은 다음 달 중앙은행이 금리를 인하할 수 있는 길을 열어두었으나, 두 가지 경제지표가 발표되면 월가의 금리인하 기대는 뒤집힐 수도 있음. 선물시장은 9월 중순 연준 회의에서 기준금리가 0.25% 인하될 확률을 75%로 반영하고 있고, 많은 경제학자들은 현재 4.25%~4.5% 범위에 있는 연방기금금리가 연말까지 추가로 인하될 것으로 예상하지만, 향후 발표된 인플레이션 및 고용 지표가 이러한 전망을 흔들 수 있다고 경고. 연준의 이중 책무 (최대 고용과 물가 안정)가 충돌하는 상황이며, 파월은 “인플레이션 위험은 상방, 고용 위험은 하방으로 기울어져 있어 도전적인 상황”이라고 언급함.

2. The Chinese gadget maker taking on Tesla and Apple : 테슬라와 애플에 도전하는 중국의 전자기기 제조사 (‘25. 8/27)

- 중국 최대 스마트폰 제조사인 샤오미 (Xiaomi)가 세운 전기차 공장이 베이징에서 관광 명소가 되었고, 이 공장을 방문하려면 한 달 전 예약이 필요하고, 성수기에는 추첨으로 입장객을 선정할 정도. 샤오미의 충성 팬들은 매일 이 스마트카 공장을 가득 메우며, 76초마다 한 대씩 생산되는 차량을 지켜보고, 가이드들은 샤오미가 테슬라와 견줄 수 있도록 자동화된 생산 라인을 구축하고 주요 전기차 부품을 자체 생산하고 있다는 점을 자랑스럽게 소개. 출시된 모델은 단 두 종에 불과하지만, 내년에는 중국 테슬라 판매량을 넘어설 것으로 중국 중신 증권은 전망함. 샤오미는 불과 15년 전 소박한 목표로 설립되었지만, 출범 3년 만에 기존 강자들을 제치고 세계 3위 스마트폰

판매업체로 도약했으며, 이후 전기밥솥부터 로봇청소기까지 제품군을 빠르게 확대해옴. 동일한 전략을 자동차에도 적용했고, 애플이 결국 포기한 자동차 프로젝트와 달리, 전기차 사업 발표 후 불과 3년 만인 지난해 3월 첫 모델 SU7 스포츠세단을 공개함. 샤오미는 또 다른 핵심 영역, 즉 반도체 개발에도 뛰어들었고, 애플, 삼성, 화웨이와 함께 높은 수준의 수직계열화를 이룬 기업 반열에 오름.

3. ‘Full of bugs’ : how the world’s biggest carmakers fell behind in software : **’버그 투성이‘ : 세계 최대 자동차 제조사들이 소프트웨어에서 뒤처진 이유** (‘25. 8/28)

- 10여년 전, 토요타가 구글 등 빅테크 기업에서 수십 명의 전문가를 영입해 하드웨어 중심에서 인공지능, 소프트웨어 중심으로 개발 전략을 전환했을 때, 기대와 관심은 매우 컸음. 그 후 세계 최대 완성차 업체인 토요타는 변속기, 브레이크, 스티어링, 도어 잠금장치까지 자율주행, 인포테인먼트까지 제어할 수 있는 중앙 집중식 컴퓨터 시스템을 구축하려 하였음. 그러나 가트너의 연례 ’디지털 자동차 제조사 지수‘는 유럽, 미국, 일본의 전통적 완성차 업테들이 여전히 테슬라와 니오, 샤오미, 샤오펑 같은 신흥 기업들에 크게 뒤쳐져 있음을 보여줌. 2025년 순위 상위 5위까지 테슬라와 중국 브랜드들이 차지했고, GM은 9위, 메르세데스 벤츠는 13위, 토요타는 21위에 그침. 전문가는 결국 스마트폰과 PC처럼, 소수의 운영체제 (iOS, 안드로이드)가 소프트웨어 시장을 지배할 것이라고 전망했으며, 이는 자동차 산업의 중심이 ’기계 설계, 제조, 판매의 저수익 구조‘에서 ’소프트웨어, 서비스의 고수익 구조‘로 이동함을 의미함. 전문가들은 전기차가 내연기관 차량보다 훨씬 더 높은 연산 능력을 요구한다고 지적하며, 기존 전자제어장치 (ECU) 대신, 차량을 구역별로 나누어 제어하는 존 (zonal) 아키텍처가 필요하며, 이는 배선 단순화와 경량화를 통해 비용을 크게 줄일 수 있음.

Federal Reserve

Wall Street's September Fed rate cut bets still hinge on next data

Jay Powell set the stage for a reduction in borrowing costs but jobs and inflation reports could get in the way

Jay Powell: 'We will not allow a one-time increase in the price level to become an ongoing inflation problem' © Jonathan Ernst/Reuters

Claire Jones in Jackson Hole, Wyoming and **Myles McCormick** in Washington

Published YESTERDAY

Federal Reserve chair Jay Powell has cleared the way for the US central bank to cut rates next month. But a duo of economic reports could still upend Wall Street bets on lower borrowing costs.

Powell used his speech at the Kansas City Fed's forum in Jackson Hole, Wyoming, to signal that growing risks from high borrowing costs will damage the jobs market.

That means a rate cut could be warranted as soon as September.

US stocks and bonds roared higher as investors cranked up bets that the Fed will soon begin cutting rates after holding them steady so far this year on concerns that Donald Trump's tariffs will cause severe inflation.

Futures markets now point to a 75 per cent chance the Fed reduces its main rate by a quarter point when it meets in mid-September. Many Wall Street economists expect more reductions in the federal funds rate, which is now in a 4.25 to 4.5 per cent range, later in 2025.

However, investors, economists and some Fed officials say that upcoming data on inflation and the labour market could still disrupt those plans.

“[Powell’s] conclusion that ‘with policy in restrictive territory, the baseline outlook and the shifting balance of risks may warrant adjusting our policy stance’ is a clear indication that a September rate cut is now the most likely outcome,” Stephen Brown at Capital Economics wrote.

“Nevertheless, the chair’s lingering caution suggests that either a very positive August employment report or a much more concerning set of price data could still trigger a delay,” he added.

The debate comes as both sides of the Fed’s dual mandate to foster maximum sustainable employment and price stability are coming into tension. “Risks to inflation are tilted to the upside, and risks to employment to the downside — a challenging situation,” Powell said on Friday.

July jobs figures that pointed to a sharp slowdown in hiring growth this summer — which were released after the Fed’s last meeting — pointed to rising strains in the labour market.

The unemployment rate has remained subdued at 4.2 per cent, which helped offset some of those worries.

At the same time, there is a debate raging at the Fed and on Wall Street on whether Trump’s sweeping tariffs on trading partners will cause a sustained burst of inflation, or a one-time price increase.

Many businesses have noted that the levies will begin to more severely affect their costs once they cycle through their pre-tariff inventory. But so far, the impact of consumer prices has been subtle, with that inflation measure running at an annual pace of 2.7 per cent in July.

The Fed's preferred personal consumption expenditures price index increased at an annual pace of 2.6 per cent in June, above the central bank's target of 2 per cent.

A one-off jump in prices would be more manageable than a more persistent increase because it is less likely to unanchor consumers' expectations for long-run inflation.

Powell noted in his speech that "we will not allow a one-time increase in the price level to become an ongoing inflation problem".

The August jobs and consumer price index reports, scheduled for September 5 and 11, respectively, will provide the most important near-term signals on both of those factors.

Michael Gapen at Morgan Stanley said that while Powell's speech pointed to a "new, more dovish skew . . . it does not definitively say the Fed will cut in September, but it comes about as close as it can given the data between now and then."

Several members of the Fed's rate-setting Federal Open Market Committee also remain deeply unsure of how Trump's tariffs will play out.

Alberto Musalem, head of the St Louis Fed and an FOMC voter this year, said after Powell's remarks that inflation was running closer to 3 per cent than the Fed's 2 per cent goal.

"There is a possibility, not the base case, that there could be some persistence," Musalem told Reuters.

Susan Collins, president of the Boston Fed and another voting member, had told Bloomberg ahead of the speech that there were still “arguments for taking a bit more time”.

She added: “It’s not a done deal in terms of what we do with the next meeting. And we’re going to get more data between now and then.”

Kansas City Fed chief Jeff Schmid has said he thinks the labour market remains solid, while Chicago Fed president Austan Goolsbee has indicated that he is concerned about persistent inflation in the vast services sector.

Susan Collins: ‘It’s not a done deal in terms of what we do with the next meeting’ © David Paul Morris/Bloomberg

The debate comes as Powell contends with a fierce campaign from the White House against him and other top Fed officials. Trump has said the central bank should drastically cut rates to just 1 per cent and labelled its chair a “numbskull” and a “moron” who is always “too late”.

In what is set to be his final Jackson Hole symposium appearance as chair, attendees viewed Powell’s remarks as a masterclass in presenting the case for lower borrowing costs in language that did not look as though he was buckling to extreme pressure from the White House.

He also received a standing ovation from central bankers at the symposium, well aware that political attacks on the monetary guardians are not confined to the US.

Some feel Powell's fight is theirs too, while the Trump administration's attacks have provoked soul-searching in others as to why central bankers are proving such easy targets for populists on both sides of the political spectrum.

The Fed chair has also faced milder dissent from within the FOMC. Two of his fellow governors, Michelle Bowman and Christopher Waller, who are seen as contenders to replace Powell when his term as chair ends next May, backed a quarter-point cut at the last vote in July — the first time two governors had not voted with the chair on interest rates since 1993.

Stephen Miran, Trump's nominee to replace Adriana Kugler on the Fed's board, is also likely to back a cut — should the Senate confirm his appointment ahead of the FOMC vote.

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Xiaomi Corp

The Chinese gadget maker taking on Tesla and Apple

Formerly dismissed as a ‘Lego’ assembler, Xiaomi is building its reputation as a high-tech manufacturer

Gloria Li in Hong Kong and **Eleanor Olcott** in Beijing

Published 3 HOURS AGO

An electric vehicle factory built by China’s largest smartphone maker has become a tourist attraction in Beijing, with visits to the company’s plant needing to be booked a month in advance and entry sometimes decided by lottery at peak times.

Xiaomi’s loyal fans, styled “mi fen”, pack its smart car factory every day to watch the production line churn out a car every 76 seconds. Tour guides proudly compare the manufacturing processes to those of Tesla, as the Chinese company seeks to emulate its American rival’s automated production line and build key EV components in-house.

Although only two models have been launched, the cars rolling off the end of the line are expected to outnumber those sold by Tesla in China next year, according to Citic Securities’ estimates. Its new SUV attracted hundreds of thousands of pre-orders within minutes of its launch in June, while its original sports sedan ranked second in premium car sales in China in the first half, only behind Tesla’s Model Y. The excitement around its cars has helped drive Xiaomi shares almost 200 per cent higher over the past year.

Xiaomi's Beijing car factory has become a popular tourist destination © VCG/Getty Images

Once an assembler that built its success on suppliers' components, Xiaomi is aiming to reinvent itself as a manufacturing powerhouse.

Xiaomi had humbler ambitions when it was formed just 15 years ago. Its name is Chinese for millet, with founder Lei Jun saying the company was created in 2010 in the spirit of "millet plus rifles", a reference to Mao Zedong's description of the Communist party's modest military resources during the civil war.

But in the space of its first three years, it leapfrogged incumbents to become the world's third largest handset vendor and expanded its product line-up to include everything from rice cookers to robot vacuums.

Despite its early success, critics have consistently drawn attention to its lack of core technologies and over-reliance on suppliers.

"The reason why it has so many products in the ecosystem is that these are not Xiaomi products in their own right historically. It has a large network of partners," said Richard Windsor, founder of research service Radio Free Mobile.

"We used to say that Xiaomi sourced everything externally and assembled them into a brick, a device . . . much like playing with Lego," said Ivan Lam, a smartphone analyst at Counterpoint Research. "In fact, Xiaomi has continued to invest in R&D over the past few years."

Acknowledging the criticism himself multiple times, Lei has been determined to shed the company's "assembly workshop" image by building up manufacturing facilities to craft premium products.

Xiaomi's smartphone, the foldable MIX Flip 2 © CFOTO/Future Publishing/ Getty Images

Its first step towards in-house manufacturing came in 2020, with the opening of a Rmb600mn ($83.5mn) factory on the outskirts of Beijing to produce small batches of the brand's first foldable phone.

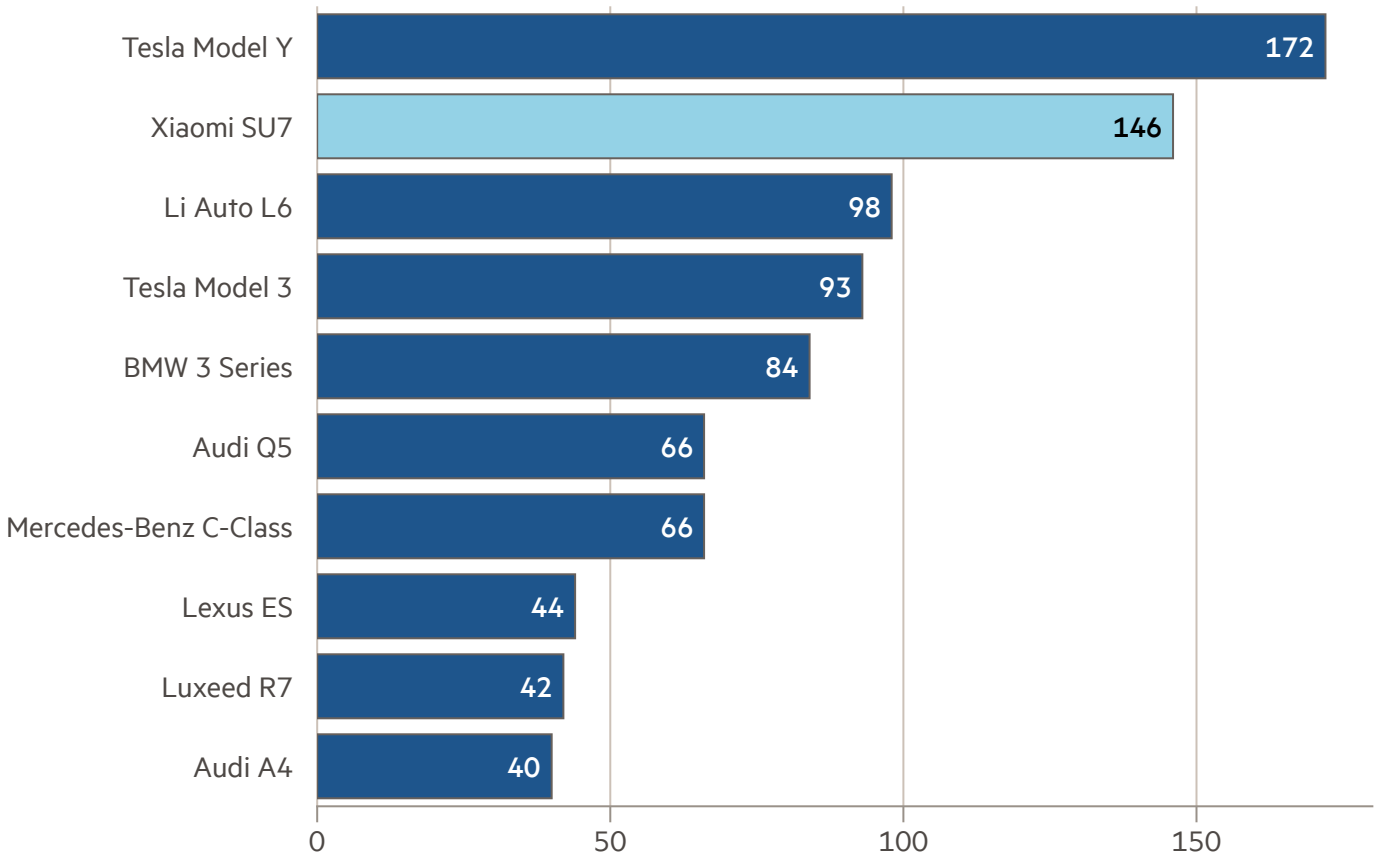
With Lei wanting to "benchmark" his company against Apple, it shifted manufacturing of its most expensive phone models to its own factories in early 2024. In the first quarter of this year, Xiaomi recorded an 81 per cent year-on-year jump in premium handset shipments, far outpacing the 3 per cent growth in its overall phone shipments, data from the Canalys research firm showed.

"Tech brands command a premium when they are known to use advanced technology, and advanced factories are one of the tangible representations," Xiaomi told the Financial Times.

The company has been applying the same strategy to cars. After following Apple on smartphones, it took only three years from Xiaomi announcing its intent to build a car to the debut in March last year of its first model — the Speed Ultra 7 sports sedan — produced at its new factory. By contrast, Apple had ditched its decade-long project to build an Apple Car a month earlier.

Xiaomi's SU7 is the number-two best-selling premium car in China

Sales volume ('000), by model, first half 2025, priced Rmb200,000-300,000



FINANCIAL TIMES

Source: China Automobile Dealers Association

Besides autonomous driving features and an operating system that links up with phones and home appliances, the company also trumpeted its investment in self-developing auto components and manufacturing equipment, ranging from a unique aluminium alloy and ultra-strength steel to the mould for car body casting.

Consumers are buying into the vision. After the SU7 became one of the best-selling cars in China's cut-throat auto market, the recently unveiled YU7 sport utility vehicle, which was designed to rival Tesla's Model Y, received 200,000 pre-orders in just three minutes at launch, a "miracle", according to Lei.

"Call me factory director Lei," the billionaire founder wrote in a social media post, extolling the virtues of the EV and smartphone factories.

Lei's current obsession with manufacturing has not stopped there. The company is currently building the second phase of its EV factory, which is expected to double production capacity to achieve its annual shipment target of 350,000 units. An air conditioner plant is also under construction in the central city of Wuhan.

The pivot from an asset-light consumer electronics business to a manufacturing high-flyer aligns with Beijing's call to domestic companies to develop "new, quality productive forces".

An approving commentary published in the People's Daily, the mouthpiece of the Communist party, made a comparison between Chinese engineers' efforts to pick through imported steel in the hope of finding auto parts in the 1950s and the use of more than 700 robots at Xiaomi's EV factory.

Xiaomi's chair and chief executive Lei Jun is pursuing a strategy of self-developing components from chips to car body materials © Anthony Kwan/Bloomberg

Xiaomi's strategy is being extended to another key area of competition with US tech companies, following Apple again in developing its own silicon. Earlier this year, it launched its Xring O1 — a system-on-a-chip built on a leading edge 3-nanometre manufacturing process. The processor powers its latest smartphones and tablets, placing the company among elite players — including Apple, Samsung and Huawei — that have achieved a high level of vertical integration.

"A self-designed chip can help Xiaomi build a more integrated ecosystem, as it enables seamless communication between different devices," said Lam from Counterpoint, while cautioning about its vulnerability to potential US sanctions. Taiwanese contract chipmaker TSMC makes the chipset, the FT reported in June.

Xiaomi has said it will invest at least Rmb50bn ($7bn) over the next decade to continue developing advanced chips, with another Rmb200bn allocated to developing "hardcore" tech, including operating systems and artificial intelligence products, over the next five years.

Lu Weibing, Xiaomi's president, predicted on an earnings call last week that the ability to create chips in-house would be a key differentiator for tech companies.

"In the future, there'll only be two types of businesses: those that develop their own chips and those that don't," he said.

"There will emerge a generational gap in core competitiveness between them."

The Big Read Automobiles

‘Full of bugs’: how the world’s biggest carmakers fell behind in software

The shift from a manufacturing model to a digital one is proving difficult and expensive for many of the industry’s traditional companies

Kana Inagaki, **Harry Dempsey** and **David Keohane** in Tokyo

Published YESTERDAY

A decade ago, when Toyota began hiring dozens of experts from Google and other tech giants to pivot its development efforts from hardware into artificial intelligence and software, hype and expectations were sky high.

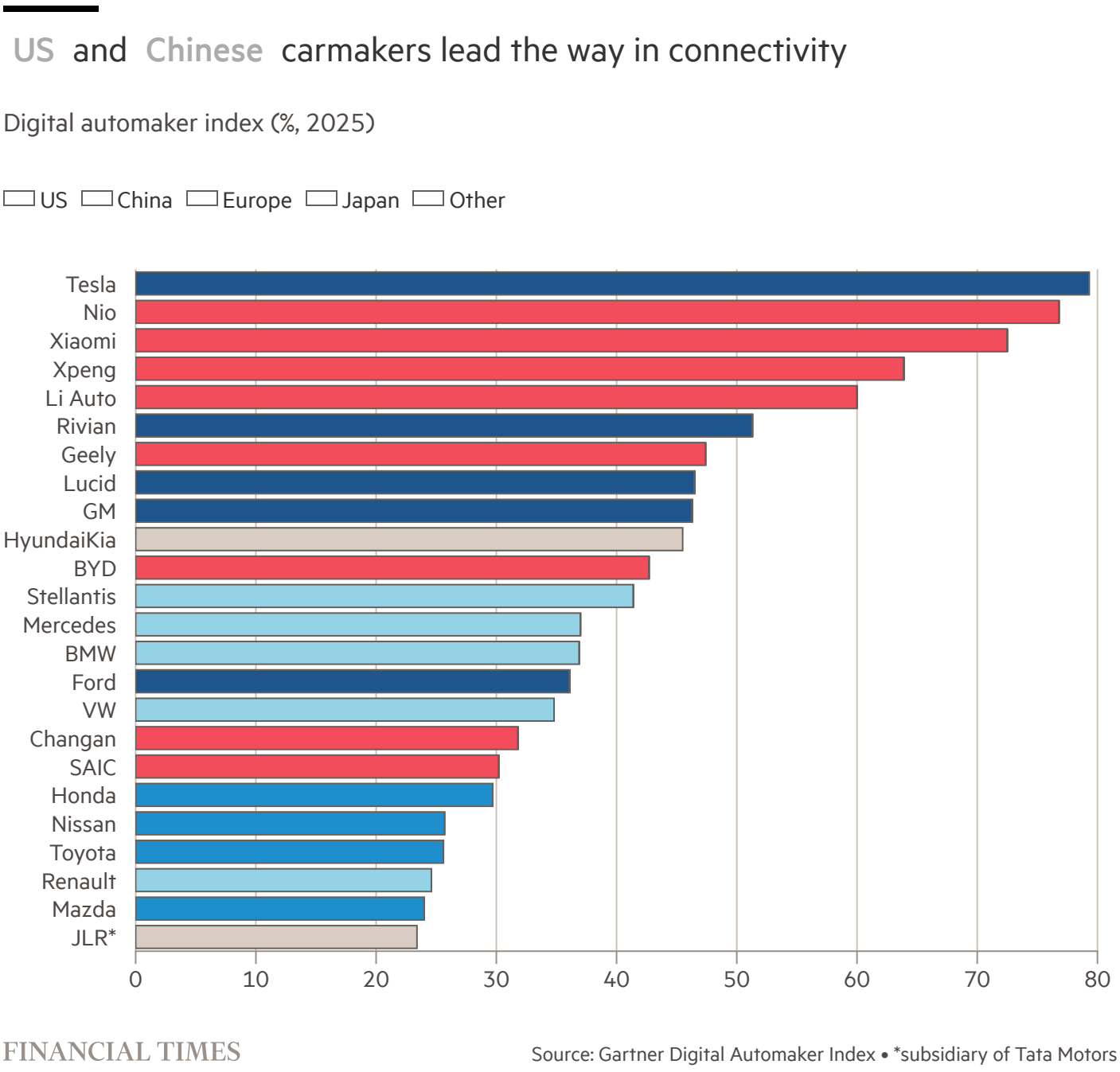
“Times have changed, and software and data are now essential components of Toyota’s future mobility strategy,” said Gill Pratt, chief executive of the Toyota Research Institute, at the Consumer Electronics Show in 2016.

In the years that followed, the world’s largest carmaker by volume nurtured ambitions to create a centralised computer system that could control everything from the transmission, brakes, steering and door locks to assisted driving and infotainment functions.

Toyota was among dozens of household-name carmakers racing to develop software-defined vehicles like those produced by Tesla and a new generation of Chinese manufacturers.

But Gartner’s annual “digital automaker index”, which compares carmakers on their potential to monetise their software, suggests traditional European, US and Japanese groups are still a long way behind these relatively recent arrivals.

Its top five in 2025 was dominated by Tesla and Chinese brands including Nio, Xiaomi and Xpeng. General Motors ranked ninth, Mercedes-Benz was 13th and Toyota was 21st.



“Very few legacy automakers are positioned to compete with Tesla, Rivian or the leading Chinese EV makers when it comes to building a pervasive automotive operation system,” says Tsuguo Nobe, a former executive at Intel and Nissan who is now a professor at Nagoya University.

Ultimately, analysts warn that the auto industry is likely to go in the same direction as smartphones and PCs, with a small number of operating systems like iOS and Android eventually dominating the software space.

They add that the transition will fundamentally tilt the industry’s modus operandi away from designing, building and selling cars — a business model characterised by mechanical engineering and relatively thin profit margins — and towards software and services.

Toyota and its peers are aiming to use these to create new sources of revenue as the industry shifts to autonomous electric cars. Investment across the industry is already shifting from superior engines and external design to the computer systems that will control everything from batteries to safety features and, eventually, self-driving functions.

But when employees, analysts and journalists gathered in a darkly lit arena on the outskirts of Tokyo to see the results of Toyota’s years-long efforts, the reaction was underwhelming.

Its software platform, known as Arene, will only power the infotainment system and advanced safety technologies in the RAV4 sport utility vehicle when it launches later this year. It is unclear when the fully integrated system will be completed, though Toyota has said it will feature in its next-generation battery electric vehicle.

Even its own executives seemed to acknowledge that the first iteration was far from a game-changer. “It’s not a big bang,” admitted John Absmeier, chief technology officer at Woven by Toyota, the carmaker’s mobility technology subsidiary. Weeks later, a Woven software engineer was even more critical, telling the FT that Arene was “horrendous”.

“It’s full of bugs. It’s not an operating system, it’s just a series of tools,” the engineer went on.

Toyota displays several generations of the RAV4 in Tokyo in May. The model was chosen for the carmaker’s new in-car software and a desire to debut it in a high-volume flagship range © Yoshinobu Goto/The Yomiuri Shimbun/Reuters

Toyota said it was part of the culture at Woven “to pause and reflect whenever issues arise, in order to improve the products we deliver to customers” and that its commitment to continuous improvement “underpins Arene and our software-defined vehicles efforts”.

Many others are encountering the same issues Toyota has. Some, such as Volkswagen, Renault and Mercedes-Benz, have turned to partners in the technology industry to accelerate the digitisation of their vehicles. But those collaborations have also created fresh tensions with Apple, Google and others as carmakers fight it out with tech giants for control over vehicle data, in-car entertainment and other aspects of the driving experience.

“Traditional original equipment manufacturers inevitably end up being tied down by their hardware-based history,” says Izumi Kawanishi, president of Sony-Honda Mobility, a joint venture established in 2022.

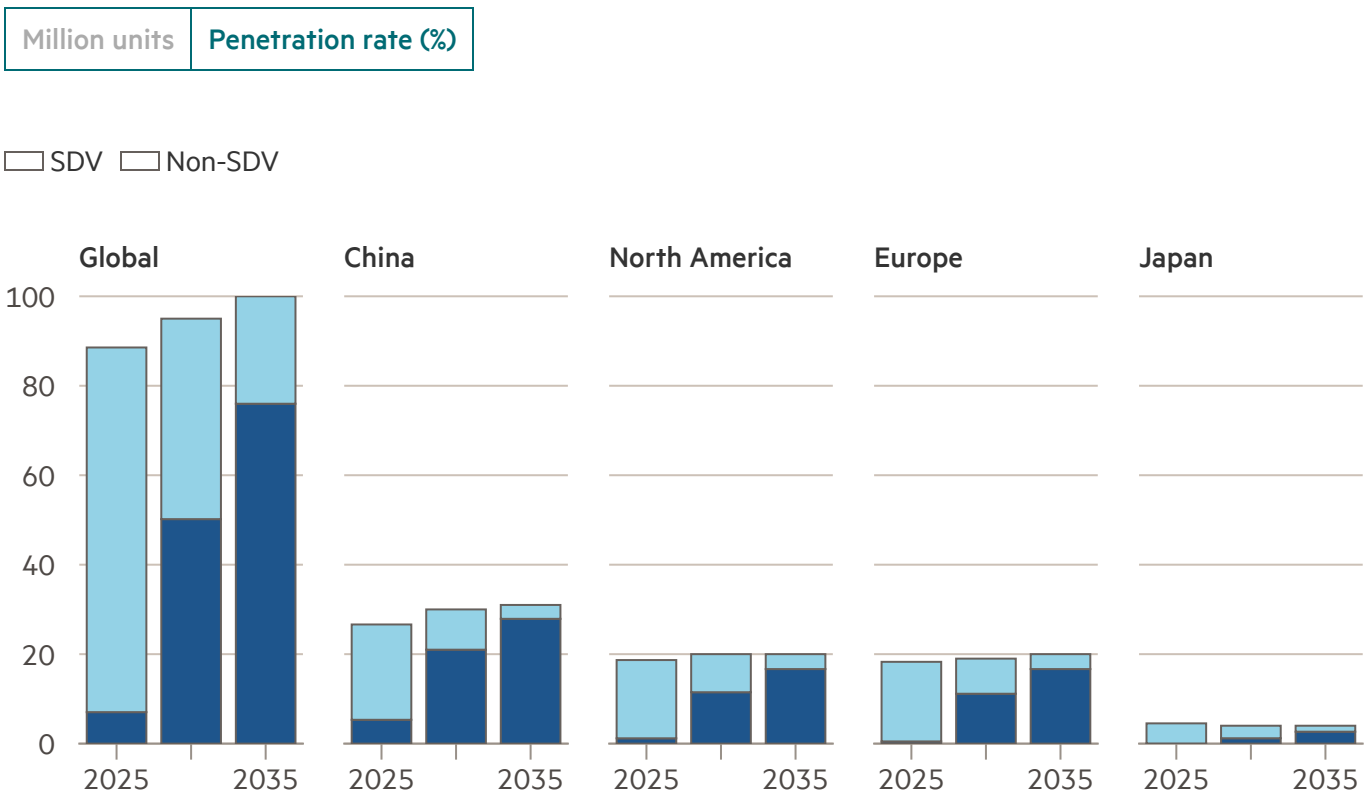
“From there, trying to pivot to software-first development is extremely difficult.”

Toyota’s software development efforts were backed by high-profile hires such as James Kuffner, a former head of robotics at Google and a key executive in the US company’s self-driving car efforts.

In 2018, Kuffner was installed as chief executive of what is now Woven. But having led the development of Arene, he abruptly stepped down in 2023 and was replaced by an executive from a subsidiary of Toyota supplier Denso.

Others involved in the project say engineers brought in from outside, who were more used to a fast-moving Silicon Valley mindset, grew frustrated with Toyota’s conservative and consensus-driven culture.

Software-defined vehicles are forecast to become dominant in all regions



FINANCIAL TIMES Source: Bernstein analysis and estimates, 'Mobility Revolution: Software-defined vehicles' by Masahiro Akita, et al (Jul 2025) • by sales volume

“There are always compromises when engineering paradigm shifts happen. After all, this is a once in a 100 year transformation of the way we build cars,” acknowledges one former Toyota executive.

“Japan being very conservative is a double-edged sword,” the former executive tells the FT. “On the one hand, not taking too many risks is good when it comes to product safety. But it is bad when it comes to rapid innovation.”

A similar story played out at Volvo Cars, one of the first European carmakers to roll out an electric vehicle equipped with advanced software and Nvidia-designed chips that facilitate software updates via the cloud.

In 2022, Volvo Cars recruited former Dyson boss Jim Rowan as chief executive. Li Shufu, who chairs the Swedish carmaker and its Chinese parent Geely, reasoned at the time that a CEO from outside the automotive industry was needed to oversee the digital shift.

Even so, the development of a new centralised computing system for its flagship EX90 model was mired with delays and snowballing costs, underscoring the challenges even for companies that have turned to external hires from Tesla and other tech rivals to strengthen their software capabilities.

At the end of March, Volvo Cars announced Rowan’s departure and the rehiring of former boss Håkan Samuelsson to navigate the uncertainty created by US car tariffs and the costly transition to electric vehicles, citing his “deep industrial experience” and knowledge of the group.

But people close to the company say Samuelsson, who will serve a fixed two-year term, returned to revive a group “buried” in massive development costs for the EX90 and its software system. He immediately announced 3,000 job cuts globally and a one-off charge of $1.2bn, caused in a large part due to the two-year delay with the EX90.

In an interview, Samuelsson warned that the company could still face new software glitches in the future, even after efforts to reduce software complexity and strengthen testing standards.

“There will always be risks of course for bugs when you introduce software,” Samuelsson tells the FT. “But in the last two years, we have had a level that was too high and unacceptable for customers and that is what we have been working on very intensively.”

Volvo Cars has opened a new, state-of-the-art software testing centre in Sweden. ‘There is no book to read about how this should be done’, says chief executive Håkan Samuelsson © Volvo CGCC

He adds that Volvo Cars will in future be able to develop and ramp up production of new models faster. “But there is no book to read about how this should be done . . . if you are the first one, you have to write your manual as well.”

Nobe, at Nagoya University, points out that electric cars require more computing power than combustion-engined vehicles to manage batteries and other functions such as regenerative braking.

This means that electronic control units with their own embedded software have to be replaced with “zonal architecture”, which controls vehicle functions such as braking as well as driver assistance features on a zone-by-zone basis, where electronic components are clustered in discrete areas of each vehicle.

“The architecture not only enables software consolidation but also reduces wiring complexity and vehicle weight, leading to substantial cost savings,” Nobe says.

He adds that the slow transition to EVs among legacy carmakers — especially Toyota, which expects hybrid technology to endure for longer than most — have hampered their efforts to develop best-in-class software.

Building processing power into a vehicle far beyond what is currently required also sits uncomfortably with Toyota’s long-standing — and highly successful — just-in-time production system that aims to minimise waste.

Woven’s Absmeier says changing the architecture is “not that difficult” to do technology-wise. The challenge is adapting it to design and manufacturing processes geared to traditional vehicles.

“There is existing investment and legacy,” he says. “We can’t just disrupt the whole architecture of the car. We have to step-by-step build the system in.”

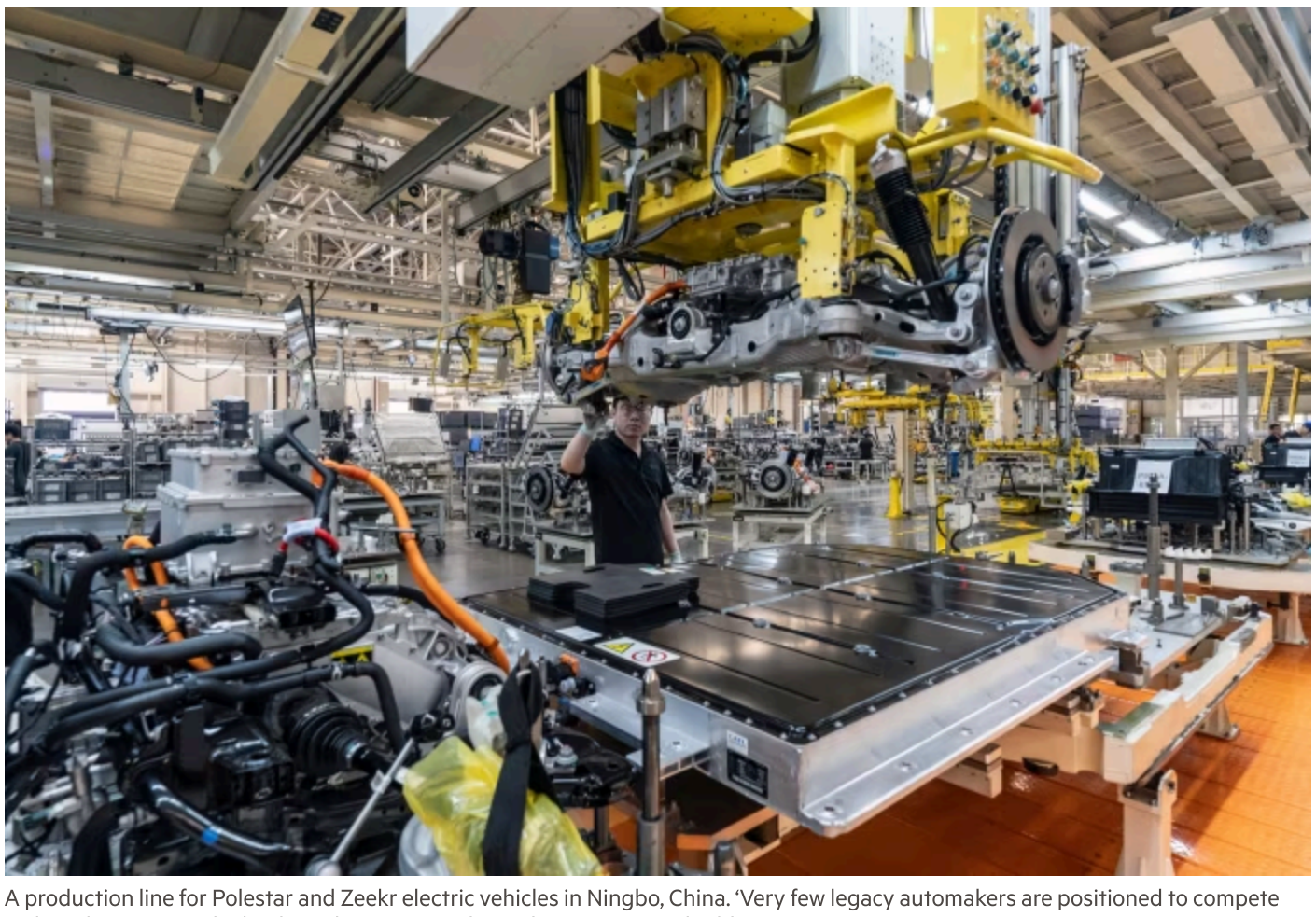
Despite the high-profile difficulties encountered by Toyota and Volvo Cars, carmakers around the world continue to plough billions into software development.

In September, BMW is set to unveil its Neue Klasse platform, a zonal architecture system that will underpin its next generation of EVs with longer range, faster charging and upgraded software capabilities.

It includes four “superbrains” that vastly improve communication inside the vehicle, infotainment displays, automated driving and other vehicle functions. Analysts say the level of integration is far deeper than the new system developed by Toyota, and the superbrains also deliver more than 20 times the computing power of current vehicles.

Neue Klasse will be installed on the new iX3 sport utility vehicle this year, and BMW plans to bring 40 new models and model updates by 2027.

“Neue Klasse is BMW’s biggest ever leap, and we believe that this represents the best opportunity for a ‘legacy’ auto player to establish not just relevance but also leadership,” said Bernstein analyst Stephen Reitman in a recent note.



A production line for Polestar and Zeekr electric vehicles in Ningbo, China. ‘Very few legacy automakers are positioned to compete with Tesla, Rivian or the leading Chinese EV makers when it comes to building a pervasive automotive operation system,’ says one industry expert © Qilai Shen/Bloomberg

Fellow German carmaker Mercedes-Benz has hired around 3,000 software developers from around the world to accelerate the rollout of new software-focused vehicles.

“It’s like going to the gym and training a new muscle,” says Magnus Östberg, Mercedes’ chief software officer. “That transition is, of course, one of the biggest challenges to make so that new skills are adopted and used throughout the organisation.”

But Östberg adds that the company also made “a deliberate decision” not to develop all the technologies on its own. Its new architecture uses Google’s AI agent that allows drivers to give commands to their vehicles in humanlike conversations, for instance.

“We do not want to do everything ourselves but we do want to have control over the architecture so it becomes a Mercedes-Benz experience,” Östberg says.

The question over control between carmakers and technology partners is becoming increasingly sensitive. Despite the huge popularity of Apple’s CarPlay system, which connects a vehicle’s dashboard to the music and mapping systems of the iPhone, the US tech group has faced resistance from the automotive industry over the latest iteration of the software.

We do not want to do everything ourselves but we do want to have control over the architecture

Mercedes-Benz was among a string of carmakers that said they had no plans to bring CarPlay Ultra, which connects to other vehicle information such as temperature, speed and fuel use and can enable drivers to customise dashboard layout, to their vehicles. Some car executives described Apple's foray into driver screens as "invasive" and an attempt to take over their own systems.

But carmakers must tread a fine line. Tech collaborations have been crucial in keeping them up-to-date with advances in software while they widen their own capabilities.

Volkswagen has struck a $5bn deal to develop new software with California EV start-up Rivian, while Europe's largest carmaker has also partnered with Chinese EV maker Xpeng to jointly develop a new generation of EVs. Both initiatives follow a series of budget overruns and stumbles at its in-house software division.

"The problem for us is to find the good level of co-operation," says one executive at a European carmaker, adding that it was difficult to strike the right balance between technology sharing and control over underlying vehicle architecture.

Toyota's hard-won reputation for well-built and reliable vehicles has meant it had to think carefully about how quickly to transition to software-driven cars.

The choice of the RAV4 for its new in-car software was driven by a desire to debut Arene in a high-volume flagship model while minimising the risks that would come from launching it more broadly, according to people with knowledge of the company's decision.

The system itself is also born of compromise since the more ambition and memory it contains, the lower the profit margins will be, the people added. That underscores the challenges carmakers face in balancing legacy businesses, safety requirements and reputations with the desire to accelerate their software efforts.

Akio Toyoda, the powerful chair of Toyota and the grandson of its founder, remains committed to transforming from a car manufacturer into a provider of software-powered mobility services, say those who know him.

The interior of a Xpeng X9 electric vehicle. Volkswagen has partnered with Chinese EV maker Xpeng to jointly develop a new generation of EVs © Lam Yik/Bloomberg

“Akio still understands the importance of software-defined vehicles, but he’s still thinking about exactly what his approach is,” says one former Woven executive.

In a statement to the FT, Toyota said its Arene system represented a “broader, more foundational software platform than a typical in-house operating system”, which enabled a faster and safer software development across different vehicles. Some analysts also contend that even if Toyota is slow, its software products will be methodological and executed well.

How exactly carmakers will make money by selling software and services on a platform they design and operate also remains unclear.

In 2021, General Motors set a target to generate up to $25bn annually from software-based connected services. Two years later, it said it would stop installing CarPlay or Android Auto on some of its EV models in North America.

But Mike Abbott, a former Apple executive poached by GM to head its software unit, stepped down in 2024 due to health reasons, and there have been few updates since on its efforts to develop software-defined vehicles.

Rival Ford has also had its share of setbacks in launching a new platform for software-defined vehicles. But its commercial fleet leasing business, Ford Pro, has been an early example of how to monetise software.

The company has leveraged vehicle data to improve productivity, maintenance and repair services for its users, who pay a subscription to access the information generated across their fleets.

Software helped to contribute 17 per cent of Ford Pro’s operating profit during the second quarter, while paid subscriptions grew 24 per cent from a year earlier to 757,000.

“Having the data itself is not the golden nugget. It’s really how do you turn it into actionable information,” says Hans Schep, general manager of Ford Pro in Europe. “We’re in the early stages.”

Data visualisation by Ian Bott