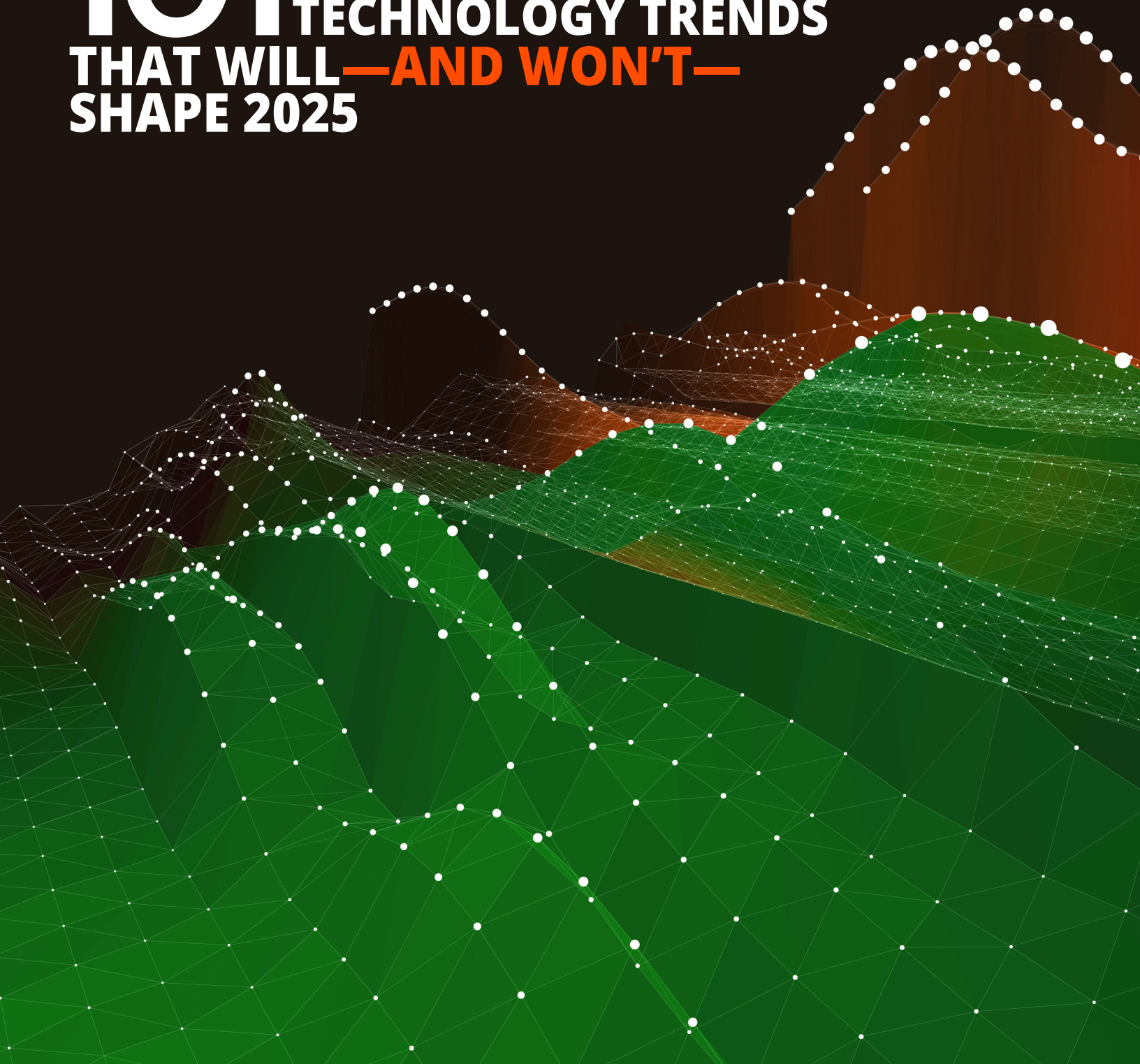
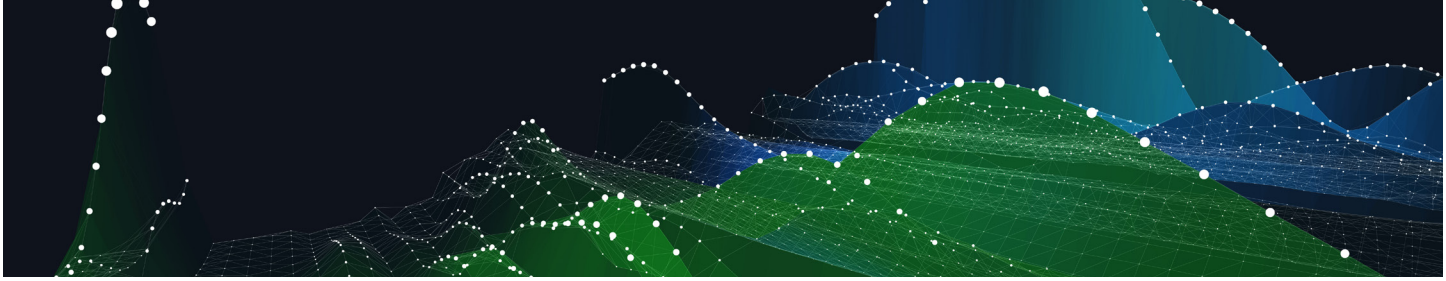
ABIresearch
THE TECH INTELLIGENCE EXPERTS℠

101 TECHNOLOGY TRENDS THAT WILL—AND WON'T—SHAPE 2025





From Our Chief Research Officer

This last year has been fraught with challenges and headwinds. Global conflict to waning inflationary pressure to political uncertainty have all put pressure on enterprise and consumer spending. The result is markets with built-in inertia, short-termism in relation to technology investments, cash on the sidelines, and an ultimate sorting of wheat from chaff as vulnerable suppliers become exposed.

From this bleak backdrop, what does 2025 hold? Global manufacturing indexes are coming out of the bottom of their slumps or at the end of historically long downturns (Germany excepted), U.S. political uncertainty has been resolved to a certain extent, inflationary pressures are now returning to normal levels, and there is a prospect to resolve global conflict.

This would suggest we are in the territory of a rebound and improved global fortunes. However, there are some endemic sustained trends that will continue to have impacts on markets moving forward. Government debt and the size of states are still affecting us following COVID-19-led decisions, the prospect of a global tariff battle looms, underlying issues of skilled workforce availability exist, global productivity growth has slowed, and free risk appetite is low. Sustainability requirements and reporting continue to be stressors, especially for smaller organizations.

So what does all of this mean for the technology landscape moving forward? Where solutions meet near-term Return on Investment (ROI) goals, they will be adopted. Where solutions alleviate some of the endemic risk factors such as workforce skills or productivity, they are likely to result in successful implementation and adoption.

From a technology perspective, it is clear that many industries and end markets are in that awkward stage of technology adoption where they are formulating implementation strategies, assessing solutions and partners, and working out if they have the resources needed to roll out solutions at scale. This is a particularly sensitive time and it tends to suggest we are on the brink of a period of a massive technology shift as these organizations work through these issues.

This coming year will be key in understanding how Artificial Intelligence (AI), Generative Artificial Intelligence (Gen AI), the cloud, the edge, the hybrid cloud, Extended Reality (XR), enterprise 5G, and the ambient Internet of Things (IoT) will develop. It will tell us much about the profile of adoption, timelines, and key critical success factors these technologies will be subject to. Much is needed in terms of shifting from visioneering to real-world marketing, education, marketing around alleviating pressing endemic risks, and shifting to smaller practical revenue-generating implementations, rather than trying to "boil the ocean."

We look forward to helping our clients navigate the intricacies of 2025. Focusing on customer value, driving ROI, and addressing endemic issues will be key factors to success.

—Stuart Carlaw

Research Service Areas

1 WILL HAPPEN

Traditional telco vendors face their day of reckoning in 2025: partner or perish.

The year 2025 will mark a strategic bifurcation in infrastructure vendors' revenue streams, with a pronounced focus on untapped 5G markets and AI-driven monetization solutions. In emerging markets across Eastern Europe, Africa, West Asia, and Latin America, vendors will promote direct-to-5G-Advanced deployments, leveraging lessons learned from early adopters' challenges. This "leapfrog" approach, promising Artificial Intelligence (AI)-integrated equipment from day one, will appeal to operators seeking to avoid the costly transition from Non-Standalone (NSA) deployments, while immediately benefiting from automated, energy-efficient operations. The timing aligns perfectly with these markets' readiness to invest, as spectrum allocations mature and digital transformation initiatives gain government backing.

Meanwhile, in mature 5G markets like Western Europe, North America, and China, infrastructure vendors will face a critical pivot in their business models. As operators' traditional Capital Expenditure (CAPEX) spending plateaus due to completed 5G rollouts and disappointing Average Revenue per User (ARPU) growth, vendors will be forced to reinvent their value proposition through AI integration. However, they will increasingly find themselves competing with specialized AI companies for operators' technology budgets. This competition will drive a fundamental shift in the vendor landscape, leading to strategic partnerships between traditional infrastructure specialists and AI-focused companies. These collaborations will combine telco-grade network expertise with advanced AI capabilities, offering operators a more compelling path to network monetization than either group could provide alone. An exception to this model will be Chinese vendors, which will maintain their traditional end-to-end approach, leveraging in-house AI models, computing resources, and proprietary AI chips. While this vertically-integrated strategy will prove successful within China's unique market environment, it will likely face resistance in other regions where the partnership model will become the preferred path forward.

2 WILL HAPPEN

AI and automation will accelerate telcos toward cloud-native.

Network infrastructure vendors have developed 5G technology beyond what operators can absorb financially and implement at full commercial scale. The 5G Core is the best example of this because despite the centrality of this technology for realizing the benefits of 5G, most brownfield operators are hobbled by legacy stacks or major investments in 5G New Radio (NR) and still unable to implement a 5G SA Core. Future-focused vendors overlook the long-term support required for legacy and, in some cases, even the roadmaps needed for operator transition. With NSA demand continuing for the next 5+ years, network vendors will need to reposition toward interoperability and building bridges to the modern infrastructure from legacy, overall providing a clearer pathway into the future from where operators stand today.

Innovation does not always occur at the cutting edge, but can also find common ground where it can advance operators' pace away from legacy. For 2025, we expect to see innovations and services that appreciate operators' immediate needs, while also boosting their journeys toward long-term 5G cloud-native plans. Examples include: 1) Virtual Network Function (VNF)-compatible cloud-native platforms with attractive automation features that can usher operators from cloud-based into cloud-native; 2) enhancement to cloud services with the use of AI tools, such as those assessing cloud-readiness or cloud-migration strategies; and 3) improved internal Application Programming Interface (API) enablement for interoperability between legacy and modern systems within the network ecosystem. The year 2024 has already seen advancements in each of these strategic areas by Red Hat, Amdocs, and Nokia, respectively, and we would anticipate that with early evidence of commercial success, these or similar solutions will diffuse through the market in 2025.

3 WILL HAPPEN

New 5G traffic patterns emerge, driven by new devices and AI.

New devices and traffic trends are starting to emerge, completely changing the way networks will be designed and dimensioned in the future. Smart glasses, like those from Ray-Ban, are gaining appeal among consumers, despite not yet being mainstream. These devices can impact traffic patterns, as Ray-Ban smart glasses, for instance, record 1440x1920 video at 30 Frames per Second (fps), requiring 2–15 Megabits per Second (Mbps) of uplink capacity and connect to smartphones via Wi-Fi or Bluetooth®, which then upload videos to the web. With a downlink/uplink ratio of 1/200, they consume minimal downlink bandwidth. However, as hundreds or thousands of such devices operate in a city, uplink traffic demands will increase, prompting operators to consider reallocating resources to the uplink. Similar applications exist on the enterprise domain, such as the low-altitude economy where drones have minimal impact on the downlink, but require high capacity on the uplink for telemetry and other operations. Chinese operators, having deployed 5G Standalone (SA) since Day 1, are already monetizing their networks in an effective manner, including priority packages for media, mobile gaming, and stadiums. These operators are showing the world what is capable with SA and have even launched network slicing capabilities, further changing traffic patterns.

The year 2025 will be pivotal for telcos to understand how these new devices and AI applications will change how their networks are being deployed.

4 WON'T HAPPEN

Telcos become stakeholders in the AI market through NVIDIA partnerships in 2025.

NVIDIA, in partnership with SoftBank, announced large-scale deployment of its Graphics Processing Unit (GPU) in Japan. In fact, SoftBank will be the first company to receive NVIDIA's new Blackwell servers, using them to build a supercomputer to be used by universities, research institutions, and businesses throughout Japan. NVIDIA is also signing more deals with several operators, including KDDI in Japan, Ooredoo in Qatar, and many others.

The SoftBank deployment includes telco network elements, with GPUs deployed across the network and monetized in a GPU-as-a-Service (GPUaaS) business model. SoftBank and NVIDIA claim that these servers can generate a 5X ROI when adequately populated with AI inference models, going well beyond their traditional use, meaning Radio Access Network (RAN) processing. The question is whether this will be successful and if other telcos can replicate this example in 2025, in an attempt to break free of their connectivity legacy and enter new markets.

ABI Research does not expect other telcos to make such bold partnerships and investments, especially as most are cash strapped. Moreover, the GPUaaS business model, although enticing, is largely unproven and incurs significant capital investment and risk—GPUs are not cheap. SoftBank may be the first among many, but 2025 will not likely see similar models being deployed in global markets.

5 WON'T HAPPEN

Telco APIs will help telcos monetize their assets.

Vendor competition for leadership with network APIs is heating up in 2024. First, in September, Ericsson announced that it will be leading a joint venture with 12 Communication Service Providers (CSPs) to aggregate and expose network APIs on its global platform. Then, in November, Nokia replied with its announcement that it had acquired Rapid Technologies to build upon its API marketplace for its own global platform. Other vendors have also been active with internal enablement of network APIs. The stakes for winners in this market are high with expectations that APIs will be a major asset for 5G monetization. ABI Research ultimately forecasts a US$13 billion market by 2028. Despite all this intensification of the market, we do not expect APIs to be a major source of revenue in 2025.

There are several major obstacles to this revenue. First, the pace of 5G SA transition will slow monetization. While network APIs can be used with legacy, adoption will be accelerated by 5G SA, which allows for granular management in controlling network resources, especially 5G applications such as network slicing and Ultra-Reliable Low Latency Communications (URLLC). Second, network vendors still need to gain traction with developer communities that will build the applications for the global platforms. There have been historic challenges to accomplishing this. Finally, we should not overlook the technical challenges posed by API platforms. These platforms need to accommodate diverse APIs from Quality-on-Demand (QoD) to network slicing and edge discovery, they must scale to millions of consumers, and they must also feature sophisticated solutions for monetization that span developer, vendor, and operator contributions.

6 WILL HAPPEN

AI PCs will become the new normal in 2025, moving from premium to standard market feature.

The year 2025 will mark the one when Artificial Intelligence (AI)-enabled Personal Computers (PCs) transition quickly from a "nice to have" feature to one of necessity, capturing approximately 60% of total PC shipments according to ABI Research forecasts. This dramatic shift will be driven by the convergence of several key factors: the proliferation of Neural Processing Units (NPUs) across different price tiers, the mainstream adoption of Large Language Models (LLMs) for everyday computing tasks, and the strategic launch of Microsoft's Windows 12 in 2H 2025. Microsoft's new Operating System (OS), optimized for AI workloads and deeper Copilot integration, will trigger a significant enterprise replacement cycle. The compelling proposition of AI PCs will be strengthened further by their superior power efficiency during AI workloads, offering extended battery life, while running increasingly sophisticated on-device AI applications.

The market dynamics will be shaped by intense competition between traditional x86 vendors and the Arm ecosystem, with Qualcomm's push into lower-priced notebook segments with its "budget friendly" Snapdragon X Plus 8-core chip democratizing AI PC access. This competitive landscape will accelerate innovation, while driving down costs, making AI capabilities standard across most price points. Enterprise adoption will be particularly strong, driven by the proliferation of productivity-enhancing Generative Artificial Intelligence (Gen AI) applications and the promise of improved employee efficiency. However, the success of this transition will depend heavily on the ecosystem's ability to deliver compelling use cases that justify the AI premium, particularly in the commercial sector where the Return on Investment (ROI) of AI-enhanced productivity tools will be crucial for widespread adoption.

7 WILL HAPPEN

Smart ring adoption will gain momentum in 2025.

Considerable expansion of the smart ring wearable market is expected in 2025. The market is currently dominated by a plethora of specialized startups, including Oura, McLEAR, Jackom, SLEEPON, Keydex, Ultrahuman, Nod Ring, e-Senses, and many others. However, there is increasing interest among major brands in the segment following Samsung's entrance with its Galaxy Ring in July 2024 and Apple's rumored interest, which will help legitimize the form factor and drive broader consumer awareness. The market will stratify across different price tiers, with premium offerings from established brands (Oura, Samsung, and potentially Apple) focusing on comprehensive health metrics and sleep tracking, while more affordable options from companies like Amazfit and Xiaomi will target specific core use cases, such as fitness tracking and mobile payments. New players are expected to emerge with specialized offerings for medical monitoring and enterprise applications, while other established jewelry brands may partner with tech companies to create fashion-led smart rings, possibly using precious stones and materials to offer premium priced devices.

However, the smart ring will remain complementary, rather than a primary wearable in 2025, serving as a companion to smartwatches, rather than as a replacement. Growth will be driven by improved battery life (reaching up to 7 days), enhanced sensors for health monitoring, and their unobtrusive form factor. Business models will diversify beyond the traditional hardware-plus-subscription approach pioneered by Oura, with some manufacturers offering basic features without subscriptions to help drive adoption and grow the ecosystem. Enterprise adoption will begin to emerge in specific verticals like healthcare and workplace security, though consumer applications will still dominate. Despite this momentum, smart rings will capture only a fraction of the broader wearables market, accounting for just 6% of total shipments in 2025, significantly below smartwatches and fitness trackers sectors, which will hold shares of 42% and 28%, respectively.

8 WON'T HAPPEN

Semiconductor onshoring dreams will not come true.

The year 2025 will mark a critical reality check for semiconductor manufacturing onshoring ambitions in the United States and Europe, as implementation complexities force significant timeline revisions. The first major hurdle emerged with the activation of the U.S. CHIPS Act itself—while established by the Biden administration in August 2022, it took until November 2024 to activate and grant Intel US$7.86 billion for new foundry sites across the country. Despite Intel's ambitious US$100 billion investment commitment, the practical challenges of establishing advanced semiconductor manufacturing are proving far more formidable than anticipated. Key projects, including Intel's facilities in Arizona and Ohio, and TSMC's Arizona fab, face delays due to multiple constraints: ASML's limited Extreme Ultraviolet Lithography (EUV) machine production capacity, workforce development challenges, and the complexity of establishing operational excellence in new locations. Consequently, these projects are unlikely to achieve full operational capacity before 2027 at the earliest. The situation in other regions of the world, notably in Europe, appear even more challenging, with major projects like Intel's Magdeburg facility facing delays and funding uncertainties, potentially derailing the EU's goal to capture 20% of global chip production by 2030.

These setbacks will trigger a strategic reassessment in 2025, as stakeholders confront the reality that building truly self-sufficient local supply chains demands significantly more time and resources than initially projected. While political commitment to onshoring in the United States and Europe remains stronger than ever, practical constraints will force a more measured approach to capacity expansion. Companies will prioritize their business interests by adopting pragmatic diversification strategies, rather than complete onshoring, focusing on strategic partnerships among trusted partners. This reality check will particularly impact advanced node manufacturing plans, as ASML's equipment constraints (limited to producing around 70 EUV machines annually by 2025) and massive capital requirements force stakeholders to prioritize certain projects, while delaying others. The semiconductor cold war's impact will extend beyond the industry itself, potentially slowing technological advancement in AI and other cutting-edge applications that rely on leading-edge chips.

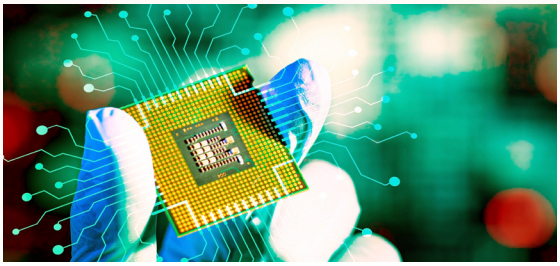
For more information on semiconductor onshoring challenges, see ABI Insight, "The Geopolitical Semiconductor Cold War: Challenges and Impacts of Onshoring Manufacturing."

9 WON'T HAPPEN

Arm-based PCs will not be more than a minority segment in 2025.

ABI Research forecasts that Arm-based PCs will represent only 13% of total PC shipments in 2025, despite this being a pivotal year for Arm's PC market expansion. While Qualcomm's latest PC processors offer enhanced performance and AI capabilities, its market impact depends heavily on resolving ongoing Arm licensing disputes. x86 incumbents Intel and AMD will continue to rule the mass market and will maintain their significant advantage in software compatibility.

In the high-end and mid-range segments of the consumer market, AI-capable laptops will become the key competitive battleground, where Arm's superior power efficiency enables all-day battery life, even when running advanced consumer workloads—a compelling advantage for modern consumer lifestyle. It is in the high-end that Apple has continued to service this segment of the Arm-based laptop market, but it has no ambition to address the lower tiers. Enterprise adoption of Arm-based laptops will likely remain modest through 2025 as organizations await broader ecosystem maturity. Consumer market gains will primarily come through specific segments like thin-and-light laptops and creator-focused devices, with success heavily dependent on the optimization of Windows 12 for the Arm architecture.



10 WILL HAPPEN

Vendors will prioritize green antennas to drive cost reduction and efficiency.

In 2025, sustainability will drive the antenna industry, with green antennas playing a significant role in achieving environmental and operational goals. Green antenna shipments, currently about 27% of global antenna shipments, are expected to rapidly grow as vendors innovate to meet the increasing demand for sustainable solutions. This growth is propelled by the emphasis on green design principles in operator requirements, where many Requests for Quotation (RFQs) now mandate that antennas meet specific sustainability criteria.

Green antennas stand out not only for their functionality, but also for their commitment to environmental responsibility, focusing on energy-efficient designs and solutions that minimize visual impact. These advancements align with operators' priorities of energy and cost efficiency. As the demand for 5G infrastructure grows, operators will adopt these green solutions due to their advanced technologies and alignment with broader industry goals to reduce energy consumption and carbon footprints.

Traditional passive antennas have significant energy losses in design and manufacturing, leading to higher energy output and increased Carbon Dioxide (CO_2) emissions. With base stations and antennas accounting for 57% of all electrical power consumption in passive antenna networks, this is a critical area for vendors to target. In 2025, the focus will be on reducing energy consumption, while improving Radio Frequency (RF) efficiency, driving the increase of green antenna shipments as the industry meets sustainability targets and supports 5G expansion.

11 WILL HAPPEN

Automation and AI take the spotlight for Open RAN.

The Open Radio Access Network (RAN) market faced a more challenging year than anticipated headed into 2024, with no commercial activity matching the size and scale of the AT&T contract that Ericsson announced in December 2023. Operators are taking a conservative approach to adopting the technology, being careful and ensuring they are not the first to fail with their launch, given that the technology is still relatively new. While initially this seems all "doom and gloom," vendors have, at the same time, spent this year working on proving interoperability in a multi-vendor environment to help score Open RAN contracts going forward. One of the key technologies related to Open RAN is the related automation technologies—Service Management and Orchestration (SMO), Non-Real-Time Radio Intelligence Controller (Non-RT RIC), and Near-RT RIC. These technologies are designed to replace the legacy Self-Organizing Network (SON) technology, which has been around since the 4G era.

With pretty much all major infrastructure vendors now supporting Open RAN interfaces for their hardware (especially for the radio), the industry will be working diligently to accelerate the development of their RAN automation technologies to help commercial viability of deployment in 2025, especially to ensure that their latest RAN automation solutions can enable the latest 5G technologies such as network slicing. Furthermore, for the Open RAN automation technology to be adopted, it needs to have a level of acceptance for the traditional RAN networks still widely available to evolve beyond being viewed solely as an "Open RAN technology."

12 WON'T HAPPEN

Active antennas will not replace passive systems in 5G deployments.

While active and Active + Passive (A+P) antenna solutions are gaining traction due to their efficiency and high performance, the idea that passive antennas will be phased out by 2025 is unrealistic. The passive antenna market has seen some stagnation due to economic pressures and operators prioritizing clear ROI, yet passive antennas still offer critical benefits in certain network environments where cost efficiency and simplicity are crucial. They are the preferred choice for lower-frequency spectrum bands (<3 Gigahertz (GHz)), essential for broad 5G coverage, especially in suburban and rural areas.

The size and complexity of active antenna systems can make them impractical for certain environments, such as in-building wireless deployments, which often face space constraints and budget considerations. In these scenarios, passive antennas are more appealing due to their straightforward design and lower installation costs. They can be integrated into existing infrastructure without significant upgrades. As global 5G rollouts continue into 2025, especially in emerging markets like Latin America and Africa, passive antennas will remain crucial for network buildouts. These regions, facing affordability and scalability challenges, will rely on passive antennas for their reliability and cost-effectiveness.

13 WON'T HAPPEN

AI-RAN won't be widely deployed for at least 3 years.

The year 2024 has seen significant traction around the development of Artificial Intelligence (AI) technology for the RAN ecosystem. At MWC this year, we saw the launch of the AI-RAN Alliance, whose member count has continued to grow throughout the year and key steps have been taken to operationalize the alliance with the formation of working groups for studies. Since the launch, NVIDIA has made a series of announcements, the latest of which has been the world's first outdoor AI-RAN trial with SoftBank with incredibly impressive results, such as a 219% profit margin when running 67% AI workloads and 33% RAN workloads on the converged infrastructure.

Despite the impressive speed at which the AI-RAN ecosystem is developing, the technology is still very new with much more development to be done before commercial deployments are expected. Even SoftBank, which just completed its trial, expects the commercial deployment of AI-RAN for its network during 2026. This technology is likely to be deployed more widely a year or two after that, given that the Japanese market has historically been one of the very early adopters of new technology, with the latest previous example being Open RAN.

In summary, AI-RAN will see an increased number of trials, Proofs of Concept (PoCs), and pilot projects in 2025. All will be contributing to the maturity of the technology, but it is unlikely to see any credible commercial deployment before 2026 with large-scale deployment not expected until 2027 at the earliest.

The new technology faces several critical challenges: the considerable cost of underlying hardware supply chain capacity uncertainties (namely NVIDIA Graphics Processing Units (GPUs)), and evolving business dynamics. AI-RAN vendors must particularly refine their business models to compete effectively for telecommunications operators' Capital Expenditure (CAPEX), which is becoming increasingly constrained as existing 5G infrastructure matures.

14 WILL HAPPEN

TinyML challengers will penetrate the embedded market.

Novel computing architectures and highly-specialized Application-Specific Integrated Circuits (ASICs) will penetrate into both Internet of Things (IoT) and consumer markets, with some reaching commercialization. Prominent examples include analog neuromorphic processors by POLYN, and highly programmable silicon offered by Ambient Scientific, which demonstrate the progress being made in the Tiny Machine Learning (TinyML) and embedded space, and the expanding capabilities for running neural networks on power-constrained devices. A sign of progress in this space is the vertical integration of Syntiant, a more established player, and its acquisition of the microphone manufacturing business of Knowles for US$150 million, allowing it to capture more of the value in complete solutions for always-on audio applications. Expect to see a growing presence at trade shows in 2025 and the maturation of solutions as vendors' investments in software optimization bear fruits, bolstered by efforts from Machine Learning Operations (MLOps) players like Eta Compute and Edge Impulse, with platforms that significantly reduce the amount of in-house talent needed to deploy AI/ML on novel hardware.

15 WILL HAPPEN

Open efforts challenging NVIDIA's proprietary solutions plow on.

Intel and AMD's open ecosystem efforts via UALink, Triton, and UEC will progress, driven by the demand to break free from vendor lock-in, and drive down prices of data center hardware. The recent incorporation of UALink, and the healthy growth in its membership, will provide a boost to its efforts to find an open alternative to NVIDIA's NVLink interconnect technology for scaling up accelerators, which has been necessary for training frontier models like those provided by OpenAI. These efforts are supported by the inclusion of hyperscalers like Microsoft in open industry groups, which will enjoy more influence over emerging data center standards, drive competition, and ultimately lower the price of AI data center solutions. Although, technically, these groups are behind the performance of NVIDIA's proprietary offerings, the desire for more competition, choice, and, ultimately, lower prices, will sustain these efforts going forward.

16 WILL HAPPEN

ML tools will expand or be acquired.

The MLOps market remains fragmented (with some notable exceptions) due to the highly specialized nature of specific AI processes (e.g., optimization, Retrieval-Augmented Generation (RAG), AI agents, neural architectural search) and AI model types (i.e., Large Language Models (LLMs), predictive models, computer vision). This specialization has, so far, proven successful, but as we move into 2025, pressure from customers and competitors will make these specialists face a choice—expand, be acquired, or potentially fail. Developers are signaling their requirement for end-to-end, frictionless experiences and those that are not providing this are facing a "developer drain" with customers shifting to one of their many platform competitors. From the supply side, "relative" stability post-election season, cash-rich AI leaders (e.g., NVIDIA, Meta, Apple, Google, and Microsoft) looking to aggressively expand their AI proposition for enterprise applications, and early investors looking for returns create the perfect environment for Mergers and Acquisitions (M&A) activity. Either way, ML companies with strong products are in a good position, but 2025 will see plenty of internal investment and/or external M&A activity. ABI Research forecasts that top of the M&A list will be companies targeting AI efficiency, data, AI governance/observability, and MLOps automation.

17 WILL HAPPEN

Lots of money will be spent on data.

AI implementations still face significant challenges, and many of these are rooted in data—non-specialized data, unstructured data, and fragmented data. Solving these issues will be a priority for all stakeholders in 2025 with investment in synthetic data, collaboration around regional or industry-specific open datasets, and further development of AI and data platforms. Snowflake's acquisition of Datavolo is an early signal of the importance of unstructured data and the value this may have for enterprise AI implementation. ABI Research believes that any MLOps or data platform provider targeting uncarpeted verticals like supply chain or industrial must be incorporating solutions to handle the enormous amount of distributed, unstructured data.

18 WILL HAPPEN

Traditional AI spending will grow as enterprises search for pragmatic, ROI-driven solutions.

Hype around Generative Artificial Intelligence (Gen AI) is quickly dying down with companies recognizing the cost, risk, and operational implications of Proofs of Concept (PoCs) with an 80% to 90% failure rate. This will create greater pragmatism in the enterprise market with many turning to "traditional" AI as a strategic alternative that can solve business problems and deliver a much clearer Return on Investment (ROW). Amazon Web Services (AWS) has shown that over 85% of projects in 2024 were not based on Gen AI—and this trend is likely to continue. Vendors should change their approach to Gen AI and view it as a solution that can be sold on top of traditional AI models with a synergistic value proposition.

19 WILL HAPPEN

The ecosystem will accelerate the build-out of AI-focused cloud capacity.

NVIDIA has made headlines throughout 2024 as it aims to support governments, local data center operators, large enterprises, and others in developing AI factories or sovereign AI infrastructure. The year 2025 will see further ramp-up with more regions recognizing the geopolitical necessity of AI infrastructure, models, and datasets. Other chip vendors like Intel, Cerebras, Groq, Samba Nova, or AMD will likely have a larger role to play as they look to offer a differentiated value proposition compared to NVIDIA (focusing on efficiency) and customers diversify against costly and hard to get NVIDIA hardware (e.g., Groq's contract with Aramco for an AI inferencing data center). Intel's partnership with Inflection AI, and Samba Nova's full-stack AI solution will play an integral role in their go-to-market strategies targeting this growing space.

20 WILL HAPPEN

Proliferation of AI agent trials and pilot projects across industries.

The year 2025 will mark the proliferation of trials, PoCs, and pilot projects associated with AI agents, as enterprises move beyond generic AI models toward specialized, industry-specific solutions. This shift is enabled by advances in Gen AI, LLMs, RAG, and High-Performance Computing (HPC). Major players across the technology spectrum—from chip manufacturers like NVIDIA, Intel, and AMD to hyperscalers like Meta and Microsoft, as well as Original Equipment Manufacturers (OEMs) like Hewlett Packard (HP) and Dell—are developing AI factories that enable enterprises to build and fine-tune custom models using their proprietary data. On the other hand, industry giants such as Siemens (manufacturing), Huawei, and ZTE (telecommunications) are leading the way by developing proprietary agents integrated with their infrastructure offerings.

While large enterprises with substantial resources will develop their own AI agents, the majority of Small and Medium Businesses (SMBs) will partner with specialized AI vendors to create customized solutions. This democratization of AI agent development will transform the market into an ecosystem of AI factories, where businesses of all sizes can deploy tailored agents trained on their specific data and use cases. This shift represents a fundamental change in how organizations approach AI implementation, moving from generic, off-the-shelf solutions, which are viewed as "helpers," to customized, domain-specific applications that directly address unique business challenges.

21 WON'T HAPPEN

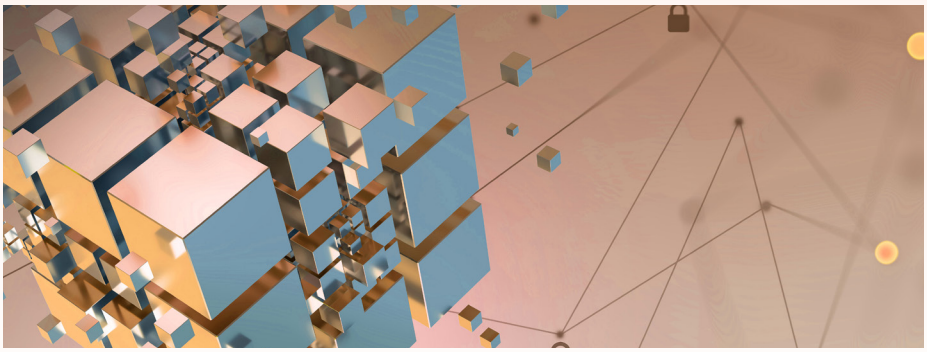
A clear contender to challenge NVIDIA in the AI data center will not emerge in 2025.

The company will continue to dominate the space—in particular, for training workloads—in computing, Graphics Processing Unit (GPU)-GPU scale-up interconnect, and networking scaling out for large clusters of chips. This will, in part, be fueled by the latest Blackwell platform ramping up in various cloud provider instances as providers race to deploy it first. Nonetheless, progress has been made by AMD with its Instinct platform and an ambitious hardware roadmap to match NVIDIA's release cadence, which has been bolstered by the (yet to be completed) acquisition of ZT Systems for its expertise in designing and deploying hyperscale solutions. Intel has launched Gaudi 3, including a reference design with clusters scaling to 512 nodes each with 8 accelerators, addressing both inference and training workloads. Progress has also been made by emerging players—with value propositions based on the Total Cost of Ownership (TCO) advantages of their hardware over NVIDIA's GPUs—such as RISC-V vendors Ventana, Tenstorrent, and Si-Five, with commercially available hardware targeting AI inferencing workloads, as well as Cerebras, which is pursuing an Initial Public Offering (IPO). Nonetheless, expect new NVIDIA hardware to keep shipping as fast as it can roll off the conveyor belt, with model developers like xAI and OpenAI racing to make the next AI model breakthrough.

22 WON'T HAPPEN

Impact of AI regulation will not be FULLY seen in 2025.

The European Union's (EU) AI Act may have been formally legalized in August 2024, but the full legal impact will not come into force for another 1.5 years (August 2026). In 2025, most controls on AI development and deployment will still originate from data regulations like the General Data Protection Regulation (GDPR)—as exemplified by Google AI and Apple Intelligence both facing issues in EU deployment. Enterprises and suppliers will be able to continue to operate effectively without AI-specific constraints for the meantime. However, regulation may not be fully enforced, but it will have a sizable impact on demand and supply. Enterprises will be reassessing existing AI deployments and looking to establish an effective long-term AI strategy that aligns with emerging regulation—this will be more challenging than many expect due to debate and confusion over AI use case risks. The supply side will face challenges bringing products and services into regulated regions and, in some cases, will need to build region-specific models or services to ensure alignment with transparency, explainability, and other requirements.



23 WON'T HAPPEN

Gen AI will STILL not create expected value.

By 2025, many enterprises, large and small, will have implemented Gen AI-related products and tools across various business processes. These will still not meet the high expectations for this supposedly revolutionary technology. Value creation will be constrained by technology and business challenges, and higher than expected implementation costs. Many enterprises have faced significant upfront costs, including data organization, fine-tuning, cloud storage, and strategic overhauls. Most enterprise implementations have been constrained to low-risk, low-value use cases due to risk aversion and other factors. With Gen AI not living up to expectations, expect projects to be abandoned with many enterprises focusing on quick and easy wins.

24 WON'T HAPPEN

Supply chain and energy constraints mean that a data center explosion will not happen in 2025.

Massive investments in data center projects were recorded in 2023 to 2024 across regions and sectors. These were driven by hyperscalers' AI initiatives, colocation providers' expansion, telco operators' 5G/6G transformations, and enterprises seeking independence from costly public cloud services and greater data sovereignty, alongside government-backed sovereign computing projects. However, the year 2025 will mark a shift toward more measured expansion as practical constraints emerge. This moderation will primarily stem from severe supply chain limitations, with NVIDIA's dominance in AI accelerators creating the first bottleneck, followed by TSMC's control of advanced chip manufacturing and ASML's exclusive position in lithography equipment. These multi-layered capacity constraints will force prioritization of large-scale customers, potentially marginalizing smaller players and sovereign computing initiatives. As a result, smaller and specialized data center projects will struggle to secure the required capacity due to supply shortages.

The mounting energy demands of these data centers will further temper expansion plans in 2025, as utility providers struggle to match the explosive growth in power requirements. While computing and AI capabilities advance rapidly, the slower pace of energy infrastructure development will create a critical mismatch between ambition and feasibility.

This imbalance will particularly impact industries lacking the scale of major data center operators, with telecommunications providers and other sectors competing for limited computing resources. The resulting supply-demand disconnect will drive a more pragmatic approach to data center investments, favoring optimization of existing facilities over new construction. Many government-driven data center projects, despite their strategic importance, could take years to materialize—if they survive the transition from ambitious plans to commercial reality.

25 WILL HAPPEN

Mobile identity wallets will continue to be a focal point for all governments in 2025.

Mobile identities within the citizen identity space continue to be a hot topic. Pilots and implementations continue to grow, with a focus on the digitization of driver's licenses and national Identity (ID) cards. Projects in Australia, the United States and the 27 European Union (EU) member states looking to adhere to Electronic Identification, Authentication, and Trust Services (eIDAS) and eventually implement an EU Digital Identity (EUDI) wallet will all be significant market drivers throughout 2025, alongside efforts within the African region, supported by World Bank funding, expanding beyond ID and biometric databases to a Mobile Identity (mID) credential.

The year 2025 will be a key one for the mID market, setting the foundation for significant growth both in the midterm, driven by mobile driver's licenses and national IDs, and in the longer term as it relates to Digital Travel Credentials (DTCs), which will form a later market growth lever.

26 WON'T HAPPEN

Despite the focus on mobile identity wallets, 2025 will not mark the beginning of the end for the physical identity credential.

Questions are often asked about the future validity of physical credentials and if mID implementations mean the beginning of the end for the physical document.

Although a valid question, there is no evidence that the physical ID credential in all its form factors, including driver's licenses, national IDs, and passports, will begin disappearing anytime soon, with continued efforts and focus on improving physical security attributes through new personalization techniques and continued migration to polycarbonate.

It is clearly evident that the physical document will remain, although a risk remains that the use of mIDs will enable countries to leapfrog smart card migration in instances where this has not yet been achieved. This is a trend expected within the African region, presenting the ability to issue a lower-cost non-smart ID credential with an mID/wallet companion.

Despite an evident focus on mID wallet implementations, 2025 will not mark the beginning of the end of the physical ID credential, although in certain instances, the mID may mean a renewed focus on physical security features in regions where skipping smart card migration looks likely.

27 WILL HAPPEN

EU's digital product passport regulations for textiles, batteries, and consumer electronics will drive supply chain transparency.

Forward-thinking suppliers and manufacturers are investing capital and building expert capabilities to adopt a holistic sustainability strategy across the company and product lines for greater sustainability impact. The EU Digital Product Passport (DPP) regulation is one such initiative that prioritized industry groups such as batteries & vehicles, textiles, electronics & Information and Communication Technology (ICT), furniture, plastics, construction, and chemicals based on their environmental impact. The DPP is a critical tool for providing information about products to the entire value chain. The objectives include sustainable products and production, identifying new business opportunities through circular value and optimization, supporting customer decision-making, and verification of products' compliance with legal obligations. This is having a cascading impact on the global supply chain. Supply Chain Software (SCS) and traceability software solution providers are evolving product offerings to cater to the DPP market by supporting existing client requests to comply with upcoming regulations and creating new revenue streams.

On the ground, the practical and realistic requirements of implementation, data structure, accessibility/availability to supplier data and business models are still developing in an emerging market. Solution providers are in the early stages of ironing out business models and commercial viability, but they are focusing on adding value to the suppliers, capturing consumers with scaled adoption, and not merely creating the DPPs. Lastly, DPP tools are viewed as adjacent software systems tools that are interoperable and extract data from Enterprise Resource Planning (ERP), Environmental Product Declaration (EPD), and Product Lifecycle Management (PLM) software. Pilot DPPs are proving they can accelerate granular supply chain transparency, improve operational efficiencies by collecting data across the value chain, support manufacturers with identifying potential challenges or risks, and subsequently reduce costs, and lastly, offer direct insights on consumer behavior.

28 WON'T HAPPEN

Circular business needs will not be addressed due to sustainability fatigue, siloed data collection, and maturing of recycling technology and customer mindset.

Customer pressure, a competitive market, and increasing awareness of global climate challenges are resulting in Original Equipment Manufacturers (OEMs) and established business operations being held accountable for the production, operation, and end of life of the products and their impact on society and environment. Circular business models are one solution to keep materials in the loop, but recycling technologies are still maturing and require high upfront costs—a critical hurdle to scaling and commercialization.

Software tools aggregate data across departments, and measure and monitor shared organizational goals to prevent data silos and collect accurate data. The horizontal flow of data across all departments, including Human Resources (HR), finance, procurement, etc., helps identify hotspots and streamline business practices to deliver a "zero waste" economy. Government policies like DPPs help streamline product information onto a single platform, hold the supply chain players responsible, and create data infrastructure for businesses to succeed. This creates unique opportunities for secondary marketplaces to thrive by encouraging customer shifts from "single use mentality" to "responsible consumption." For circular business models to succeed in a competitive marketplace, emphasis on product durability, profitability, measurable & manageable impact metrics, second-life value, and customer loyalty programs is critical to propel sustainability into common business practices.

29 WILL HAPPEN

Multi-protocol smart home to reach its inflection point in 2025.

The year 2025 will mark an inflection point for multi-protocol adoption in smart home devices, as manufacturers recognize that no single wireless technology can adequately address modern connected home requirements. Major players like Samsung, Apple, and Amazon will aggressively expand their whole-home coverage strategies by embedding combinations of Wi-Fi, Bluetooth®, and 802.15.4 capabilities directly into mainstream devices like Televisions (TVs), soundbars, and displays. This integration will eliminate the need for dedicated smart home hubs, with ABI Research expecting a considerable number of new smart home entertainment devices to ship with multi-protocol capabilities by year-end 2025.

The Matter standard will emerge as the primary catalyst for this transformation, pushing manufacturers to adopt multi-protocol solutions for seamless interoperability. While the transition faces challenges in managing multiple protocols efficiently, manufacturers must adapt or risk obsolescence. Smart TVs, speakers, and major appliances will increasingly serve as border routers and smart home controllers, reshaping the landscape by reducing installation complexity and fragmentation. This shift will particularly impact established manufacturers that have built their businesses around proprietary protocols, forcing them to either evolve or fade away in a market dominated by multi-protocol solutions.

30 WON'T HAPPEN

HarmonyOS will not become a global OS in 2025 to threaten Android and Apple ecosystems.

Huawei officially launched an update to its own Operating System (OS), HarmonyOS NEXT, in October 2024, marking a decisive separation from the Android ecosystem. The company plans to initially deploy the new OS across its smartphones and tablets, establishing a distinct ecosystem and user experience. It intends to extend this platform to desktop computers, notebooks, and wearables, creating a harmonized experience across all device categories. Crucially, some leading Chinese tech companies have already pledged their support for the platform. Since 2019, when Huawei faced tightened sanctions as a result of the U.S.-China trade wars, the company has notably retrenched back to the Chinese market and has managed to rebuild supply chains for its own 5G chips and smartphones.

Key questions remain about HarmonyOS' future ecosystem. First, the potential support from major chipset suppliers like Qualcomm and MediaTek remains undetermined. Second, it is uncertain whether HarmonyOS will be embraced and expand to other vendors, particularly Chinese manufacturers such as Xiaomi, OPPO, HONOR, and vivo. Importantly, by retaining elements of open source, the HarmonyOS platform enables the rest of the ecosystem to contribute to its development in line with advances and innovation coming from various nodes of the technology supply chain. As a home-grown OS, coupled with the surge in affinity for local Chinese "homegrown" brands, Huawei may not be aiming for global reach and will primarily stick to the Chinese market for now, although the next 12 months will undoubtedly reveal the success of the ecosystem and acceptance by consumers through expanded growth in device shipments and continued development of platform applications and services. Despite current expectations, HarmonyOS NEXT may eventually break out of the Chinese market once it reaches some level of maturity, although there are still many barriers and many years yet to be overcome before it can be classed as a global OS.

31 WON'T HAPPEN

The introduction of tri-fold smartphones will not bolster the foldable's desire to become mainstream.

Despite the best efforts of many in the industry over the past few years to make the user experience of foldable devices more acceptable, including thinner and lighter designs, good battery life, improved durability through better hinges and crease-free displays, fold and flip form factors, and larger cover screens, they still have yet to fully convince consumers of the practicalities of foldable phones. Now with tri-fold smartphones in the mix, they still need to go through a lot of changes in the coming years in terms of innovation and hardware, as well as price, to hit critical mass. The foldables market volume is still small for the time being, running at less than 2% of total smartphone shipments globally, and adoption remains low.

This steady, if unspectacular growth has been helped by a healthy roster of available devices from a variety of global brands, including Samsung, HONOR, Google, Motorola, Huawei, vivo, OPPO, and TECNO. The addition of a tri-fold design, primarily from Huawei for the Chinese market, brings yet another dimension to the sector, representing a significant step in innovation and bringing an array of differing cogent user experiences catering to multimedia and productivity trends. While it is likely that other leading, notably Chinese, vendors are expected to soon launch their own tri-fold smartphones, a major stumbling block for adoption will be the relatively higher price points due to the added complexity of design and component costs. Moreover, it is too early to tell how tri-fold smartphones will be accepted by consumers or what the main motivations will be for purchase, although it is evident that the foldable market has abundant room for growth if it can move from being a niche, expensive technology to one that can aspire to mass adoption.

32 WON'T HAPPEN

Point and trigger must wait to revolutionize the smart home user experience.

In 2025, we will see Ultra-Wideband (UWB) technology gain meaningful traction in smart homes through "point-and-trigger" applications, driven by increased UWB adoption in high-end smartphones beyond Apple's ecosystem. Major Chinese manufacturers like Xiaomi, along with Apple and Samsung, will expand their UWB device portfolios, focusing on spatial awareness applications that enable users to control appliances by simply pointing their phones at them. The technology's centimeter-level accuracy and spatial awareness capabilities will create compelling use cases in smart locks, entertainment systems, and lighting control. However, implementation will remain selective, as manufacturers balance the FiRa Consortium's standardization efforts with the cost considerations of integrating UWB alongside other wireless protocols.

Bluetooth® Channel Sounding will emerge as a complementary technology in 2025, offering a lower-cost alternative for spatial awareness in mid-range devices. While UWB excels in precise positioning and secure access control, Channel Sounding will find its niche in presence detection and basic gesture control. The key challenge in 2025 will not be technical capabilities, but rather user experience standardization. Despite the FiRa Consortium's efforts to establish consistent point-and-trigger interfaces, fragmentation between ecosystems (Apple, Samsung, Xiaomi, etc.) will create user experience inconsistencies. This will force manufacturers to either choose ecosystem alignment or implement multiple standards, potentially slowing adoption in the mass market, while premium segments embrace the technology's capabilities for enhanced spatial control and automation.

33 WILL HAPPEN

QR code payment acceptance will continue to increase with use cases expanding.

Although QR code payment acceptance is prevalent in countries such as China and growing in emerging digital payment markets, including in India, use cases and potential growth areas are not limited to these countries. Significant and continued investments by vendors, including PayPal, Stripe, and SumUp, are setting the foundation for increased adoption in other mature and established economies with use cases expanding. Although QR codes are already being used by many Small and Medium Enterprises (SMEs) and pop-up retail businesses, 2025 will mark the year when the technology begins to shift from one of niche to partial mainstream.

The flexibility to offer digital payment acceptance via a unique QR code, rather than leasing a Point of Sale (POS) device is not only appealing to SMEs, but also to the larger merchants operating within the hospitality sector, including restaurants, which continue to experience significant financial pressures. Service providers can provide the ability to integrate existing online Application Programming Interfaces (APIs) into a more accessible format, when compared to a POS terminal, improving time to market and scalability, while QR code acceptance offers merchants the ability to extend payment choice, further streamline operations, cut costs, and offer self-service payment offerings.

34 WON'T HAPPEN

Payment card IC ASPs will not return to pre-COVID-19 levels.

Since the COVID-19 pandemic, chipset pricing has been on a continual rise, driven by increased pricing in myriad areas of manufacturing, including energy, raw material, and transit pricing, as well as inflation, driving up wages. This was further compounded by the chip shortage and, according to ABI Research, the Average Selling Price (ASP) for a payment card Integrated Circuit (IC) increased approximately +30% between 2020 and 2023.

As we entered 2024, pricing pressures were beginning to return. It was inevitable that prices could not remain on an increasing trajectory in the mid to longer term and that a regular cadence of pricing deprecation would eventually return to the market. These pressures have been evident throughout 2024, and will continue into 2025, further driven by aggressive pricing strategies by Chinese manufacturers looking to expand beyond localized markets, with a focus on countries within Southeast Asia and Latin America.

However, despite pricing pressures returning, the cost of payment ICs are some years away from matching pre-COVID-19 levels. Although 2025 will mark another year of pricing deprecation, it will not be until around 2028 when pricing is expected to steadily drop to levels similar to those achieved in 2019.

35 WILL HAPPEN

Chinese EV sales will exceed ICE sales throughout 2025.

China will become the world's first majority new energy vehicle market, with sales of Electric Vehicles (EVs) expected to account for more than 50% of new vehicle sales in the last months of 2024, and this momentum is expected to continue in the region throughout 2025. This will be in spite of a challenging macroeconomic environment, and a fiercely competitive market that has seen enormous cost pressures and greater Original Equipment Manufacturer (OEM) scrutiny of a number of technology differentiators.

This continued momentum is due, in no small part, to a highly conducive policy environment, which includes a range of recently introduced stimulus measures designed to further EV production. China's transformation into an EV-dominated market will continue to put domestic OEMs at an advantage over non-domestic competitors, with relatively poor performance in China throughout 2024 that impacted their sales performance on a global level.

36 WON'T HAPPEN

The EV market will not return to rapid growth in 2025.

The EV market endured a relatively challenging year in 2024. While the expected penetration rate of 21% (all Plug-in Electric Vehicles (PEVs)) of new vehicle sales is far higher than might have been expected at the beginning of this decade, it represents a cooling off compared to the extraordinary growth seen in 2022 and, to a lesser extent, in 2023.

This slowdown was driven by a combination of factors with important regional variations; nevertheless, the factors that inhibited EV market growth in key regions are not expected to lessen significantly in the short term. While the longer-term prospects of the market are reinforced by general, albeit wavering commitment to net-zero transportation by 2050, this is not backed up by sufficient short-term incentives for the next wave of consumers to pivot to EVs.

The withdrawal of subsidies in some European markets, such as in Germany in 2024, is expected by many in the industry to be echoed in the United States in 2025. Meanwhile, protectionist measures in both the United States and Europe, designed to minimize the influx of Chinese models at the expense of native automotive manufacturing, will lessen the ability of automakers to leverage the scale and economies of the healthy Chinese EV market to offer cost-competitive EV models elsewhere in the world.

Overall, ABI research expects PEV penetration of new vehicle sales to reach almost 25% in 2025, once again ahead of many expectations held at the beginning of the decade, but with an acceleration in growth required if the market is to achieve fully net-zero new vehicle shipments by 2035.

37 WILL HAPPEN

5G-as-a-Service growth will outpace its CAPEX-intensive counterparts.

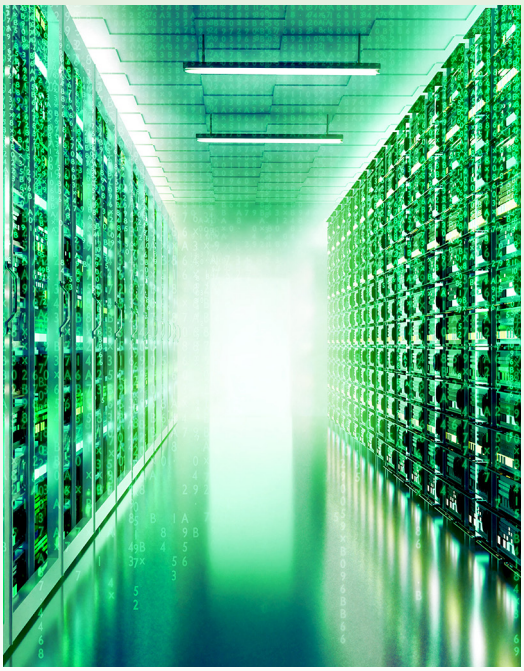
Emerging from slow enterprise adoption of private networks, vendors and System Integrators (SIs) are increasingly looking to adopt the scalable as-a-Service model for their 5G services. Providing a lower commitment, more flexible, and dynamic alternative to permanent and outright purchasing of hardware and software, companies are becoming more inclined to adopt the technology—likely reaching a boiling point in 2025. This growth is apparent in the expansion and announcement of subscription and pay-per-use solutions offered in 2024, such as Boldyn Networks' Private 5G as a Service, Celona's 5G Local Area Network (LAN), and NTT's Managed Network Services. Given the recessionary headwinds and global geopolitical uncertainties, enterprises will heavily struggle with spending on infrastructure that does not directly impact their core value-making proposition. This is why as-a-Service models will provide an important catalysts to spearhead private 5G deployments.

38 WILL HAPPEN

Enterprises will embrace the public cloud, even for critical data.

In 2025, enterprise cloud strategies will undergo a significant evolution, moving beyond the restrictive, highly controlled environments that have dominated in industries with stringent compliance or security needs. While 2024 saw many enterprises prioritizing private cloud models to fuel their digitization efforts to maintain tight control over sensitive data and workloads, 2025 will mark a shift toward greater adoption of public cloud environments due to advancements in security, compliance capabilities, and multi-cloud interoperability.

As enterprises will continue to face strong economic headwinds in 2025, their budgets for technology events will decrease even further in real terms—driving them to more cost-efficient offerings. Public cloud providers have ramped up their security offerings considerably, with Amazon Web Services' (AWS) Identity & Access Management and Security Hub, Microsoft's Azure Sentinel and Security Center, and Google Cloud BeyondCorp & Chronicle Security Operations.



39 WON'T HAPPEN

Enterprise cloud strategies will not completely abandon on-premises compute.

Despite the undeniable rise of hybrid cloud models, the complete elimination of on-premises infrastructure remains unlikely for several reasons. First, many enterprises still rely on legacy systems that are deeply embedded in their operations. These systems, especially those used in industries like finance, manufacturing, and healthcare are often too complex or costly to migrate fully to the cloud. Moving them to the cloud would require significant reengineering, and the potential disruption during migration could outweigh the benefits in the short term.

Moreover, there are several technical, regulatory, and operational factors that make a full transition to cloud-only models impractical. For instance, industries that are heavily regulated, such as banking, government, and healthcare, must adhere to stringent data sovereignty laws that often require data to be stored and processed within specific jurisdictions. These laws prevent companies from moving all data to the public cloud, which may be geographically distributed or subject to different regulatory frameworks. As a result, data privacy and compliance issues will continue to make on-premises data storage necessary for these sectors.

40 WON'T HAPPEN

AI integration will not be a driving factor in private 5G.

Although various alliances and solutions encompassing AI and networks have been introduced in 2024, it is unlikely that they will be widely adopted in 2025. Indeed, a great deal of hype and interest surrounds this synergy of concepts. Among the significant deployments this year is NTT DATA's Artificial Intelligence (AI)-Radio Access Network (RAN) smart city implementation in Las Vegas, which looks to serve as a backbone for future Large Language Model (LLM)-powered applications in the metropolitan area. NVIDIA and SoftBank have also collaborated on a Japanese AI-RAN deployment, and Orange executives are postulating on deploying AI for networks in the future. However, a number of factors hinder implementation. The cost of adoption is extremely high, especially when considering the breadth of physical infrastructure, energy costs, software subscriptions, and human capital required to employ the solution.

In a private networking context, there is simply not enough high-quality proprietary data available to provide accurate and meaningful insights for network applications. At this point, AI is not currently mature enough for use in conjunction with enterprise-grade private cellular networks. Real-life valuable use cases and Return on Investment (ROI) have yet to be seen, as use cases are forward-thinking and theoretical. More supporting devices in the ecosystem must be released before this can happen. Lastly, especially outside of enterprise premises, where the environment is uncontrolled and prone to virtual attackers, it is difficult to explain and trust automated decision-making.

41 WILL HAPPEN

2025 will be filled with turmoil for industrial and manufacturing firms.

The year 2025 will be another one filled with turmoil for Industrial and Manufacturing (I&M) firms with challenges emanating from trade disputes, conflicts, and the workforce (retirements, upskilling current employees, and attracting individuals to work in the industries), to name just a few. The automotive industry will be a case in point with the transition from the Internal Combustion Engine (ICE) being far from a smooth process with customer demand plateauing, while regulators continue to push for the transition. Traditional producers must juggle the need to continue production and sales of ICE-based vehicles to support the cash flows and balance sheets required to design, manufacture, and sell hybrid and Battery Electric Vehicles (BEVs). In 2025, we will witness announcements, rather than just rumors, of factory closures and staff cuts by both Original Equipment Manufacturers (OEMs) and their suppliers. Suppliers of Computer-Aided Engineering (CAE), Enterprise Resource Planning (ERP), Manufacturing Execution System (MES), Manufacturing Operations Management (MOM), Product Lifecycle Management (PLM), data analytics, and other solutions will need to reinforce how their solutions support productivity gains.

Those I&M firms that have not already undertaken a robust workforce-planning exercise will need to do so in 2025. Affording the wage expectations of staff will continue to be a challenge. The temptation will be to perceive Artificial Intelligence (AI) tools as the silver bullet. But any such deployments require firms to upskill staff and plan for reactions to changes in job roles and staff cuts. Furthermore, new digital-based processes cannot be successfully implemented if the underlying data foundations are suspect.

42 WON'T HAPPEN

2025 will not be witness to many large-scale digital transformation projects.

To be successful, large digital transformation projects require individuals and organizations to grasp the full potential of the plethora of technologies that can potentially improve their operations. An ABI Research survey found this topic to be the biggest barrier to adoption and the impact being an inability to articulate Return on Investment (ROI) and projects not getting started. The year 2025 will be characterized by firms appreciating the need for change, but grappling with designing projects and deploying technologies.

43 WILL HAPPEN

Complex simulation capabilities fueled by AI algorithms will become the backbone of core manufacturing software and new tech deployment.

The deployment of Artificial Intelligence (AI)-infused simulation software on the factory floor is not a new topic; however, it made a resurgence in 2024, with manufacturing software providers pouring extensive capital into acquiring advanced AI simulation providers. The most notable acquisition announcements in 2024 were Synopsys' acquisition of Ansys (US$35 billion), Siemens' acquisition of Altair (US$10.9 billion), Renesas Electronics' acquisition of Altium (US$5.9 billion), and Simulation Plus' acquisition of Pro-ficiency Holdings (US$100 million). Given the momentum manufacturing software providers are showing in purchasing advanced AI simulation providers during 2024, 2025 will only see more of the same.

The rationale behind consolidation in the advanced AI simulation market in 2024 and the extension into 2025 comes down to two key factors. The first factor is the short-term gain of integrating existing software such as Computer-Aided Design (CAD), Manufacturing Execution System (MES), Product Lifecycle Management (PLM), and Quality Management Software (QMS) with advanced AI simulation. Although the integration of advanced AI simulation software will be ubiquitous in manufacturing software, it will not take the same form from software to software. For instance, advanced AI simulation in CAD and PLM technologies will focus more on simulating numerous product designs to deduce the optimal product layout that minimizes material usage, scrap, and time to design. The application of advanced AI simulation within QMS and MES will focus more on simulating and perfecting the manufacturing methods of products, while also utilizing AI-based simulation to predict expected product defects and perform root cause analysis for insightful resolutions. Although the use cases for advanced AI simulations will differ based on which manufacturing software is deploying the technology, the underlying connection will be the left shifting of potential impediments, which will be incredibly valuable for end-using manufacturers.

The second driver that will propel further acquisitions of advanced AI simulation providers in 2025 will be the implementation of new technology such as Generative Artificial Intelligence (Gen AI) and the industrial metaverse. Gen AI has been on a booming trajectory since the release of ChatGPT and competing Large Language Models (LLMs); however, the development and implementation of use cases on the factory floor have not matched the current level of Research and Development (R&D) investments in Gen AI. With manufacturing software providers acquiring advanced AI simulation companies, the rollout of more pragmatic and revenue-generating use cases will be built out in 2025. This will help bridge the gap between high investment levels with non-matching use rates among manufacturers for Gen AI solutions. Lastly, the industrial metaverse is heavily dependent on precise and real-time simulation capabilities to accurately depict factory floor conditions. With industrial metaverse deployments expected to increase in 2025, it stands to reason that advanced AI simulation and High-Performance Computing (HPC) will be an investment priority for manufacturing software providers in 2025.

44 WON'T HAPPEN

Small and medium enterprises will not adopt Gen AI, digital threads, or industrial metaverse solutions at meaningful rates in 2025.

The year 2025 will not be the year that SME manufacturers will take a significant leap toward Industry 4.0 in regard to new technology such as Gen AI, digital threads, and industrial metaverse. SME manufacturers have always been laggards in adopting new technologies for three reasons: price sensitivity for expensive technology, ambivalence about new processes, and the uncertainty risk that any manufacturing changes will yield little to no Return on Investment (ROI). Although this has been a long-standing issue facing SME manufacturers, 2025 will only exacerbate these concerns as the next wave of technology (Gen AI, digital threads, and industrial metaverse) are all costly endeavors that have a lot of question marks surrounding them.

SME manufacturers have shown the desire to adopt new technologies in the past, but only when technologies have a tested and proven track record that illustrates a high degree of certainty to reduce time to market or overhead spending. A good example would be the increasing adoption level of Software-as-a-Service (SaaS), as this allows SME manufacturers to utilize comprehensive manufacturing software at a fraction of the price compared to previous on-premises licenses that lacked modularity and the precise purchasing of isolated software functionality. Notable companies that have made strides toward deploying SME-targeted software are Autodesk with Fusion 360, PTC with Windchill+, Rockwell Automation with Plex MES, Siemens with Opcenter X, and Intellect QMS. In regard to the new wave of Gen AI, digital threads, and industrial metaverse, these technologies are still underdeveloped and have not had extensive field tests by large manufacturers for the confidence level of SMEs to rise beyond the point of mild interest. As the new wave of technology proves economic viability over the next couple of years, SMEs will slowly become customers; however, this will not be the case in 2025. Out of the three emerging technologies, SME manufacturers will be most keen on adopting Gen AI as software vendors release Gen AI-infused solutions that benefit from being deployed as SaaS, rather than on-premises.

45 WILL HAPPEN

Drones will take off.

China is poised to lead the initial deployment phase, leveraging its flexible low-altitude flight regulations and strong government support for low-altitude economic initiatives. These projects span multiple sectors, including smart transportation, industrial automation, last-mile delivery, and lifestyle solutions. With more than 80 low-altitude pilots already operating across 25 provinces, China is rapidly gaining practical experience. By 2025, several of these initiatives are expected to evolve into commercial-scale applications within China.

However, Chinese companies may face challenges when expanding internationally, as they will need to demonstrate clear Return on Investment (ROI) and benefits under different regulatory frameworks and market conditions outside their domestic market.

46 WILL HAPPEN

China's production will threaten existing robot makers.

China will continue to flood markets with low-cost robotics in 2025. The last two 5-year plans of the Chinese government have pushed robotics manufacturing; as a result, China is becoming dominant in producing classic industrial, collaborative, and mobile robots, along with drones (DJI enjoys a 75% market share). Chinese robotics will continue to eat into the revenue of incumbent Original Equipment Manufacturers (OEMs) such as ABB, FANUC, YASKAWA, and Kawasaki, as has already been reported in these companies' financial reports. This trend will continue into 2025.

Importantly, China does not have a technological competitive advantage over other nations. Western countries remain at the cutting edge of robotics-applied Artificial Intelligence (AI) with many companies forming from university spinouts. Building on this advantage is the best path forward. Incumbent OEMs, especially in the Asia-Pacific region, must innovate if they hope to remain competitive in the face of low-cost Chinese robotics. This may come in the form of partnerships with disruptors such as NVIDIA or through strengthening ties with other ecosystem players and the manufacturing base that they have long supplied. For all vendors, focusing on innovation and how AI value-adds can create new applications for robotics, while forming strong partnerships with application and integration specialists is a good way to expand without becoming hamstrung.

47 WON'T HAPPEN

The investment boom will not continue.

The year 2022 set the funding record for robotics innovation at US$18 billion, while 2024 yielded some US$11 billion. Although the high-profile initiatives launched by NVIDIA and Tesla heralding a robotics revolution attracted much attention, it is likely that 2025 will see this hype decline. Technical shortfalls (ultimately, AI is not very intelligent when dealing with the real world) and regulatory obstacles (no humanoid is yet classed as collaborative) will beleaguer the market and hamstring deployments. Investment will continue to tumble in 2025 as the industry grapples with the stark reality gap between demonstration capabilities and actual real-world deployment. This downturn will be further influenced by the evolving political landscape, which is reshaping labor markets and potentially reducing automation urgency. Supply chain constraints for critical components continue to present significant challenges.

Investors will scrutinize key business metrics more carefully. The high Total Cost of Ownership (TCO) remains a major concern, with emphasis shifting toward solutions that can demonstrate rapid ROI. Meanwhile, the industry is closely watching the viability of transformative business models, particularly Robotics-as-a-Service (RaaS), which promises to reduce upfront capital requirements, but faces its own implementation challenges.

48 WON'T HAPPEN

NVIDIA's physical AI strategy is slow to gain traction.

NVIDIA's physical AI will initially struggle to take root. Although NVIDIA's Isaac products are enabling impressive capabilities for robots, decision makers will shy away from adopting costly robotics value adds with an unproven track record. The initiative, which encompasses the Omniverse, Isaac, and Jetson product portfolios, has demonstrated considerable value by providing a robust reinforcement learning pipeline for robotics. In 2025, we will see NVIDIA create further partnerships with established robotics OEMs demonstrating AI augmentation.

A reduction in funding, driven in part by uncertainty surrounding U.S. government policy in 2025, may lead decision makers to avoid large capital commitments. To sufficiently woo business, NVIDIA needs to demonstrate practical commercial value with larger active deployments of physical AI. This will be achieved through partnerships with organizations focusing on problems in specific industries, rather than a blanket approach.

49 WON'T HAPPEN

Humanoids will not take over the world...again.

Funding will continue to be drawn to humanoid development due to the societal issues the technology promises to address. The year 2025 is also when China intends to become the global humanoid leader. However, humanoids are not yet ready to experience widescale uptake. Significant advances have been made in hardware—now there are a dozen humanoids as advanced as Boston Dynamics' Atlas, while teleoperation has demonstrated impressive performance. Humanoids will struggle to advance much beyond this point without a radical step change in AI. Despite this technical shortfall, automotive manufacturing will continue to be the proving ground for humanoid robots and more manufacturers will buy-in to the form factor in 2025.

The success in certain quarters notwithstanding, we may begin to see smaller humanoid vendors struggle as the venture capital firms that support them become impatient for ROI. ABI Research forecasts an AI-driven inflection point for humanoids between 2026 and 2027. Until then, stakeholders would be wise to follow the successful example of Agility Robotics, adopting the RaaS business model—equating robot labor to the hourly wage of human workers and creating metrics to quantify robot performance—and building teleoperation capabilities to manage edge cases during deployment to aide decision makers with identifying value and derisking adoption.

50 WILL HAPPEN

2025 will be the year LTE Cat-1bis takes off globally for the IoT.

The year 2025 will be when Long Term Evolution (LTE) Cat-1bis takes off globally for the Internet of Things (IoT). Cat-1bis has already sold well in China, but has been slower to get off the ground in other countries. With no LTE Cat-M networks in China, Cat-1bis quickly filled the need for the lowest-cost, moderate throughput, and ubiquitously available IoT connectivity. Four of the six semiconductor manufacturers making Cat-1bis chips are Chinese. Outside of China, the Cat-1bis share of LTE Cat-1 shipments for most module vendors was 10% in 2023, growing to 20% to 30% in 2024. This means that the older, more expensive, and less efficient Cat-1 still dominates throughout the rest of the world, but why? The reason is twofold: inventory overstocking, and IoT device design cycles. Between 2021 and 2023, IoT device Original Equipment Manufacturers (OEMs) over-ordered cellular modules. Also, most orders were placed before many module vendors had Cat-1bis products. OEMs, therefore, need to work their way through their existing Cat-1 stock first. Therefore, 2023 and 2024 were fallow years for some module vendors, as their customers needed to order less—sometimes as little as half as much. This caused some module vendors to go from being concerned about being able to fulfill their order books during the chipset crisis of 2021 to 2022, to being forced to lay off staff during 2024.

Secondly, Cat-1bis chips and modules are not drop-in replacements for their Cat-1 predecessors. IoT device OEMs need to organically reach their next device design cycle, at which point the use of Cat-1bis will be designed in and Cat-1bis module orders will pick up. The answer to Cat-1bis migration is a matter of time. And many module vendors are hoping that 2025 is the threshold, when IoT device OEMs will both have exhausted their current module stocks and will be ready to launch their next-generation devices. Cat1-bis is a double-edged sword, as it signals the recommencement of module shipments at the volumes vendors were once used to, but at a much lower price, essentially half as much, thereby generating only half as much revenue. For vendors without access to the Chinese market, it has been a hard couple of years. Vendors that do have access to the Chinese market and for the few that have begun to capitalize on the 5G market for automotive, which is now starting to ship for contracts signed 2 years ago, will be in an even stronger position to compete in the looming international Cat-1bis market.

51 WON'T HAPPEN

5G RedCap will not set the IoT alight in 2025.

5G Reduced Capability (RedCap) will not set the IoT alight in 2025. In fact, 5G RedCap as it currently stands, is likely to be relatively useless for the IoT, period. 5G RedCap modules have been launched by all leading cellular module vendors. It is necessary for vendors that offer a full complement of cellular products to do so, in order to stay competitive and be seen as being at the cutting edge. But it is also the case that some vendors are actively seeking to target their module products at the mobile broadband markets for routers and dongles. The cellular module market does not exist purely for the sake of the IoT, even if most vendors are dedicated to the IoT; and even if the majority of all cellular modules sold are used in IoT devices. Examples of 5G RedCap-based IoT devices have been rare so far, with security cameras being one of the most notable. Interest in 5G RedCap also exists in the automotive market to provide basic telematics services for entry-level passenger vehicles. But despite cars being expensive objects, auto OEMs are acutely sensitive toward the cost of the smallest component. And more optimized, lower-cost 5G RedCap chipsets and modules will be required and, outside of China, ones that are automotive grade.

Enhanced RedCap (eRedCap) is the technology that hopes to make 5G relevant to the IoT. But the first chipsets are not expected until 2026. Cellular module vendors are acutely aware of the need to be leaders first in LTE Cat-1bis, and then after in eRedCap. These technologies are expected to be the most versatile, and best value for money, and are thereby sold in the greatest volumes. Higher throughput technologies, and Low Power Wide Area (LPWA) technologies are more niche. High throughput modules are worth more per unit, but are sold in fewer numbers, while LPWA has the potential to be sold in high quantities, but only at the lowest possible price possible, so they are worth less. Cat-1/bis and LTE Cat-4 represent a "sweet spot" that eRedCap and, eventually, 5G RedCap will replace. But all RedCap variants need to decline to prices comparable to LTE, and have equivalent network coverage before being viable. Thus, it is being suggested that to provide the maximum run up to 5G and the smoothest transition from LTE in the IoT, 2025 will see the first network refusal to certify new LTE modules. The activation of new devices using certified modules will continue for years. But this is a big step in compelling IoT hardware makers to comprehensively switch their Research and Development (R&D) efforts to 5G.

52 WILL HAPPEN

Supply chain visibility customers will increasingly thank you for your services.

Now that adoption of Internet of Things (IoT) solutions for supply chain visibility problems is advancing at a faster pace, customers are increasingly thinking about the next steps. Devices and data are a good start, but they are only a start. Increasingly, customers want their data to be working harder for them, without having to do any harder work themselves.

This is the context in which solution providers are looking more carefully at increasingly specific solutions accompanied by managed services and ecosystem creation. Rather than supply chain visibility solutions, we will see more risk management or quality assurance solutions, for instance. This will require a change of messaging from solution providers, as well as ecosystem creation: for instance, bringing together a network of service providers (think insurance, traceability, sustainability, customs compliance companies) to enable customers to build best-in-breed supply chains from an easily accessible "marketplace." This process has already started with leading companies, but much more work remains to create visibility markets.

53 WILL HAPPEN

Logistics service providers will invest more heavily in visibility.

Shippers consider the supply chain a cost. Companies that can take away that cost, while improving shippers' supply chain quality will be rewarded. Logistics service providers are an important part of this story, and will increasingly put into practice transformation roadmaps to turn themselves into digitally-enabled companies. This is not primarily a question of technologies, but of processes and company identity; in other words, it starts with the outcome of what the service providers believe they should be to their customers, before working backward toward the technologies that will enable this.

The examples of pallet pooler Brambles, shipping company Hapag Lloyd, and parcel company UPS all show the benefits when logistics service providers adopt a digital transformation mindset and create clear messaging around internal-facing operational benefits, enhanced value to customers, and impact on the company's bottom line. As these leading companies show the way in their respective fields, their peers will look to follow.

54 WILL HAPPEN

MVNOs will continue to search for a silver bullet service or use case as connectivity commoditizes.

The Internet of Things (IoT) Mobile Virtual Network Operator (MVNO) industry is highly competitive, with many companies offering similar coverage, platform, and service capabilities. It is increasingly vital that virtual operators can differentiate themselves from the competition, while defending against the thinning margins of low-data IoT use cases.

IoT MVNOs will take several routes to diversify their offerings in 2025. Several will follow Wireless Logic's lead, targeting high-throughput applications like video surveillance to counter the weak profitability of low-throughput applications like asset tracking or condition-based monitoring. 1nce's new high data IoT service, which is partly centered around camera use cases, signals that more traditional low-data IoT MVNOs will likely make similar pivots in the coming year.

IoT MVNOs might also follow the route of Kore Wireless and carve out a vertical specialty, especially in markets that could feature many high-throughput applications in the future, like fleet management. IoT MVNOs could view verticalization as a natural differentiator and an opportunity to create new, specialized services that cater to the specific needs of one market.

Additionally, differentiation could be an even greater necessity in 2025 if operators continue to enter the IoT MVNO market with their own reseller businesses. Vodafone further intensified IoT MVNO market competition when it established its own MVNO company in April 2024. These operator-backed MVNOs benefit from significant technical and financial advantages, and will further push independent MVNOs to reassess their go-to-market strategies in the coming year.

55 WON'T HAPPEN

Industrial IoT users will not flock to private 5G in droves, instead relying on 4G or non-cellular connectivity technology.

Private 5G networks are often touted as transformative for the IoT market, particularly for manufacturing and other industrial use cases. Indeed, a private 5G network is a powerful option for mission-critical Industrial IoT (IIoT) applications. They can support autonomous equipment in mining and manufacturing, and have played an important role in innovating legacy industrial markets, such as ports, by supporting advanced environmental and video monitoring use cases.

However, mission-critical IIoT use cases account for a small portion of the IoT market. Most IoT applications feature disparate devices and infrequent data transfers, and would not require a high-powered, expensive connectivity solution like private 5G. Non-mission-critical IoT use cases that require a private network would be much more likely to search for a lower-cost option more suited to the true performance needs of most IoT use cases. These private network options could include a private LoRaWAN deployment, a Wi-Fi network, a private 4G network, or even a private network using the relatively new DECT-2020 New Radio (NR) technology. These private network solutions are typically cheaper than a private 5G solution and have technical specifications more aligned to the IoT market as a whole.

56 WILL HAPPEN

Bluetooth® channel sounding will help enable wider adoption of fine-ranging in 2025.

The arrival of Bluetooth® Channel Sounding, recently introduced in Bluetooth® Core Specification version 6.0, is the latest step in the evolution of Bluetooth® Low Energy's (LE) positioning capabilities. This introduces a new, secure, and fine-ranging capability, providing centimeter-level accuracy when measuring the distance between two Bluetooth® LE devices, a significant improvement over Received Signal Strength Indicator (RSSI) techniques.

While we are still in the early stages of adoption for Bluetooth® Channel Sounding, the unique presence of Bluetooth® technology in platform devices and connected devices has the potential to significantly expand the current market presence of distance awareness solutions. This includes more accurate Bluetooth® Find My solutions, secure digital key and automotive access control solutions, and a whole range of new potential opportunities such as enhanced asset tracking, human interface devices that can switch between active and inactive states depending on proximity, proximity-based interactions such as device unlocking, geofencing-based home and building automation, and safer industrial Human-Machine Interfaces (HMIs) that can only be used when at a certain distance from the equipment it is controlling.

The centimeter-level accuracy, ubiquitous availability of Bluetooth® smartphones and platform devices, lower chipset costs, lower power consumption, reduced design complexity, and the avoidance of an additional radio could prove compelling enough to leverage standalone Bluetooth® Channel Sounding as an alternative to Ultra-Wideband (UWB) fine-ranging across many distance measurement use cases, enabling much wider adoption of fine-ranging solutions in 2025.

57 WON'T HAPPEN

5G-only positioning solutions will not start to dominate the RTLS space.

5G positioning had a somewhat muted 2024 compared to previous years. Some of the more prominent developments were the finalization of The 3rd Generation Partnership Project (3GPP) Release 18, bringing wider support for low-power high-accuracy positioning and Reduced Capability (RedCap) positioning, new 5G positioning testbeds to help end users test 5G positioning capabilities on their premises before the arrival of commercial equipment, some commercial deployments offering several meters of location accuracy and testing for sub-meter level, and new 5G-Advanced hardware and software suites that offer support for higher accuracy 5G positioning.

However, while 5G positioning is being pushed heavily by some vendors such as Ericsson and Huawei, traction remains limited, and positioning is now being pushed as a core component of 6G innovation by the wider cellular industry, perhaps shifting some of the commercial adoption timelines out even further. In addition, there is still very much a disconnect between the envisioned simple rollout of positioning over 5G infrastructure versus the reality of complex, harsh industrial environments where robust, reliable, and accurate positioning is not at all easy to achieve. This often comes at an additional expense and may require a similar density of 5G infrastructure as that of UWB today. Furthermore, the limited availability of 5G positioning-capable client devices and tags can only hamper the deployment of standalone 5G positioning solutions in addressing all enterprise use cases.

As a result, there is a growing acknowledgement that 5G will need to be deployed alongside other positioning technologies based on Wi-Fi, Bluetooth®, UWB, Radio Frequency Identification (RFID), Global Navigation Satellite System (GNSS), and Low-Power Wide Area Network (LPWAN) solutions. Here, the increased availability of hybrid Real-Time Location System (RTLS) solutions based on multiple technologies, alongside the development of Omlox, an open standard for RTLS that enables interoperability across multiple technologies and vendors, will help end users transform their operations by reducing technology fragmentation, enabling greater product choice, eliminating use case silos, and reducing the overall cost and complexity of RTLS deployments. 5G positioning solution providers will need to investigate such partnerships as 5G-only solutions are likely to be insufficient in addressing the complexity, reliability, accuracy, and scalability requirements of all enterprises as things stand.

58 WILL HAPPEN

Cloud providers will accelerate sovereign cloud investments.

Geopolitical tensions and the U.S.-China trade war has put into focus the importance of digital sovereignty. In 2025, we will see the rise of the private sovereign cloud becoming mainstream. Amazon Web Services (AWS) is set to launch its European Sovereign Cloud offering by the end of 2025, focusing on meeting the strict security, sovereignty, and privacy requirements of public sector organizations and enterprises in highly regulated industries. Oracle's EU Sovereign Cloud has dedicated sovereign cloud entities across Europe, with physical and logical access restricted to within the EU Sovereign Cloud realm, to European Union (EU) residents employed by EU legal entities.

The emergence of the European Union Artificial Intelligence (EU AI) Act has forced enterprises in Europe looking to deploy enterprise Artificial Intelligence (AI) services to comply with strict data governance policies. In Asia-Pacific, several countries, including India, Indonesia, South Korea, and Japan, have started tabling AI regulations, specifically focusing on personal data protection and enterprise AI misuse. Singapore's government is using AWS' Dedicated Local Zone to address regulatory and digital sovereignty needs, enabling the Singaporean government to run sensitive workloads in the cloud and keep data within national boundaries.

As enterprise AI services move beyond the Proof of Concept (PoC) stage to production, cloud hyperscalers are targeting enterprises looking to deploy enterprise AI use cases such as Natural Language Processing (NLP)s for better customer experience or error detection in a manufacturing supply chain. Use cases with huge amounts of personal and sensitive data, all of which will need to be stored, processed, and accessed securely, make the private sovereign cloud the ideal platform of choice.

59 WON'T HAPPEN

Enterprise data fabric will be the catalyst toward data monetization.

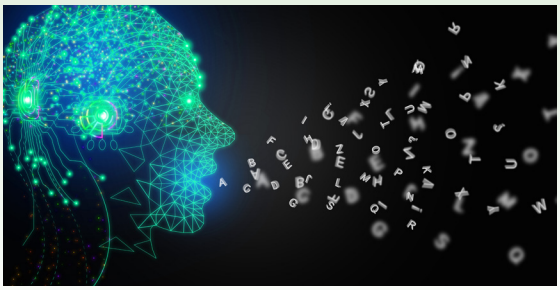
Enterprises are looking to monetize the huge amounts of data at their disposal and look at enterprise data fabric as the silver bullet in achieving this. This will not happen in 2025. The enterprise data fabric market is still relatively nascent, and data management vendors are focusing on providing data solutions that can connect and integrate disparate and siloed data sources spread across different environments, as the first step toward data monetization.

Most enterprise data fabric vendors have infused AI-based solutions to help automate data integration pipelines and improve data searchability and quality. Moving forward, data management vendors will need to deploy AI solutions that can help enterprises improve data tracking and data lineage analysis, which will be an important step toward providing data monetization services such as Data-as-a-Service or AI/Machine Learning (ML) predictive analytics models. Enterprises will need to work with data management vendors to first identify, track, and tag data structures found within the organization, ensure data are optimized for usage using enterprise data fabric solutions, and decide on the monetization channel, with data sold directly to potential customers or using a cloud provider's marketplace portal.

60 WILL HAPPEN

XDR maturity for OT cybersecurity.

Extended Detection and Response (XDR) technologies are the next evolution up from Endpoint Detection and Response (EDR). Already a well-established market in the Information Technology (IT) space, XDR has surfaced as a viable solution for Operational Technology (OT) security in the last few years. The year 2025 will see OT XDR maturity finally emerge for the broader industrial sector, and particularly in critical infrastructure markets. EDR always had limited appeal in OT, as endpoint security had to compromise with a highly fragmented (and often legacy) ecosystem of endpoints. XDR manages to bridge that gap to the network, with extended visibility, as well as pushing on the automation and integration aspects lacking in the OT security space. By unifying networks with endpoint protection, a more holistic protection can be achieved for OT assets. We will see more commercialized and tested solutions come to the fore that are specifically targeted for OT, with future potential for vastly improving solutions through Generative Artificial Intelligence (Gen AI) and Large Language Models (LLMs).



61 WON'T HAPPEN

No mass adoption of OT cybersecurity among industry operators.

While OT cybersecurity solutions are closing the gap with what is available on the IT security market, adoption remains fragmented, varying widely. Critical infrastructure is more likely to have holistic OT security strategies and technology implementation, but this is primarily driven by regulatory and standards-based requirements. There remain significant sectoral and regional disparities; industrial operators that understand and deploy OT security are still far and few. Most security policies come from the IT department, and there are gaps in both cooperation and understanding between IT and OT personnel, despite growing convergence of the two in industrial operations. This coming year is not likely to see OT cybersecurity ubiquitously deployed in most OT operations; adoption is slow and piecemeal, often driven by fallout from an initial attack or by emerging regulation. It will be a number of years still until OT cybersecurity becomes as prevalent as IT security.

62 WILL HAPPEN

NIST finalizes the official post-quantum algorithms, restimulating market demand for digital trust offerings and producing an influx of quantum-resistant solutions that incorporate PQC.

While leading cryptographic vendors made a head start on integrating candidates for the National Institute of Standards and Technology's (NIST) post-quantum cryptographic standards into their solutions in 2022, the official announcement of the final algorithms in August has revitalized the digital trust market, priming the market for success in 2025 and aligning with the United Nations' (UN) denomination of 2025 as the International Year of Quantum Science and Technology (IYQ). The announcement prompted cryptographic service vendors to squeeze Post-Quantum Cryptography (PQC) integration into their developmental timelines throughout the last quarter of 2024. Finalized quantum-ready products are expected in the latter half of 2025, while some frontrunners are preparing for release in the first two quarters of 2025. A minority of vendors at the forefront of the market have already launched quantum-integrated, market-ready solutions. Leading references include SEALSQ's integration of post-quantum algorithms CRYSTALS-Kyber, CRYSTALS-Dilithium, Sphincs+, and Falcon into its Public Key Infrastructure (PKI) solutions, IBM's fusion of Elliptic Curve Cryptography (ECC) with quantum-safe algorithms in its Key Protect services, and Crypto4A's quantum-resistant Hardware Security Module (HSM) architecture, equipped with quantum-secure root of trust.

Interoperability challenges will inhibit widescale migration to exclusively post-quantum cryptographic solutions and engender a degree of oscillation between successful PQC integration and incompatibilities with legacy systems. ABI Research expects hybridized offerings to form the bulk of the market, rather than rip and replace style solutions, with most customers opting for a blended offering that leverages classic and PQC alongside one another.

63 WILL HAPPEN

The cryptographic services market will see increased demand for AI enhancements baked into digital trust solutions.

The growing complexity of enterprise ecosystems, now sprawled across multi-cloud and hybridized environments, has complicated digital trust management, rendering Artificial Intelligence (AI) capabilities increasingly necessary for automating and streamlining digital trust processes. This shift toward automation is further compounded by the push toward crypto agility, propagated by the post-quantum migratory movement. While some vendors are already developing AI-enhanced digital trust solutions, ABI Research expects the large-scale emergence of AI-enhanced digital trust products to take off in 2025, commensurate with intensifying cryptographic priorities on the demand side, and in accordance with the roadmaps of prominent players within the digital trust space.

Notably, the incorporation of AI within Key Management Systems (KMSs), as well as PKI offerings, is expected to gain traction, both to facilitate key and certificate management and to enhance proactive threat detection. Further innovation will center around automating device identification workflows using Machine Learning (ML) and assessing the resilience of organizations' cryptosystems through AI-enhanced analysis of organizations' existing keys and certificates as new vulnerabilities materialize or as cryptography advances. Implementing AI to monitor device behavior across digital trust ecosystems will also present unique opportunities, particularly for vendors operating in healthcare and manufacturing verticals. ABI Research expects an uptick in collaborative partnerships delivering AI-enhanced digital trust offerings throughout 2025.

64 WON'T HAPPEN

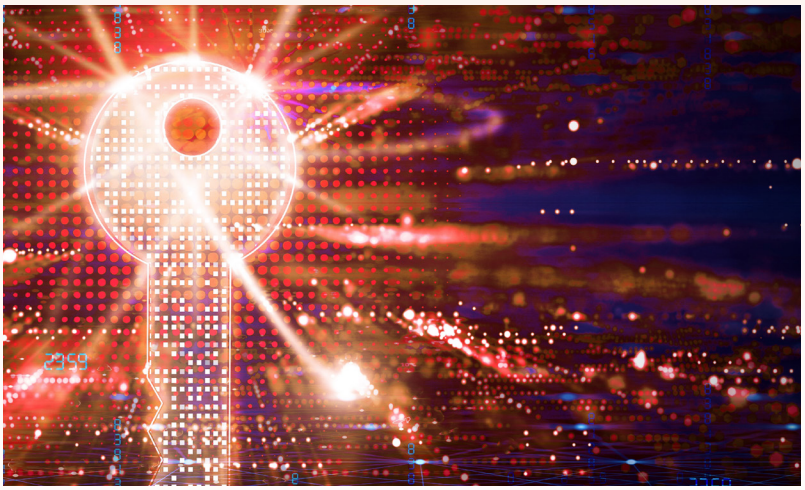
Digital trust technology has potential in combating AI-related fraud and misuse cases; however, this potential will not be practically realized in 2025.

Reciprocally, digital trust technology itself will snag increased market attention as a tool for tackling AI-related fraud and misuse cases, given its ability to fortify user trust in digital interactions. While currently in the nascent phases of development, the potential for digital identity to verify the authenticity of written, auditory, and visual media—debunking misinformation, manipulated content, and "deep fakes"—is being propagated by leading digital trust vendors. Although the application of digital trust in AI misuse cases will not materialize in a commercially available manner in 2025, it is pegged for continued Research and Development (R&D) throughout the next 2 to 5 years.

65 WON'T HAPPEN

Despite some buzz within fintech, a dual strategy deployment of both QKD and PQC will not break into the mainstream—yet.

Migration to PQC is a lengthy process with complete migration to PQC not expected for another 10 to 15 years. Currently, progressive security customers with enterprise configured architectures, particularly in the fintech and healthcare sectors, are early adopters of a dual strategy: combining PQC with Quantum Key Distribution (QKD) for maximally secure quantum-safe migration. During the quantum migration process, enterprises are likely to face gaps in security, creating risks that big players are unwilling to accept. By deploying QKD on weak spots in the network with high attack surfaces, typically large data centers, a dual strategy provides an additional layer of protection. While synthesizing PQC and QKD in this manner provides maximum security, it will not be applicable to every vertical at this stage. Large players, such as big banks, can afford to leapfrog over integrating NIST's post-quantum algorithms, moving directly to dual strategy. However, cost factors will continue to limit uptake in other verticals for now. Asia-Pacific is likely to become a key battleground for dual strategy offerings, driven by desires to signal to the global economy that the region is a future-proof, quantum-safe environment for computing. The merits of dual strategy solutions have received industry buy-in, particularly in this region, with the Monetary Authority of Singapore issuing advice earlier this year urging banks to leverage both QKD and PQC as appropriate. However, while its potential is seismic, widespread adoption of dual strategy solutions is not yet on the horizon for 2025.



66 WILL HAPPEN

Amazon Kuiper will begin the launch of its new global LEO broadband network to compete with Starlink and Chinese operators.

While Amazon's mega-constellation of 3,232 Low Earth Orbit (LEO) broadband satellites, Project Kuiper, was meant to begin launching in 2024, the company has adjusted the network's launch to early 2025.

With an abundance of low-latency satellite capacity in LEO and decreasing launch costs across the space industry, it is expected that LEO operators will continue to enter traditional satellite communications markets (land mobility, maritime, aviation, fixed broadband, Direct-to-Cellular (D2C), and the Internet of Things (IoT)) with more competitive pricing and flexible direct-to-consumer business models.

ABI Research expects further expansion of satellite connectivity into mobile smartphones, homes, and vehicles in both developed markets (the United States and Europe) and frontier markets (Africa, the Middle East, Asia, and Eastern Europe), expanding the total user base of satellite connectivity globally. We estimate that, by 2030, there will be more than 32,800 active LEO satellites in orbit supporting global services, accounting for over 97% of active satellites in space.

67 WILL HAPPEN

The first-stage commercial rollout of D2C satellite services.

In 2025, D2C satellite services will transition from Proof of Concept (PoC) and pilot projects to initial first-stage commercial deployment. This technology will revolutionize connectivity in emergency situations, and remote and underserved areas.

Why It Will Trend in 2025

Maturing Pilot Projects:

- AST SpaceMobile, Lynk Global, and SpaceX have demonstrated the feasibility of D2C communication through pilot tests.
- By 2025, these players will very likely launch commercial operational services for basic communication, such as text messaging, SOS functionality, and emergency services, with voice and data services expected to follow.

Evolving Partnerships Between Satellite Operators and MNOs:

- Collaborations between the satellite operators and the major Mobile Network Operators (MNOs) such as T-Mobile, AT&T, Vodafone, Verizon, Optus, and KDDI will drive adoption of the D2C technology.
- MNOs might also see the D2C technology as a cost-effective way to expand coverage without building extensive terrestrial infrastructure.
- D2C services could also be an extension of the MNOs' business portfolios. (e.g., emergency services, premium messaging, roaming).

ABI Research projects a promising future for the D2C technology, forecasting that connections for The 3rd Generation Partnership Project (3GPP) (Long Term Evolution (LTE)/5G) segment will exceed 50 million by 2030.

68 WILL HAPPEN

3GPP Release 19 will be frozen in late 2025, enabling new features and technologies for NTN, and benefiting Iridium.

There is a high degree of confidence that 3GPP Release 19 will be finalized (aka frozen) in 4Q 2025. Hopefully, nothing will delay the process. In Release 19, 3GPP crystalizes a number of features and technologies for the Satellite Communications (SatCom) industry.

In particular, it introduces a "regenerative payload" with a complete Next Generation Node B (gNB) radio unit) on the satellite, offering greater flexibility and performance compared to the previous "transparent" architecture. Release 17 and Release 18 Non-Terrestrial Network (NTN) were based on a transparent, or bent-pipe, architecture. The satellite, therefore, just acts as a radio repeater. A regenerative payload enables global coverage, as traffic can be routed over the "Xn inter-gNB" interface for inter-satellite links. Release 19 would also deliver:

- Round-Trip Time (RTT) is reduced for improved latency
- Store-and-forward functionality—no need to revert to ground station connectivity
- Support for data centers in the sky

Release 19 will also be beneficial for Iridium. In 3Q 2024, 3GPP accepted Iridium's request for its "Narrowband Internet of Things (NB-IoT) for Non-Terrestrial Networks (NTN)" functionality profile in the official 3GPP Release 19 Work Plan. Iridium believes this will enable Iridium's satellite service to be accessible via industry-standard chipsets. Iridium wishes to transition from its legacy, proprietary SatCom service to its 3GPP standard-based "Iridium NTN Direct" service. Full commercial service is likely to only commence once a sufficient number of satellites are in orbit; potentially in 2026 or 2027, but at least Iridium NTN Direct will be 3GPP fully compliant.

69 WON'T HAPPEN

Mainland China becomes a hotbed for satellite connectivity.

There is much discussion around the emergence of China as a space tech superpower with the announcement and launch of several LEO mega-constellations by Shanghai Spacecom Satellite Technology (SSST) (上海垣信卫星科技有限公司) (14,000 satellites), Shanghai Lanjian Hongqing Technology (Shanghai 蓝箭鸿庆科技) (10,000 satellites), and Guowang 国家网络 (China Satellite Network Group Ltd.—13,000 satellites).

Despite great ambitions, only SSST has begun to launch, with 3 batches totaling 36 satellites in 2024. In this regard, many more satellites will need to be launched in 2025 before these networks can provide continuous global coverage. Furthermore, these networks will primarily serve as a critical backup layer for Mainland China (which is already well covered by terrestrial 5G) and seek commercial opportunities overseas in the Middle East, Africa, and Asia likely through infrastructure and device ecosystem partnerships. While there are opportunities, much progress is needed with acquiring landing rights and deploying network capacity before these networks enter as serious competitors in the global space market. Progress, however, is being made rapidly.

70 WON'T HAPPEN

High-speed D2C broadband for standard smartphones.

While D2C services are advancing rapidly, achieving high-speed broadband directly to standard smartphones faces several critical technological and operational hurdles.

Why Not?

- Satellites share spectrum with terrestrial mobile networks, and allocating sufficient bandwidth for high-speed broadband to millions of simultaneous smartphone connections is a significant regulatory and technical challenge.
- Standard smartphones are equipped with small, low-gain antennas optimized for terrestrial cell towers, which are typically much closer and more powerful than LEO satellites.
- High-speed broadband requires more robust and directional antennas to capture the weaker signals from satellites hundreds of kilometers above the Earth.

Expected Reality:

- Broadband services will remain limited to specialized hardware or ground-based satellite dishes, with standard smartphones only capable of low data rate communications.
- High-speed Internet directly to unmodified smartphones will likely only emerge in the late 2020s.

71 WON'T HAPPEN

QKD over satellite will NOT be commercialized in 2025.

Quantum Key Distribution (QKD) solutions will play an invaluable role in keeping e-commerce, authentication, government services, etc. safe and secure in a future world where quantum computers could potentially crack existing public key encryption.

Several QKD satellite service providers are jockeying for position in the sector. Commercial deployment of large-scale QKD is very unlikely to take place in 2025. All of them are still very much in the process of demonstrating their solutions, sourcing additional funding and attempting to ramp up commercial deployment. Potential QKD providers include:

- **SpeQtral:** A spin-out from Singapore's Centre for Quantum Technologies (CQT). Investors include NUS Technology Holdings, TIS INTEC Group, Xora Innovation, NASA SBIR/STTR, and Batshit Crazy Ventures. A Proof of Concept (PoC) was demonstrated in 2019. Two additional QKD satellites, SpeQtre and SpeQtral-1, are to be launched between 2025 and 2026.
- **EAGLE-1:** A dedicated consortium of 20 European partners led by SES that intends to develop the European Quantum Communication Infrastructure (EuroQCI) initiative. TNO and Airbus are developing the ground station for QKD. The satellite platform for the Quantum Cryptography System will be delivered by SITAEL (Italy).
- **QUBE:** Launched on SpaceX's Transporter-11 Mission in 2024 to demonstrate QKD solutions. QUBE is a 3U cubesat that contains a miniaturized Quantum Random Number Generator (QRNG). QUBE was prototyped by Germany's Center for Telematics.
- **Boeing:** Deploying a small (Q4S) satellite in 2026 to test QKD. The satellite will use the Corvus satellite platform from Astro Digital. All of the funding is coming from Boeing.

72 WILL HAPPEN

Digitalization and data collection of existing building stock through hardware and software upgrades will pave the way for smarter, intelligent buildings.

Increasing operational costs, the regulatory push for energy efficiency, occupant wellbeing, and labor shortages are motivating building owners and developers to embrace smart technologies to streamline operation and maintenance. A digitalized building portfolio creates unique opportunities for space flexibility, increases property value, improves brand perception, and reduces carbon footprint. Regulators like California's Title 24, Europe's EN1246 standard, and Indoor Air Quality (IAQ) regulations are stressing the importance of increased operational and energy efficiency, environmental impact, and healthy workplaces.

Strategic partnerships such as Siemens, Enlighted, and Zumtobel Group aim to advance smart building solutions in commercial buildings, specifically hospital, education, and hospitality facilities in North America and Europe. Bosch Group's recent acquisition of Johnson Controls International's Residential and Light Commercial (R&LC) has cemented its market share in the Heating, Ventilation, and Air Conditioning (HVAC) space, while Schneider Electric acquired a major stake in Motivair, strengthening its data center portfolio. These examples demonstrate how established commercial building automation providers are expanding product portfolios to cater to existing customer demand, geographies, and evolving market needs. North America and Western Europe will drive adoption and investment of digitalized buildings tapping into the retrofitting market, while buildings in Asia-Pacific are focusing on integrating smart systems into new builds in the coming years. The biggest hurdle implementers and solution providers are facing are upfront capital, data security, reliability of wireless connectivity, and upskilling contractors.

73 WILL HAPPEN

Smart home OEMs will partner with builders, home services, and utility providers to catapult their products into mainstream residential builds.

Smart home adoption is steadily increasing; the rate and speed of adoption depends on multiple factors such as increased connectivity in households, price point, installation type, and customer service catapulting smart home products to mass adoption. Consumers are purchasing products that offer enhanced security, time savings, convenience, utility bills, and enhanced overall well-being. Solution providers are using a multifaceted approach to attract homeowners and increase adoption, be it partnering with builders for new builds or existing energy and water providers to raise awareness, prove use cases, and ease installation. For instance, energy regulations, eco bonuses, and subsidies in Europe (France, Germany, and Italy) are driving the adoption of smart thermostats and opening new install opportunities in the retrofit markets.

Key factors inhibiting adoption are pricing, device capabilities, reliable Internet connection, lack of clear value proposition, educating consumers on relevant use cases, complex installation, and security/data privacy concerns. Data analytics, Machine Learning (ML), and Artificial Intelligence (AI) are critical tools that solutions providers are tapping into to enhance the customer value by streamlining operating schedules, decision-making, and real-time awareness without being intrusive. As smart home devices become more common, convenience, data security, and interoperability with other devices will be top consideration for consumers.

74 WILL HAPPEN

2025 will be a decisive year for hydrogen tech.

For watchers of clean Hydrogen (H2), 2024 was turbulent. Some major projects failed; others became operational. Large rounds of funding were issued to bolster supply, yet demand generally remained weak. But despite this instability, the overall trajectory for green H2 has been decidedly upward.

The year 2025 will be a decisive one, and 2026 and 2027 are set to mark the beginning of scaling for existing plants, providing the capacity for green H2 to make significant inroads into the existing H2 market by 2030. However, for this to be achieved, the groundwork must be built in 2025. What can we expect?

In Asia-Pacific, China will extend its lead in installing generation capacity, but we will also see other entrants, like India, establish themselves. Europe's prospects are uncertain, but if regulators stick to their 2030 deadlines, and suppliers are given more support in meeting them, we could see the region become a hub for investment in 2025—especially in countries like Spain, where projects have gained momentum. Also notable is what we will not see: U.S. leadership in the industry, as blue H2 will remain the alternative choice if clean H2 is prioritized.

The International Renewable Energy Agency (IRENA) has forecast that, by 2050, 14% of all energy will be provided by H2 in some way, and 2025 looks set to be a milestone in that timeline.

75 WON'T HAPPEN

Complete resolution of energy grid capacity and transition challenges.

Despite progress in grid digitalization, the broader challenges of insufficient energy grid capacity and delays in renewable energy deployment will not disappear in 2025. The energy sector will continue to face bottlenecks similar to those seen in 2024, such as delays in connecting new infrastructure—whether Electric Vehicle (EV) charging stations or data centers—to the grid. The energy transition toward renewables will remain slow, hindered by the complex integration of solar, wind, and other renewable sources into existing grids.

Even with calls to action from governments and organizations like COP28 UAE and technology leaders like Schneider Electric, the pace of deploying renewable energy assets will struggle to meet the demands of net-zero targets. The push for a fully renewable and resilient energy grid will remain a long-term endeavor, requiring sustained innovation and investment beyond 2025.

76 WILL HAPPEN

Consumers will embrace the use of digital car keys for convenient and secure vehicle access, with revenue potential to follow.

Digital car key technology has historically suffered from a technology security and consumer marketing problem. Consumers note stories of relay attacks and general mistrust of entirely digital alternatives (such as smartphones) to key fobs as obstacles to adopting this technology, but innovations with the addition of Ultra-Wideband (UWB) connectivity to digital keys are being rapidly embraced by automakers. This will address security concerns from relay attacks, as well as offer consumers additional features for convenient access to their vehicles. The number of vehicles shipped with this technology for digital keys will increase by 80% in 2025 compared to 2024 (from 3.3 million vehicles to nearly 6 million), as more automakers expand their key offering in their premium vehicle lines. It will continue to proliferate throughout automakers in the coming years, reaching over 26 million vehicle shipments in 2031.

To convince consumers to actually use this technology, some automakers offer these keys for a free trial period after sale, often around a year. The revenue potential of an annual subscription for digital key features on a smartphone is an exciting prospect for an industry that has been struggling for continuing after-sales monetization, but the successful conversion of this potential to reality requires consumer trust in digital keys to be built up throughout premium vehicle lines and pricing to correspond with convenience.

77 WILL HAPPEN

Level 3 autonomous driving will reach genuine highway speeds.

In 2024, we saw the green shoots of unsupervised autonomous driving in passenger cars finally emerge, albeit at a small scale. Both Mercedes-Benz and BMW announced systems coming to market that year or the next that will enable eyes-off autonomous driving in constrained Operational Design Domains (ODDs). The road environment first being targeted by these automakers for Level 3 operation is the highway, a road type that has widely been held to be more predictable and better maintained then urban or interurban roads, and as such, a more readily addressable opportunity for unsupervised automation.

However, these first systems, while groundbreaking, were initially only able to support Level 3 operation at modest speeds around approximately 60 Kilometerse per Hour (km/h)—a range of speed that does not match the road environment specified in the ODD. Mercedes-Benz announced at the end of 2024 that the operational speed for its DRIVE PILOT 3.0 system will be extended to 95 km/h, making the system much more likely to deliver genuine consumer value on roads in Germany. The German automaker expects the system to be certified in time for shipments to begin in 2025.

Democratizing high-speed Level 3 operation will require the adoption of technologies that will extend perception, even over the horizon, to allow for the autonomous system to adequately anticipate and respond safely to the changing situation on the road. High-Definition (HD) live maps and imaging radar are, therefore, two technologies expected to play a vital role in continuing the momentum behind Level 3 autonomous driving.

78 WON'T HAPPEN

Newer, more powerful hardware will not bring the SDV transition automakers are hoping for, because the problem lies with them, not technology.

The year 2024 saw several vendors unveil powerful System-on-Chip (SoC) platforms boasting unparalleled compute power packed with Artificial Intelligence (AI) acceleration and marvels of graphical processing. These platforms are capable of driving multi-display, multi-zone entertainment and driver convenience features, while allowing for the long-term updating of vehicles with new and improved features. This compute power is expected to increase steadily in the coming years, as average Central Processing Unit (CPU) power for the digital cockpits grows 13% per year until 2027, and Artificial Intelligence (AI) and graphical compute power grow at even faster rates.

However, despite having a wealth of computing power at their fingertips, automakers will not be able to convert this into meaningful progress in the Software-Defined Vehicle (SDV) transition in 2025. Hardware consolidation is a key part of the SDV transition, and the technology is ready to enable this. But the problem does not lie with the technology—instead, it is the organizational capability of automakers to consolidate multiple, historically siloed, development teams to create, maintain, and update features in the same compute system. Today, automakers encounter several issues with this—often, ownership of features is misunderstood or disputed, with development responsibilities, therefore, being misaligned or slowed down by this lack of coherent organization.

Technology solutions such as digital twins or AI-enabled software toolchains are serving a role in accelerating development to combat these challenges, but adjustments must be made at a broader level in 2025 to make cross-domain development team collaboration the new normal with standardization of software approaches and best practices.

79 WON'T HAPPEN

Non-domestic OEMs will not claw back their market share in China in 2025.

The year 2024 saw the acceleration of a long-term and concerning trend for global automakers, namely their shrinking market share in the world's largest automotive market, China. As recently as 2019, global automakers could count on China to deliver enormous shipment volumes, with some automakers enjoying higher sales within China than in the rest of the world combined.

Now, these same global automakers find themselves continually outpaced by domestic alternatives. A significant factor here has been the rapid electrification of the Chinese automotive industry and the ability of domestic Original Equipment Manufacturers (OEMs) to deliver far more compelling Electric Vehicle (EV) models than their foreign rivals, and at a much more competitive price point. However, electrification is not the only trend in which these global OEMs have found themselves outclassed by local rivals. Chinese OEMs have consistently delivered digital innovations in the digital cockpit and driver assistance domains at a faster pace than their foreign competitors. They are also better attuned to the unique requirements of the typical Chinese consumer, who is generally younger and more tech savvy than the equivalent new car buyer in Europe or the United States.

Chinese OEMs threaten to take the lead in the three major automotive megatrends—electrification, automation, and Software-Defined Vehicles (SDVs). Retaining and reclaiming market share in China is, therefore, a strategic priority for global OEMs, but this is unlikely to take place in 2025. Most OEMs have concluded that to compete effectively in the world's largest automotive market, they must regionalize the vehicle design process for the Chinese market within China, working with domestic suppliers and tech companies to accelerate their design process and deliver a compelling value proposition. While this is a vital step to take, it is unlikely to bear fruit quickly, so global automakers must anticipate another chastening year in the Chinese market in 2025.

80 WILL HAPPEN

Smart manufacturing and Industry 4.0 poised for continued strong growth.

Southeast Asia (SEA) continues to thrive as an attractive location for manufacturing activity, especially as major manufacturers aim to shift their manufacturing activities outside of China, which is otherwise known as the "China Plus One" strategy with enterprises avoiding investing solely in China and diversifying production in other countries. Some major highlights include public announcements by both Western companies, such as Apple, Microsoft, and NVIDIA, and Chinese firms, such as BYD, Aion, and Midea, on their growth and expansion plans in SEA.

The shift in manufacturing activity outside of China has presented new opportunities for smart manufacturing solution providers that have established new partnerships and/or expanded their presence in SEA. In some of the more advanced markets, such as Singapore, Thailand, and Malaysia, Artificial Intelligence (AI) and other advanced data analytics solutions are already being implemented to facilitate increased automation and predictive maintenance.

Looking toward 2025, continued diversification and growth strategies will continue to direct more investments toward SEA's manufacturing market. SEA governments are looking to take advantage of this opportunity and have each released their own policy directives encouraging growth in their respective manufacturing markets. For example, Indonesia set out a comprehensive set of strategic programs under the Indonesian Digital Industry Centre (PIDI 4.0) to drive digital solution adoption. Elsewhere, Thailand established the Eastern Economic Corridor (EEC), along with various tax breaks, aiming to encourage foreign direct investment in the local manufacturing scene. As a result of these positive developments, overall digital spending across the main SEA economies is projected to increase from over US$30 billion in 2022 to more than US$200 billion in 2028.

81 WILL HAPPEN

As the demand for energy continues to rise in Southeast Asia, increasing focus will be placed on energy security, stability, and sustainability in 2025.

SEA's energy demand is expected to grow by 60% by 2040, accounting for 12% of the increase in global energy use as its economy more than doubles. As a result, there is an increase in demand for both renewable and non-renewable energy.

To meet the increased demand, SEA countries are making progress with the ASEAN Regional Power Grid (APG) initiative to ensure energy security and stability. In addition, SEA countries are expanding their renewable energy capacity across solar, wind, and hydrogen power sources. For example, wind and solar energy is gaining traction in Vietnam, while Thailand focuses on solar and biomass. Indonesia holds substantial geothermal potential, the Philippines leads in geothermal energy development, Laos is heavily invested in hydropower, and Myanmar also possesses significant hydropower and solar resources.

Hydrogen power is also gaining momentum. A new hydrogen-enabled power plant is being built at Pulau Seraya Power Station on Singapore's Jurong to support the nation's goal of reaching net-zero carbon emissions by 2050. Furthermore, Sembcorp and PT PLN Energi Primer Indonesia (PT PLN EPI) signed a joint development agreement for SEA's largest green hydrogen production facility in Sumatra, Indonesia in October 2024.

Looking toward 2025, ABI Research anticipates further momentum in the green energy market, as SEA countries attempt to cope with increasing manufacturing plants and data center deployments in the region. While current energy initiatives are very much led by governments, ABI Research also foresees increased public-private partnerships to form and accelerate efforts toward achieving global net-zero targets.

82 WON'T HAPPEN

AI's "third wave" will not see large traction among Southeast Asia's enterprises in 2025 due to ROI concerns.

As Artificial Intelligence (AI) technology continues to evolve, new opportunities are opening in the form of the "third wave" of AI, which includes the use of Agentic AI. This is a new development of AI technology that allows autonomous agents to perform complex tasks and make decisions without constant human supervision, such as interacting with other agents, making weighted decisions, and dynamic adaption in task execution. Spurred by the promise of significant investments in AI and data centers in SEA from technology giants like Microsoft, Amazon, and Google, along with the favorable AI policies in SEA, some enterprises may see this as an opportune time to leapfrog their competition by investing in developing proprietary AI in-house.

However, developing an intricate and complex Agentic AI for enterprise use is costly. While attaching essential components of AI Agents like Natural Language Processing (NLP), speech recognition, and machine translation is relatively affordable, the advanced components essential for Agentic AI, such as larger datasets, computer vision, deep learning, and increased development time, are the key factors driving up development costs significantly.

Looking toward 2025, while most large enterprises in SEA would have likely implemented some form of traditional or Generative Artificial Intelligence (Gen AI) in their operations, ABI Research does not expect significant interest from these enterprises in developing Agentic AI applications as they wait for their earlier AI investments to bear fruit (or Return on Investment (ROI)). Additionally, several major industry tech leaders, such as ByteDance, NinjaVan, Shopback, and Xendit across SEA, announced layoffs in 2024, with increasing pressure to show short-term returns in AI investments, which is likely to also deter organizations from making further investments into newer Agentic AI technology.

83 WON'T HAPPEN

Singapore will not have adapted to the climate crisis by the end of 2025, but investments in HPC resources and digital twin technology could show the way.

Over the past 5 years, Singaporeans have noticed a shift in weather and temperature patterns. Indeed, the Meteorological Service Singapore's (MSS) Centre for Climate Research Singapore forecasts that daily average temperatures in Singapore could rise by 5°C by end of century. The highest temperature in 2023 was 37.2° with 90% humidity. Heatstroke can occur around 40°C. Not only that, but sea levels around Singapore are also expected to increase 0.2 meters by 2050, and 1 meter by the end of 2100. That may seem manageable, but with storm surges and tidal effects, the sea level could potentially increase by 4 meters to 5 meters—30% of Singapore is less than 5 meters above sea level.

Over the past 4 years, the National Super Computing Centre (NSCC) in Singapore has been developing a comprehensive "digital twin" of the entire country. The digital twin allows Singapore-based environmental scientists to simulate materials, buildings, and landscaping to make living spaces cooler in tropical Singapore. The "Digital Urban Climate Twin" program, is part of a wider multi-institute initiative, "Cooling Singapore 2.0," which is led by the Singapore-ETH Centre. High-Performance Compute (HPC) processes data that relate to island-wide vegetation cover, traffic patterns, heat emitted from industries, and weather-related data (e.g., wind flow). Iterating the deployment assumptions of materials with various albedo characteristics and altering the landscaping to encourage airflow can mitigate temperatures, but what is a viable configuration? The HPC can also model various water run-off and storm surge scenarios so that national and local governments can respond proactively to the challenges of climate crisis.

84 WILL HAPPEN

Continued consolidation of point solutions (WMS, TMS, YMS) into interconnected platforms.

Through integration and acquisition, point solutions, including Warehouse Management Systems (WMSs), Transport Management Systems (TMSs), and Yard Management Systems (YMSs) are continuing to be pushed into cloud-native supply chain platforms. Leading software providers, including Blue Yonder, Manhattan Associates, and Körber, are pushing customers from using siloed applications to leveraging interoperable, network-focused solutions for more seamless end-to-end visibility and orchestration.

Notable acquisitions in 2024 include Kaleris acquiring CAMS Software, Blue Yonder acquiring One Network Enterprises, and Körber acquiring MercuryGate, all expanding existing software portfolios into new areas of the supply chain to create a broader execution suite.

ABI Research expects further acquisitions of supply chain network and point solution providers by established software players in 2025, while also focusing development on interoperability and cloud-based applications.

85 WON'T HAPPEN

Enterprise use of AI or full automation of supply chain execution.

Applications of Artificial Intelligence (AI) and Generative Artificial Intelligence (Gen AI) are sweeping into the industry, as it is everywhere, but AI-enabled solutions will remain limited and siloed in the supply chain. Traditional AI is primarily being used for advanced data analysis, with leading providers starting to also deliver predictive analytics and system-generated resolutions to issues for decision support. And while they are beginning to be used by end users, this remains in the early stages, limited by data quality, system integration, lack of internal expertise, and general AI trust.

Gen AI solutions have emerged, primarily as copilots and chatbots, with the main function of querying data in a more intuitive way. But solutions are finding it difficult to deliver any radical Return on Investment (ROI) to spur broader deployment. Co-development projects with customers underway by many of the major software vendors should help the industry find best applications, but this will take time, so 2025 will continue to be somewhat of a testing year for both AI and Gen AI in the supply chain.

86 WILL HAPPEN

Digitalization will drive sustainable outcomes for industrial organizations.

Industrial and manufacturing organizations have access to immense quantities of data due to the advent of digital technologies such as the Internet of Things (IoT), sensors, edge devices, AI, and Machine Learning (ML) technologies. These data have historically been used by industry players to enhance production efficiency, improve product quality, enhance asset management, and more. In recent years, the application of these digital technologies and the data they generate to enable sustainable outcomes have gained significant attention, with companies like Schneider Electric regarding their role as critical to any sustainable development strategy.

Digitalizing operations create significant value by maximizing visibility and control of industrial operations and processes, facilitating the identification of efficiency gains in the form of reductions in energy, waste, emissions, and cost. Energy Management Systems (EMSs) are a common form of digital technologies used today, leveraging AI to detect inefficiencies contributing to excess energy consumption.

As industrial organizations look to optimize operations and improve sustainability performance, the proactive development and use of digital tools to achieve environmental targets will continue to increase in 2025 and beyond.

87 WON'T HAPPEN

Adoption of carbon capture as an industrial decarbonization solution will remain low.

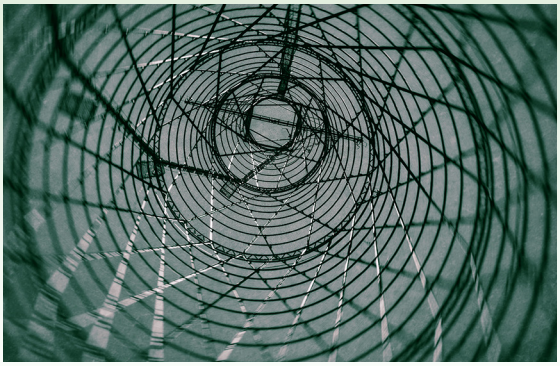
Carbon Capture, Utilization, and Storage (CCUS) technologies are expected to be crucial to achieving net zero in the industrial sector by mitigating hard-to-abate emissions from heavy industries such as steel, cement, and oil & gas. According to the International Energy Agency (IEA), CCUS technologies will contribute to 15% of the reduction in emissions needed to decarbonize the industrial sector. Today, around 65% of CCUS capacity is at natural gas processing plants; however, its application has continued to grow over the last couple of years in the power, hydrogen, steel, and cement industries.

Despite increasing investment and a gradual increase in pilot projects, deployment levels are low. The market faces several barriers to adoption, including high costs of equipment, significant energy requirements, long project lead times, and lack of financial incentive. Capital costs will eventually decrease as the technology becomes more mature, but this will require investing billions of dollars. Industry collaboration and government policy support will be essential to incentivize investment and drive the market.

88 WILL HAPPEN

Deployment of Open RAN creates the potential for increased RAN energy efficiency.

Improving the energy efficiency of network operations has become a key item on the agenda of telecoms companies worldwide. The industry is experiencing a shift toward open and disaggregated network architectures, particularly with the introduction of Open Radio Access Network (RAN) technology, splitting traditional RAN infrastructure into radio, hardware, and virtualized function components. Opening up the RAN will provide greater flexibility and interoperability, which is expected to create vast opportunities for energy efficiency improvements through resource sharing and optimization. Introducing standardized and vendor-agnostic architectures enables operators to benefit from collaborative energy-savings efforts by merging hardware and software solutions from multiple vendors. Open RAN will also facilitate the entry of new innovative specialist vendors that may bring new levels of energy efficiency to mobile networks.



89 WON'T HAPPEN

Telcos will continue to grapple with Scope 3 emissions management responsibilities.

Over the last few years, telco operators and vendors have successfully implemented initiatives to cut Scope 1 and Scope 2 emissions; however, Scope 3 has often been overlooked. While there has been some improvement in efforts from telcos to measure, report, and reduce emissions stemming from their value chains compared to last year, progress has typically been slow across the industry. Enabling significant reductions is challenging, but telcos need to adopt a more proactive approach and take full ownership of their carbon footprint. Mandatory disclosure regulations and increasing stakeholder pressure for energy-efficient networks are emerging as effective mechanisms that will facilitate this in the coming years.

There are clear regional differences in the progress of telcos in addressing Scope 3 emissions. Companies in the European Union (EU) face strict regulatory pressure through the Corporate Sustainability Reporting Directive (CSRD), with initial disclosures required on January 1, 2025. European companies continue to make strong progress in implementing effective supplier engagement programs and developing energy-efficient products and solutions to curb emissions. Companies like Nokia are leading in this area, with a string of solutions enabling AI-driven energy-efficiency improvements of RAN infrastructure and network operations.

On the other hand, organizations across Asia-Pacific are still establishing Scope 3 reporting frameworks, with some not yet reporting all relevant Scope 3 emissions categories. A consistent, global acceleration of decarbonization efforts will be critical to achieve meaningful emissions reductions across the industry.

90 WILL HAPPEN

Small and medium operators will level up security.

Small and medium operators will benefit from lowering barriers to entry for security products, resulting in an industry-wide upgrade in standards. The "stick and carrot" of increasing global regulations and potential operational and financial benefits from increased network visibility as a result of security tooling implementation provides powerful motivation for all operators to improve security standards.

While some regulations stagger deadlines for compliance by operator size—as seen in the United Kingdom's Telecommunications (Security) Act—this is in light of how much further some Tier Two Mobile Network Operators (MNOs) have to go to comply, and they will need to make progress throughout 2025.

Thankfully, a proliferation of consulting services, automation tools, and scalable managed service models will provide a lower initial investment and expertise requirement, enabling Tier Twos to upgrade security flexibly.

First, the increased availability of "as-a-Service" and virtualized infrastructure lowers upfront investment, reflecting a shift from a Capital Expenditure (CAPEX) to an Operational Expenditure (OPEX) investment, which better captures small MNOs struggling against slower-than-expected 5G Return on Investment (ROI).

Second, the proliferation of consulting services, security automation tools, and Artificial Intelligence (AI) solve an industry-wide skills shortage problem, giving lower-tier MNOs access to expertise they could not hope to secure in-house and reducing the time cost of proper security management.

All of these conditions combine to provide a stellar opportunity for small and medium MNOs to make leaps forward in their security posture, breaking down the upgrade into manageable, incremental progressions.

91 WON'T HAPPEN

Telcos will not deploy cyber-style security orchestration tools en masse in 2025.

Despite numerous arguments in favor of Information Technology (IT)-style security tools such as Extended Detection and Response (XDR) transplanting into the telco world, with orchestration and automation tools solving network complexity challenges and security expert shortages, this will remain the domain of security innovators in 2025.

For many operators, basics such as firewalls have yet to be deployed, and many more still struggle with vulnerabilities due to misconfigurations and a lack of interoperability between tools.

Security vendors are improving the situation with more flexible products and more streamlined Single Pane of Glass (SPOG) interfaces, as well as improving interoperability to provide more seamless integration into the network, but this is a process still being undertaken by many operators.

On the other end of the spectrum, operators with advanced security will have to contend with a specialization process of these cyber-born tools as vendors work to tailor them to the cellular environment. For those looking to use AI features, and particularly Generative Artificial Intelligence (Gen AI) features where Large Language Models (LLMs) will need to draw from large data pools, there is a prerequisite workload of data preparation.

While many leaders will seek to deploy these tools and techniques in 2025, for many, there is a path yet to walk to be in a position to exploit them fully.

92 WILL HAPPEN

Secure microcontroller unit adoption to accelerate in edge devices.

The secure Microcontroller Unit (MCU) market was already on track for exponential growth over the coming years, with demand driven by 5G connectivity (and therefore, for secure Over-the-Air (OTA) and device lifecycle management demands), as well as by emerging regulation, notably around cyber resiliency and supply chain security. These have been driving root of trust integration and secure execution environment capabilities in MCUs. Today, with advances in Artificial Intelligence (AI), especially at the Internet of Things (IoT) edge, demand is ramping up for security measures to ensure that Machine Learning (ML) algorithms, as well as data input and output, are adequately protected. The use of Trusted Execution Environments (TEEs) is particularly prized for protecting proprietary algorithms, and secure communication capabilities for moving data about. This market is being served by higher-end MCUs, and increasingly, vendors are pushing the boundaries of the application processor space with converged MCU/Microprocessor Unit (MPU) offerings; essentially dual core offerings, typically using a mix of Arm Cortex A and M. These are proving especially popular in industrial automation and automotive applications where a rich Operating System (OS) and software stack is needed, but real-time functionalities and latency are also a requirement. These hybrid, multi-core products are emerging where one of the cores (typically the MCU) focuses on latency and/or security processing, while the other (MPU) handles the performance (especially where AI is involved).

93 WON'T HAPPEN

PQC readiness in embedded devices.

Although three Post-Quantum Cryptography (PQC) standards have been published by the U.S. National Institute of Standards and Technology (NIST) in 2024, meaning that implementation and Post-Quantum (PQ) migration timelines have officially kicked off, their integration into semiconductors will take time. It is unlikely that many chipsets in 2025 will have PQC capabilities. This is due to a number of barriers that chipset vendors need to first overcome. First is the design of appropriate hardware that can effectively support the new algorithms, which are drastically different from traditional crypto. This means finding the right libraries (and choosing which algorithm to include). The more algorithms, the higher the development costs. Then there is the need for hardware acceleration for secure boot and OTA updates, as well as ensuring the algorithms can work in small and embedded form factors. This is important as PQC can be quite heavy, so these hardware improvements will be key to usability. Finally, chipset vendors will have to work on securing against side channel and fault injection attacks. Retrofitting older chipsets with these capabilities will not be possible; new product lines need to be developed, and this will take time. The year 2025 will see some PQC-ready chipsets hit the market, but availability of PQC-ready end devices will not really occur until the following year.

94 WILL HAPPEN

Wi-Fi 6E will fade into obscurity in 2025.

Wi-Fi 6E was always a bit of an oddity. While it was introduced to much fanfare in January 2020, from the outset, it was widely acknowledged by the industry that its time in the limelight would be fleeting. This was because besides offering 6 Gigahertz (GHz) compatibility, the underlying 802.11 technology stack for Wi-Fi 6E was identical to that of Wi-Fi 6, whereas the subsequent Wi-Fi 7 protocol was set to offer a plethora of new innovative features designed from the ground up to harness 6 GHz. Given that radios are the most expensive component of a Wi-Fi Access Point (AP), it was inevitable that including an additional 6 GHz radio in Wi-Fi 6E equipment would mean that it would cost significantly more than a Wi-Fi 6 AP, but not much less than a Wi-Fi 7 AP with the same number of radios. Thus, as soon as Wi-Fi 7 hit the market in earnest in early 2024, Wi-Fi 6E's value proposition was swiftly diminished.

The only saving grace that Wi-Fi 6E benefitted from in 2024 was that several large enterprise vendors that had invested heavily in Wi-Fi 6E were resistant to introduce its successor before they had achieved acceptable Return on Investment (ROI) on the technology (or accept that they must cut their losses and move on). Now that the final holdout, and also the industry's largest enterprise Wireless Local Area Network (WLAN) vendor, Cisco has announced its Wi-Fi 7 portfolio, we can now expect Wi-Fi 6E shipments to gradually peter out, with the majority of 6 GHz-related opportunities in the market now migrating to Wi-Fi 7.

95 WON'T HAPPEN

Standard power 6 GHz will not become widespread in 2025.

Although it is now approaching 5 years since the United States became the first nation to allocate the 6 GHz spectrum for unlicensed use back in April 2020, the industry is still far from having a unified policy toward the band. The world is now divided into three distinct camps, split between those that have released the entire 1200 Megahertz (MHz) of 6 GHz, those that have settled for just the lower 500 MHz, and finally, those that have not allocated any of the band for unlicensed use. Yet, not only is this state of affairs unlikely to be resolved in the near term, but the divergence between markets is now set to grow even more, as regulators grapple with certifying the Automated Frequency Coordination (AFC) systems required for Standard Power 6 GHz.

To date, the use of these AFC systems, which essentially confirm the absence of existing incumbents in the band before authorizing higher power 36 Decibel-Milliwatts (dBm) transmissions, have only been permitted in two markets—the United States and Canada. This is slow progress seeing as Standard Power 6 GHz APs have already been available for several years. Unfortunately, the pace of national regulator authorizations is set to remain sluggish, as each nation across Europe and Asia-Pacific has to deal with its own set of unique incumbents in the 6 GHz band. The situation is further complicated by the fact that national regulators each have their own individual regulatory frameworks, meaning that AFC system suppliers will need to modify their application process to suit the demands of every regulator. Indeed, even between the United States and Canada, the process varied significantly, with the vendor being responsible for testing in the United States, whereas in Canada, the Innovation, Science and Economic Development Canada (ISED) department will conduct testing internally and ask vendors any pertinent questions resulting from the in-house trials. Given this complexity, despite the many benefits that Standard Power 6 GHz can offer, it is unlikely to become widespread by the end of 2025.

96 WILL HAPPEN

Wi-Fi HaLow will finally start to take advantage of emerging IoT applications.

Wi-Fi HaLow, also known as IEEE 802.11ah, is an extension of Wi-Fi technology into the sub-1 Gigahertz (GHz) bands. It brings whole home, building, or neighborhood level coverage, can help offload the congested 2.4 GHz band for Internet of Things (IoT) devices, can readily integrate into existing Wi-Fi Access Points (APs), and takes advantage of the inherent interoperability and security benefits of Wi-Fi technology. Despite these benefits, for various reasons, Wi-Fi HaLow technology has failed to gain mainstream traction since the standard was first published in 2017.

However, over the last 12 months, momentum for Wi-Fi HaLow technology has accelerated. The arrival of new Intellectual Property (IP), chipsets, and modules from multiple vendors has led to more and more commercial products hitting the market. This includes a range of device types, including home and enterprise cameras, smart doorbells, wireless sensors, and a diverse combination of enterprise, industrial, and agricultural APs, extenders, gateways, and bridges. In addition to these real-world products, in July 2024, the Wireless Broadband Alliance (WBA) made available its Wi-Fi HaLow for IoT: Field Trials Report, demonstrating the effectiveness of Wi-Fi HaLow across a range of environments, including smart home, industrial, warehouse, connected agriculture, smart city, and smart building environments.

These devices and trials are combining to help prove the credentials of Wi-Fi HaLow technology in the real world and forge the pathway to an end-to-end Wi-Fi HaLow ecosystem. The availability of such solutions is expected to grow considerably over the next few years as awareness of the market develops further and the tangible benefits of Wi-Fi HaLow technology are increasingly realized. Furthermore, leading Wi-Fi HaLow chipset vendors such as Morse Micro and Newracom continue to innovate to improve their product offerings, while a growing number of new module partners, case studies, and trials are helping to develop the Wi-Fi HaLow ecosystem further.

97 WON'T HAPPEN

Despite the first real-world deployments, Bluetooth® Auracast™ broadcast audio will not yet become a mainstream assistive listening technology in public venues.

Bluetooth® Auracast™ broadcast audio is set to transform the way people experience audio in public spaces, changing the consumer audio and assistive listening landscape. Opportunities for the technology are enormous, with the technology envisioned to be leveraged as an assistive listening solution within audio systems in conference and lecture halls, theaters and cinemas, and places of worship, Public Address (PA) and alert systems in airports and transportation hubs, and eventually, one-to-one countertop deployments in retail and other service environments. According to ABI Research, more than 60 million venues globally could potentially benefit from assistive listening or augmented audio experiences. Some of these venues may support multiple use cases, ranging from assistive listening solutions to silent Television (TV) use cases, or the emergence of new audio experiences.

Real-world demonstrations from Listen Technologies and Ampetronic at the Hearing Loss Association of America (HLAA) 2024 Convention marked the first complete installed assistive listening system that will utilize Auracast™ broadcast audio technology. In addition, new Auracast™ broadcast audio products targeting public venues such as Bettear's B-CASTER streamer and B-RTX transceiver have emerged, while various retrofit Universal Serial Bus (USB), 3.5 Millimeter (mm), optical, or High-Definition Multimedia Interface (HDMI) interfaces transmitters are being developed to connect to a variety of existing audio sources in public venues. ABI Research expects 2025 to mark the first year of notable rollouts of Bluetooth® Auracast™ broadcast audio in public venues, as well as much wider availability of dedicated infrastructure solutions, whether retrofit or fully integrated Auracast™ broadcast audio equipment.

However, the reality is that it will be several years before Bluetooth® Auracast™ broadcast audio becomes a mainstream assistive listening technology in public venues. This will require much greater proliferation of Low Energy (LE) Audio and Auracast™ broadcast audio hardware and software support, greater support within assistive listening regulatory frameworks across different regions, growing partnerships with system integrators, support within public assistive listening, enterprise audio, and wireless infrastructure vendor portfolios, and greater end-user awareness and education around the benefits of the technology.

98 WILL HAPPEN

Healthcare, education, and manufacturing lead the way in XR adoption.

Over the past year, it has been clear that healthcare, education, and manufacturing are the top verticals for Extended Reality (XR) adoption. And it is even clearer that, in 2025, those same verticals will be leading the way in XR adoption. They will be leveraging technologies to address critical needs and enhance productivity, paving the way for other verticals to recognize the value of XR in enterprise sectors. Artificial Intelligence (AI)-driven hardware, such as Augmented Reality (AR) smart glasses that are currently generating a wave of interest, and more immersive Mixed Reality (MR) headsets, will be playing a pivotal role in this growth. In healthcare, these devices will be facilitating advanced diagnostics, surgical planning, and remote training. Education will benefit from immersive learning experiences tailored by AI to individual learners, transforming how complex concepts are taught. Manufacturing will rely on XR tools for digital twins, predictive maintenance, and hands-free workflows.

The integration of AI with XR hardware is a key connector that is driving innovation across these industries, reshaping how they operate and evolve. It will be enabling smarter, more context-aware, and efficient solutions. One example lies in data; AI enhances XR by processing real-time data, offering natural language understanding and enabling predictive analytics, which are fundamental to transforming these sectors. Expect AI smart glasses with no displays, AR smart glasses, and MR headsets to begin integrating AI enhancements throughout 2025.

99 WON'T HAPPEN

Consumer smart glasses see adoption at scale.

While the XR market will continue to evolve, certain advancements are unlikely to occur at scale, particularly the widespread adoption of smart glasses. Despite the significant strides that we will see in AI, smart glasses are expected to remain predominately in the realm of early adopters. This will be due to challenges in affordability, battery life, and seamless integration into everyday workflows. In terms of consumer adoptions, Virtual Reality (VR) will maintain its strongest foothold in gaming, sports, and fitness, where immersive experiences have already proven their value and consumer demand remains. Smart glasses require more user education and convincing potential buyers of value, with some critical hardware barriers in form factor and battery life remaining. While some companies will hit the market with early products and developer solutions, such as Snapchat with its newest Spectacles, 2025 will still be another transitional year for smart glasses, with most traction coming from niche applications, rather than widespread consumer or at-scale deployment.

100 WILL HAPPEN

AI-first smart glasses (with no display) will bring significant competitive activity.

Considering the success of Ray-Ban Meta glasses over the past year, with more than 700,000 pairs sold, 2025 is poised to mark a shift in the Extended Reality (XR) landscape. It is clear that there will be a strong focus on Artificial Intelligence (AI)-first glasses driving the industry's evolution. Meta will likely be at the forefront of this innovation, with advancements and integrations of AI for enhanced spatial computing, intuitive interactions, and a focus on Agentic AI—enabling more personalized, context-aware experiences. AI smart glasses are expected to redefine user experiences by merging AI capabilities with consumer-friendly, lightweight designs. While Meta did showcase its full Mixed Reality (MR) Orion glasses at the recent Meta Connect event, they are not expected to reach the market for a number of years. However, this does not mean we will not see a wave of AI-enhanced Augmented Reality (AR) glasses. Other major players, including startups and established tech companies, are anticipated to follow closely, contributing to the competitive race in AI-driven wearable tech. Tech incumbents like Google, Samsung, Xiaomi, Huawei, and Lenovo may leverage their existing technologies and ecosystems to push into the AI-enabled AR space.

This convergence of AI and Extended Reality (XR) sets the stage for broader adoption across industries where these devices could transform workflows and consumer interactions. For example, AI smart glasses could enhance productivity by providing real-time translations, navigation assistance, or even on-the-job training through immersive overlays. However, challenges remain, especially around balancing price and performance, as well as gaining consumer trust around data privacy and ensuring seamless integration with daily activities. Nevertheless, 2025 is likely to be a pivotal year, when these innovations will begin to shape the future of XR, bridging the gap between AR and everyday practicality.

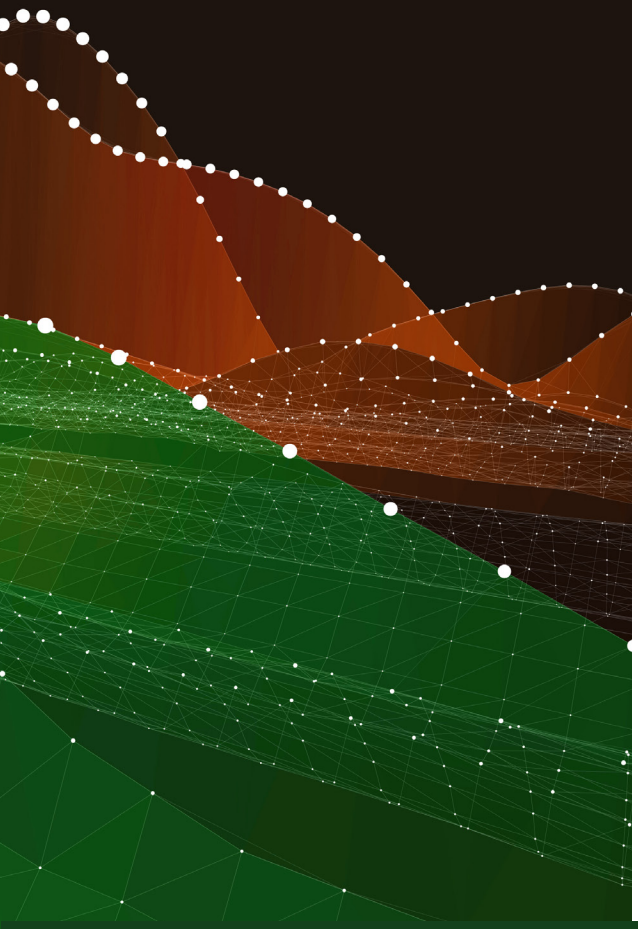
101 WON'T HAPPEN

Apple is expanding its XR portfolio.

While AI smart glasses are set to be the focus in 2025, it is unlikely that we see Apple release smart glasses in 2025, primarily due to the technical and design challenges involved in delivering a product that meets its high standards for usability, aesthetics, and functionality. Alongside that, recent reports are indicating that Apple has reduced production of its Vision Pro headsets, with some reports suggesting a complete halt by the end of 2024. This highlights broader challenges in the AR market, including steep manufacturing costs, limited consumer adoption of high-priced devices, and the complexity of delivering seamless AR experiences. With Apple's track record of entering the market only when the technology and demand align, smart glasses may remain in the Research and Development (R&D) phase for some time still. This cautious approach reflects a broader industry trend: while many companies race to launch AI-enhanced devices, achieving meaningful use cases and solving real-world problems remain significant hurdles.

Additionally, consumer readiness for smart glasses is still evolving. Unlike smartphones, which integrated seamlessly into daily life, AR glasses need to overcome challenges like social acceptance, privacy concerns, and battery life limitations. Competing players like Meta are focusing on early iterations and enterprise applications, but even these may not gain widespread traction until the technology matures further. This suggests that while 2025 will see progress in AI and XR, we are still in the early phases of mainstream adoption, with incremental steps, rather than revolutionary leaps likely defining the year ahead.

2025 IS EXPECTED TO BE A YEAR OF CHANGE.



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