The Intelligent Edge

Strategic insights into the future of video

Security | Safety | Business intelligence | Operational efficiency

Axis Perspectives Report 2026

AXIS COMMUNICATIONS

About Axis Perspectives

Axis Perspectives is an annual research-based report from Axis Communications, designed to deliver insight, context, and strategic foresight into the evolving role of intelligent video technology and its growing intersection with other smart connected solutions.

As the inventor of the first IP camera and the leader in network video innovation for nearly three decades, Axis has played a central role in the transformation of surveillance into a core component of public safety and modern business infrastructure.

The Axis Perspectives report reflects our commitment to providing meaningful value to our partners, customers, and industry stakeholders – through analysis, commentary, and a clear view of what's next.

As video technology continues to evolve, IP cameras are no longer defined solely by their role in surveillance. Today, they are intelligent, connected devices capable of delivering real-time insights at the edge and integrating easily with enterprise systems – transforming how organizations approach security, operations, and business performance.

Advances in AI, imaging, cybersecurity, and cloud-edge architecture have redefined the role of these devices. For security professionals, this means smarter threat detection, faster incident response, and tighter integration with broader infrastructure. At the same time, they are enabling new applications – from business intelligence and operational efficiency to compliance and process automation. No longer isolated systems, intelligent cameras are becoming core components of open, connected IoT ecosystems, supporting both traditional security requirements and enterprise business goals.

This report explores the key areas which are shaping the impact of intelligent IP video.

Drawing on proprietary research, industry analyst insights, expert viewpoints, and real-world examples, Axis Perspectives is designed to help organizations move toward integrated, data-driven solutions that deliver more meaningful value today and into the future.

The evolution of intelligent IP cameras

From surveillance to strategic intelligence.

01

IP cameras have undergone a significant transformation from simple monitoring devices to sophisticated tools that deliver real-time insights and operational value. This evolution is driven by technological advancements, expanded use cases, and growing integration across industries. This progression invites a closer look at the innovations, strategic benefits, and shifting market trends, shaping the future of intelligent video systems.

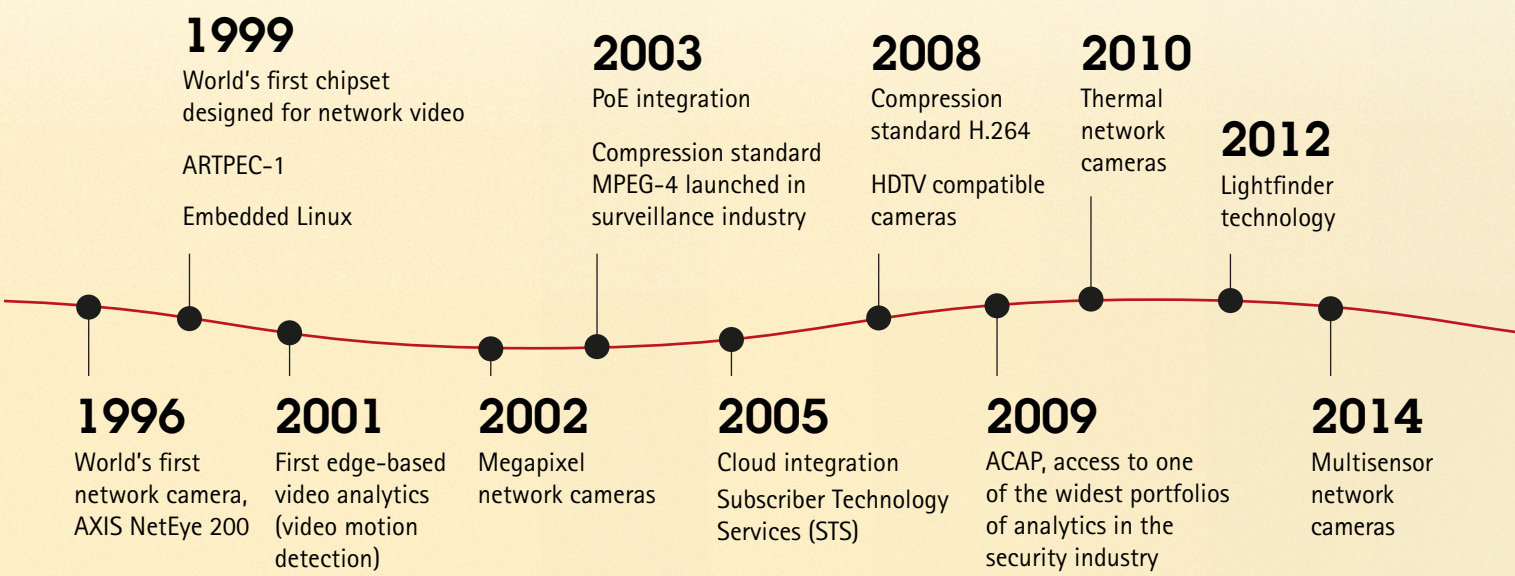
Technology milestones that enabled smarter cameras

The journey from basic video surveillance to intelligent sensing has been marked by a steady progression of breakthroughs – each expanding what cameras can see, understand, and do. What began as a shift from analog to digital has evolved into a fusion of edge computing, AI-driven analytics, and hybrid cloud architecture.

A foundational enabler was the development of purpose-built chipsets, bringing advanced image processing and analytics directly to the camera and reducing latency, bandwidth use, and reliance on central servers. This made possible the first built-in video analytics, from basic motion detection to advanced object detection and metadata-generated tools, paving the way for today's deep learning models. Meanwhile, image quality advanced with megapixel resolution, multisensor designs, and innovations like Lightfinder and Forensic WDR, delivering clarity in low-light and high-contrast conditions.

To manage rising data volumes, compression technologies, from H.264 and H.265 to AV1, enabled efficient storage and streaming, especially in cloud-based systems.

The rise of cloud and hybrid architectures gave organizations flexibility to scale while maintaining edge performance. Features like auto-configuration, remote updates, and health monitoring made deployment and management faster, more consistent, and less resource-intensive. Industry-wide adoption of open standards such as ONVIF-enhanced interoperability, while growing connectivity, brought cybersecurity to the forefront –with secure boot, signed firmware, and encryption now essential safeguards. Together, these milestones have transformed IP cameras into intelligent systems that deliver real-time insight, operational efficiency, and strategic business value.



1996
World's first network camera, AXIS NetEye 200

1999
World's first chipset designed for network video

ARTPEC-1

Embedded Linux

2001
First edge-based video analytics (video motion detection)

2002
Megapixel network cameras

2003
PoE integration

Compression standard MPEG-4 launched in surveillance industry

2005
Cloud integration

Subscriber Technology Services (STS)

2008
Compression standard H.264

HDTV compatible cameras

2009
ACAP, access to one of the widest portfolios of analytics in the security industry

2010
Thermal network cameras

2012
Lightfinder technology

2014
Multisensor network cameras

How intelligent cameras have become strategic assets

As IP cameras have evolved, so has their role. No longer limited to surveillance, these systems now deliver immediate intelligence, support faster decision-making, and create value across industries. Their impact is expanding in business intelligence and operational efficiency as well, reshaping how organizations operate, plan, and respond.

From passive surveillance to real-time intelligence
Traditionally, cameras served as passive devices – footage was often reviewed after incidents occurred. Today, IP cameras proactively detect unusual activity, recognize patterns, and trigger real-time alerts. This allows organizations to respond quickly and prevent incidents from escalating.

Smarter sensing at the edge
Onboard processing means critical information is generated the moment it's needed, enabling capabilities like license plate recognition, object detection, and scene analysis without relying on centralized infrastructure. This improves response times and situational awareness in fast-paced environments like transportation, logistics, and retail.

Improved image quality, efficiency, and reach
New generations of IP cameras deliver high-quality imagery even in low light or harsh conditions, ensuring accurate scene capture across diverse environments. At the same time, energy-efficient designs enable wide-scale deployment, including in remote or infrastructure-light areas, while AI-enhanced image processing reduces false positives and improves long-term reliability.

Scalable systems, simplified management
Features like auto-configuration, remote updates, and hybrid cloud support streamlined deployment, maintenance, and scaling. Open standards further enable integration across locations and systems, offering flexibility and consistency for distributed operations.

Cross-sector value and measurable ROI
Across industries, intelligent video is driving measurable outcomes:

- In retail, it reduces shrinkage and informs layout and staffing strategies.
- In transportation and logistics, it increases throughput and reduces errors.
- In industrial settings, it supports safety, compliance, quality control, and predictive maintenance.
- In smart cities, it improves traffic flow, emergency response, and public safety.

More examples can be found on page 20.

2015
Zipstream technology

2017
Radar technology in surveillance

2020
Embedded deep learning

2021
Edge Vault supports signed video to safeguard the device's integrity

2024
World's first AV1 video encoding standard for streaming video in the surveillance industry

Intelligent IP cameras are no longer just tools for observation – they're foundational to digital transformation, driving smarter, more resilient operations through actionable intelligence and delivering enterprise value.

Expanding roles of intelligent IP cameras: evolving market trends

While security and safety remain primary drivers, the role of video surveillance is rapidly expanding into business intelligence and operational efficiency, reflecting a broader shift toward intelligent, value-generating infrastructure.

In 2025, Axis annual surveys[1] of end customers across the Americas, EMEA, and APAC show continued strong demand for security and safety use cases, alongside increasing adoption of video systems for business intelligence (38%) and operational efficiency (42%). By comparison, in 2024, 20% of respondents reported using video systems for business intelligence and 38% for operational intelligence, in addition to security and safety functions.

Architects and Engineers (A&Es) who specify and recommend these systems report similar adoption rates, signaling growing demand for solutions that contribute to broader innovation goals and deliver measurable business value. When asked about anticipated future use cases for video surveillance, their responses suggest that customers will significantly expand their usage of IP cameras in all areas, including security, safety, business intelligence, and operational efficiency.

Security remains the cornerstone – cited by 89% of end customers and 96% of A&Es as the primary use case – reaffirming its critical role in protecting people, assets, and infrastructure.

Yet organizations are now layering on new applications (figures referring to end customers' responses):

- **Safety** has become a central focus, with 81% of customers prioritizing it in their video strategy. This reflects a shift toward proactive risk management – using technology not just to respond to incidents, but to prevent them.
- **Business intelligence** is also on the rise with 38% using video to uncover insights on customer behavior, space utilization, and performance trends that inform smarter decisions.
- **Operational efficiency** is a growing priority with 42% of organizations leveraging video to optimize workflows, manage resources in real time, and streamline logistics.

Together, these trends reveal a powerful shift: video technology is evolving into a multi-dimensional platform. While security remains fundamental, organizations increasingly see camera networks as tools for insight, safety, and operational excellence – protecting what matters most while driving measurable business value.

Cameras drive AI-powered quality control at BMW

High-resolution network cameras are central to BMW Group's AI-driven quality inspection (AIQX) across its iFACTORY facilities. Integrated with BMW's AIQX platform, they capture detailed vehicle images in real time, enabling automated inspections of components – from logos to door handles – with precision.

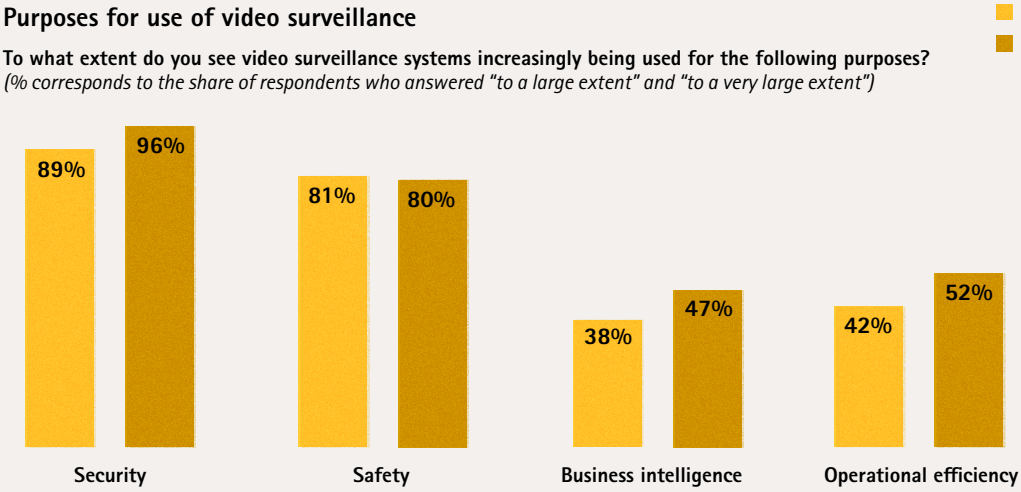
Leveraging advanced imaging, the system provides reliable data even in challenging lighting, allowing AIQX to detect defects instantly and support staff in correcting errors quickly. Deployed globally, this approach enhances efficiency, reduces costs, and upholds cybersecurity and sustainability standards, advancing BMW's vision of fully digitalized vehicle production.

BMW is using the AI capabilities of video surveillance cameras to undertake quality inspections throughout the automotive manufacturing process.

- Axis Communications, Moving beyond the hype of security[2]

Purposes for use of video surveillance

To what extent do you see video surveillance systems increasingly being used for the following purposes?
(% corresponds to the share of respondents who answered "to a large extent" and "to a very large extent")



Overall, this data underscores a broader transformation underway in the video surveillance market. According to Novaira Insights[3], the number of installed cameras outside China is projected to reach 562 million by the end of 2025, climbing to 736 million by 2029. Globally, the largest regional installed bases in 2025 include the U.S. (100 million), India (86 million), and Latin America (70 million), with Western Europe, the Middle East and Turkey, Southeast Asia, Northeast Asia, and Oceania contributing significant additional volumes.

In the U.S., an estimated 10 million cameras are added each year, while other regions see annual shipments ranging from 0.8 million in Oceania to 11 million in India. As analog HD cameras continue their steady decline – accounting for just 10% of total camera revenue in 2024 – IP cameras accounted for 90%, highlighting the prevalence of connected, digital infrastructure.

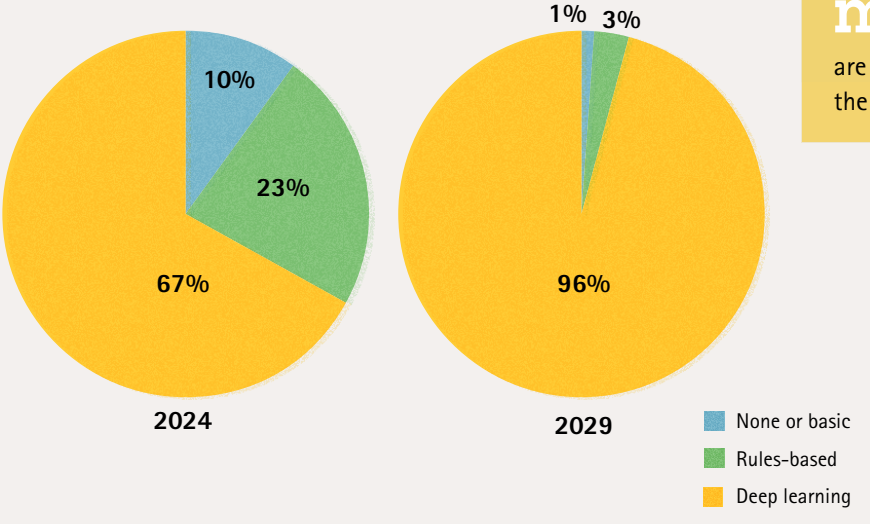
In parallel, intelligence is becoming the new standard: nearly 80% of cameras shipped in 2024 included analytics capabilities, with 23% offering rules-based analytics and two-thirds already featuring deep learning-based functionality[3].

As technology becomes more advanced and interconnected, it is enabling smarter, more responsive environments. IP cameras are now integral to digital transformation strategies, positioning video not just as a security asset, but as a driver of enterprise intelligence.

562
million cameras
are estimated to be installed in the world by the end of 2025, excluding China.

Network cameras by analytics functionality

In revenue (MUS$) - world excl. China



Key shifts driving the transformation

Macro forces shaping the intelligent edge.

02

The intelligent edge is increasingly shaped by external forces that influence how it is applied, integrated, and valued within organizations. Broader shifts in enterprise strategy, technology maturity, and regulatory landscapes are redefining expectations – positioning edge systems not just as infrastructure, but as critical enablers of performance, security, and innovation.

Modernization driven by manual inefficiency

The prevalence of manual processes in security – with roughly 80% of expenditures devoted to guards, monitoring, installation, and maintenance – highlights a broader macro trend: industries that remain labor-intensive are ripe for transformation. Intelligent IP devices, equipped with AI and video analytics, can automate routine tasks, reduce false alarms, and minimize alert fatigue, allowing personnel to focus on higher-value strategic work.

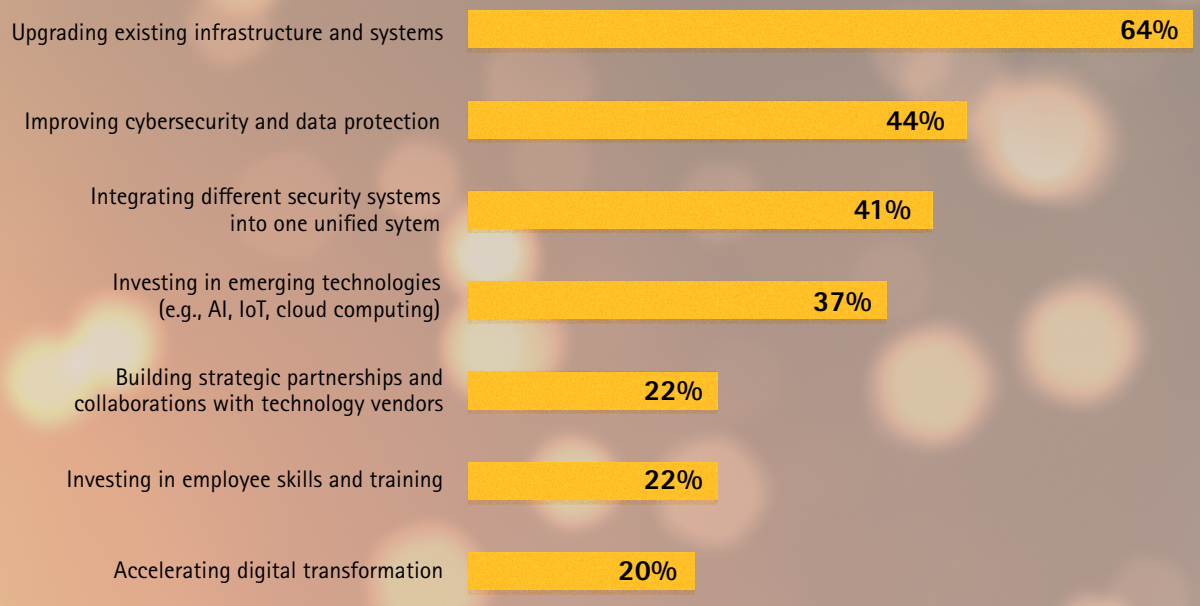
The impact is clear: Securitas reports AI-powered monitoring has cut escalated false alarms by 59%, freeing hundreds of guard-hours annually[4], while a study by Omdia, commissioned by BriefCam, found that over 85% of organizations using video analytics achieve rapid ROI within one year[5].

Security operations exemplify how antiquated manual workflows are driving the adoption of digitalization, edge intelligence, and automation – enabling organizations to modernize operations, optimize labor, and extract actionable insights from connected devices.

Enterprise expectations: from cost centers to value drivers

Physical security technology is a strategic asset driving measurable business outcomes, with today's organizations prioritizing investments that align with business goals. Axis research confirms this: 64% of end customers prioritize upgrading infrastructure for performance and compatibility as a primary driver to success over the next 1-3 years, while 37% emphasize investing in emerging technologies like AI and IoT to future-proof operations and unlock new value.

Over the next 1-3 years, what key areas will require your primary attention to drive success in your role?



41%

of end customers identified integrating different security systems into ONE UNIFIED PLATFORM as a top priority for success.

IT/OT/Physical security convergence: unifying enterprise infrastructure

Another key trend is the convergence of information technology (IT), operational technology (OT), and physical security. Traditionally siloed systems are increasingly unified as enterprises adopt integrated platforms that connect video, sensors, and enterprise applications. This convergence enhances data sharing, strengthens security, and increases operational efficiency.

Integrated platforms also enable edge-generated data to flow seamlessly into business workflows, supporting real-time monitoring, advanced analytics, and process automation across the enterprise. In our recent research, 41% of end customers identified integrating different security systems into one unified platform as a top priority for success over the next 1–3 years. This demand signals a strategic move toward resilience, simplified management, and enhanced situational awareness.

Rise of edge and hybrid AI: flexible, scalable intelligence

Deep learning at the edge is transforming how intelligence is deployed and scaled – with hybrid architectures enabling AI models and analytics to run both centrally in the cloud and locally at the edge, for low-latency, real-time decision making.

By processing data at the edge and sending only essential information to the cloud, organizations reduce bandwidth demands and strengthen privacy while maintaining scalable analytics. Market research and industry experts highlight significant, sustained growth in global edge-computing investment, underscoring rapid enterprise adoption of distributed, hybrid infrastructures designed to support real-time intelligence at the edge.

User experience focus: simplified interfaces, automation, and insight delivery

As IP video systems become more advanced, enterprises are implementing simplified, intuitive interfaces that reduce operator workload and accelerate decision-making. Automation is crucial: organizations want systems that minimize manual oversight, streamline complex workflows, and augment human capabilities through AI-driven assistance with clear, measurable impact on safety and efficiency.

Industry research reinforces this evolution. In Axis' State of AI in Video Surveillance report[6], 62% of system integrators identified AI and generative AI as top trends, while end customers prioritized analytics and actionable insights. This points to a growing recognition that how intelligence is delivered – through dashboards, alerts, or embedded recommendations – is just as critical as the intelligence itself.

To meet these expectations, intelligent edge platforms are prioritizing usability, presenting insights that are visual, accessible, and tailored to non-technical users. These tools empower faster response times, reduce training burdens, and improve situational awareness. Clean design and efficient insight delivery are increasingly essential for adoption, scalability, and long-term value.

Data governance: privacy, compliance, and security at scale

With the proliferation of connected devices and the growing volume of data generated and managed across distributed environments, governance is critical. Enterprises face mounting challenges around privacy, compliance, and data security.

Axis research shows that 44% of end customers identify cybersecurity and data protection as a top priority for success over the next 1–3 years, underscoring the need to safeguard sensitive data without hindering innovation.

Cybercrime is now the world's fastest-growing criminal threat, with annual worldwide losses currently at US$9.22 trillion[7] from crimes ranging from data theft and ransomware to IP losses and operational shutdowns. This highlights both growing exposure and an expanding attack surface within physical security infrastructure.

This convergence of rising threat exposure, growing attack frequency, and high breach costs makes clear that enterprises integrating physical security with IT and OT must adopt unified governance strategies.

Safeguards across video, sensors, and enterprise systems are no longer just best practices – they are essential to preserving trust, ensuring compliance, and preventing disruptions.

44%

of end customers identify cybersecurity and data protection as a top priority for success over the next 1-3 years.

By eliminating vendor lock-in and simplifying integration, open, interoperable ecosystems enable organizations to scale intelligent edge solutions efficiently while adapting to changing business demands.

– Fredrik Nilsson, Vice-President, Americas, Axis Communications

Open ecosystems: innovation through interoperability

Open, vendor-neutral platforms are now crucial to intelligent edge architectures. By enabling seamless integration across systems, networks, and devices, open ecosystems reduce deployment complexity, lower costs, and foster innovation, eliminating vendor lock-in and increasing agility.

A recent milestone is the adoption of the AV1 video codec in surveillance[8], which improves compression efficiency, reduces bandwidth and storage needs, while enhancing video quality, AI performance, and cybersecurity – especially in cloud-connected environments.

Overall, open platforms allow organizations to unify video, sensors, analytics, and enterprise applications, scaling intelligent edge solutions as needs evolve.

Together, these forces – enterprise demand for value, IT/OT/Physical Security convergence, edge and cloud AI, stringent governance, user-centric design, and open ecosystems – are redefining the intelligent edge. Success now depends on upgrading infrastructure, strengthening cybersecurity, integrating systems, and embracing emerging technologies to unlock new competitive advantages in a rapidly digitizing world.

What is AV1?

AV1 is a modern, open, royalty-free video codec created by the Alliance for Open Media (AOM), a consortium of major technology companies including Google, Amazon, Netflix, Microsoft, and others. Launched in 2018, it was designed to replace older, proprietary codecs with a more efficient, future-proof standard optimized for high-resolution video, cloud streaming, and broad device interoperability. As an open standard, AV1 encourages industry-wide adoption and innovation, positioning it as the next foundational codec for digital video – including IP surveillance.

Top 3 benefits of AV1

1. **Offers high-quality video at low bitrates**, allowing for efficient network video transmission and reduced storage costs.
2. **Support for video wider than 8K**, otherwise only possible with H.265.
3. **Hassle-free playback** thanks to decoding support in web browsers, operating systems, and mobile devices.

The expanding role of the intelligent camera

New roles – how cameras are powering the enterprise.

03

With embedded analytics, AI capabilities, and seamless integration into broader systems, IP cameras now contribute directly to business operations, customer experience, and strategic decision-making. Their expanding role reflects a broader shift from passive monitoring to active, value-generating assets within the modern enterprise.

Maximizing enterprise value with the expanding role of intelligent cameras

IP cameras have evolved into platforms that deliver real-time analytics, AI-driven threat detection, and automated response. Their capabilities now span risk mitigation, compliance, and operational insight, driving measurable business value.

82%

of organizations are using or planning to use real-time data processing.

75%

are applying AI and machine learning to automate decision-making and accelerate responsiveness.

Real-time threat detection: IP cameras can automatically detect behaviors like loitering, perimeter breaches, and large gatherings, triggering immediate alerts. For example, in the U.S., the rise of real-time crime centers (RTCCs) underscores the value this provides: the country now has over 300 RTCCs, up from roughly 80 five years prior[9]. These centers depend on integrated video intelligence, showcasing the growing demand for real-time situational awareness.

Smart alerts and automated workflows: Integrated with security platforms, intelligent cameras deliver prioritized, context-rich alerts that reduce false positives and speed response, while automated workflows standardize verification and escalation for greater efficiency. This reflects a broader enterprise trend: 82% of organizations are using or planning to use real-time data processing, and over 75% are starting to layer additional services like AI and machine learning to process the massive amounts of data coming from their IoT deployments[10].

Secure, evidence-grade video: In regulated environments, video systems must meet a growing number of compliance requirements. End-to-end encryption, signed firmware, and secure boot help ensure chain of custody and prevent tampering or unauthorized access. This is crucial in sectors like healthcare, finance, and critical infrastructure, where compromised video handling can erode trust and increase legal and compliance risk[11].

These capabilities shift a camera from a passive monitoring device where video was recorded for forensics purposes to proactive security assets – enhancing awareness, reducing risk, and enabling smarter, faster decisions.

Cameras as business intelligence tools

Today's IP cameras are generating actionable business insights by analyzing behavior and activities.

Foot traffic analysis and dwell time: Cameras track visitor counts, entry/exit flows, and the duration individuals spend in specific zones. Retailers use this data to optimize layout, staffing, and marketing, while transit hubs manage passenger flows and improve scheduling.

Heatmaps and space utilization: Visual heatmaps illustrate the most frequented areas, helping facility managers maximize space usage and enhance customer experiences. Airports and large venues use this data to improve crowd management and operations.

Customer and visitor analysis: AI-enabled cameras interpret movement and engagement patterns, enabling personalized promotions and operational improvements. Malls can identify peak food court times to adjust staffing, while transit hubs can improve wayfinding and manage passenger flows.

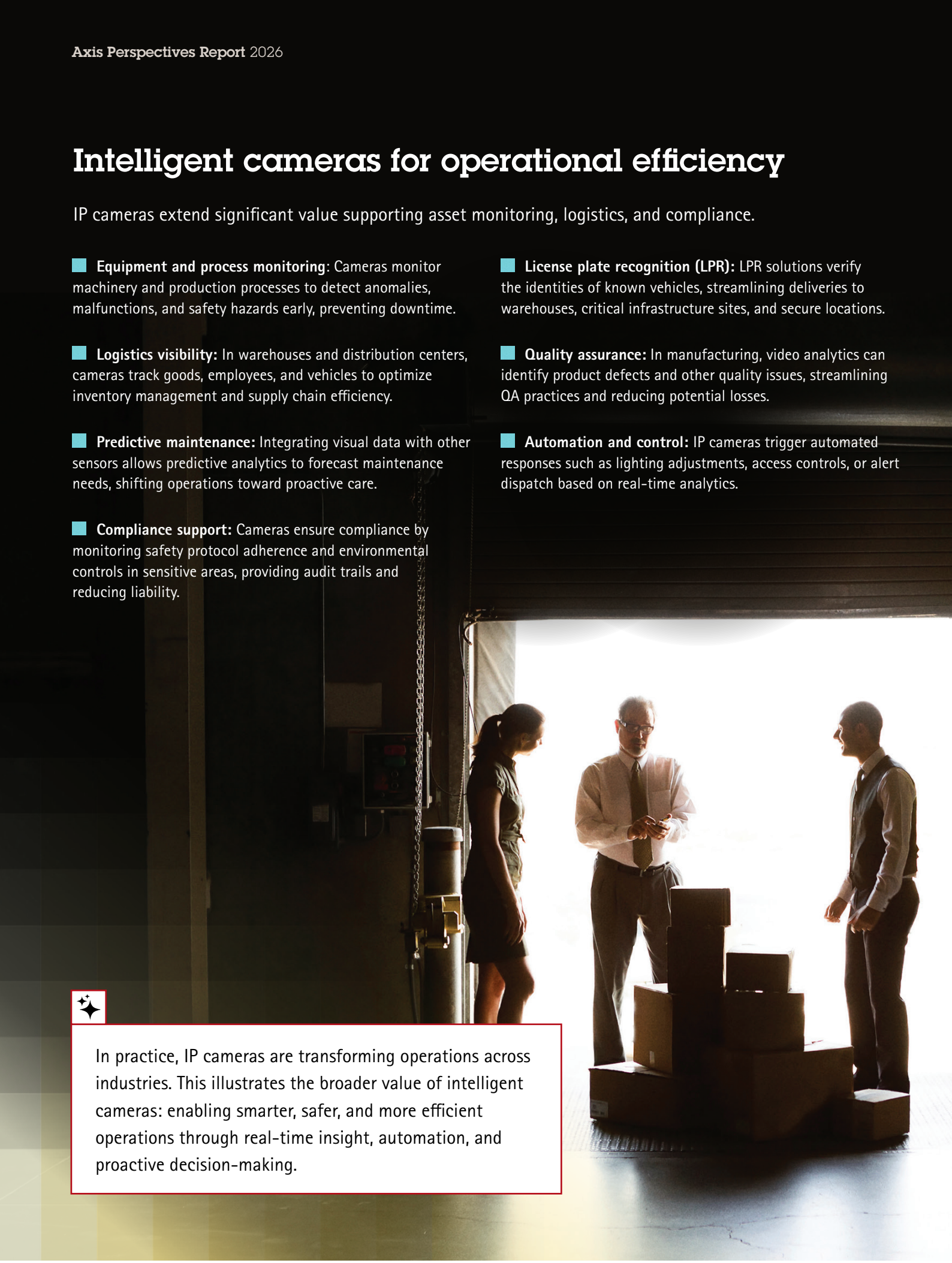
The increased processing power available to edge devices and at the core of networks means multiple video analytics can be run concurrently to provide use for both security and non-security workflows. Security vendors are creating new value by integrating together video-centric security systems, IoT devices, AI-powered intelligent software, and services. This expanded approach enables these solutions to serve workflows beyond an organization's security operations.

- Josh Woodhouse, Lead Analyst and Founder, Novaira Insights

Intelligent cameras for operational efficiency

IP cameras extend significant value supporting asset monitoring, logistics, and compliance.

- **Equipment and process monitoring**: Cameras monitor machinery and production processes to detect anomalies, malfunctions, and safety hazards early, preventing downtime.
- **Logistics visibility:** In warehouses and distribution centers, cameras track goods, employees, and vehicles to optimize inventory management and supply chain efficiency.
- **Predictive maintenance:** Integrating visual data with other sensors allows predictive analytics to forecast maintenance needs, shifting operations toward proactive care.
- **Compliance support:** Cameras ensure compliance by monitoring safety protocol adherence and environmental controls in sensitive areas, providing audit trails and reducing liability.
- **License plate recognition (LPR):** LPR solutions verify the identities of known vehicles, streamlining deliveries to warehouses, critical infrastructure sites, and secure locations.
- **Quality assurance:** In manufacturing, video analytics can identify product defects and other quality issues, streamlining QA practices and reducing potential losses.
- **Automation and control:** IP cameras trigger automated responses such as lighting adjustments, access controls, or alert dispatch based on real-time analytics.



In practice, IP cameras are transforming operations across industries. This illustrates the broader value of intelligent cameras: enabling smarter, safer, and more efficient operations through real-time insight, automation, and proactive decision-making.

Emerging modalities and multimodal AI

Advances in sensor technology and AI are pushing intelligent IP cameras beyond purely visual capabilities into multimodal analytical domains, enhancing situational awareness, detection accuracy, and contextual understanding. Cameras are increasingly becoming data-rich platforms capable of interpreting complex environments both in real time and over time.

- **Audio analytics:** Detecting sound events – such as raised voices, breaking glass, machinery noise, or gunshots – adds vital context that complements visual analysis for better threat detection, incident validation, or equipment monitoring.

- **Thermal imaging:** Thermal sensors offer visibility in low-light or obstructed conditions and can detect temperature variations for perimeter surveillance, asset monitoring, and fire prevention.

- **Environmental sensing:** Integrated or networked sensors measure air quality, humidity, or pollutants, supporting use cases in manufacturing compliance, cleanroom monitoring, and urban air quality assessment.

- **Radar integration:** Radar delivers range, speed, and motion data, enhancing detection where video alone may underperform, such as in poor lighting or bad weather. Radar-video fusion reduces false positives and improves motion tracking.

- **Text and license plate recognition (OCR/LPR):** Optical character recognition systems extract textual information – such as license plates, signage, or product labels – adding semantic context for access control, logistics tracking, and safety enforcement.

- **Object classification and metadata tagging:** AI-driven detection distinguishes between people, vehicles, or other objects and metadata tagging (e.g., size, direction, motion) enables advanced search, behavior analysis, and system-wide filtering.

- **Temporal and contextual analysis:** Timeline-based reasoning tracks how events evolve. This helps differentiate routine activity from emerging anomalies or risks in complex, dynamic environments.

By combining these diverse modalities, multimodal AI systems synthesize a richer, layered dataset that enhances decision-making and automation. They enable more nuanced event interpretation, reduce false alarms, and improve responsiveness in a wide range of environments.

By turning video into actionable insight, enterprises can reduce risk, accelerate response, and make smarter decisions that improve efficiency and customer experiences today, while building a scalable foundation for future growth.

- Verena Rathjen, Vice-President, EMEA, Axis Communications

Form factor expansion and specialized use cases

As intelligent camera technology evolves, form factors are diversifying to meet the distinct operational, environmental, and regulatory demands of various industries. This expansion is enabling more precise, scalable, and context-aware deployments across sectors such as public safety, healthcare, manufacturing, transportation, and critical infrastructure.

Bispectral: Cameras that capture both visible and thermal imagery simultaneously support complex use cases such as condition monitoring, industrial inspection, and concealed object detection.

Integrated audio and intercom: Devices with built-in microphones and speakers enable real-time two-way communication, enhancing visitor verification, access control, and emergency response workflows.

Thermal and specialized cameras: In sectors like healthcare, energy, and manufacturing, thermal imaging supports applications from elevated temperature detection to equipment monitoring and fire prevention in visually obstructed environments.

360°/Panoramic: Fisheye and multi-sensor cameras provide wide-area coverage from a single device, reducing blind spots and total camera count. These are increasingly deployed in transportation hubs, large retail spaces, and public venues.

Ruggedized and discreet: Designed for harsh or specialized conditions, rugged cameras are weather-resistant, vibration-proof, or explosion-protected. Meanwhile, compact or sensor-unit designs allow discreet installation in environments where aesthetics or discretion is critical.

Drone detection: IP cameras and drone detection solutions are used to detect, track, identify, and assess whether approaching drones pose a potential threat.

This broadening of camera form factors reflects a shift from static surveillance to highly adaptive, mission-specific tools. By selecting the right form factor for the environment and task, organizations can improve visibility, reduce infrastructure complexity, and unlock greater operational and strategic value.

Body worn cameras

Expanding applications and steady growth

Body worn cameras are seeing significant adoption beyond law enforcement, driven by rising demands for accountability, safety, and operational transparency. According to Omdia (2024)[12], the market is experiencing steady growth due to both technological evolution and expanding use cases across commercial sectors. Key trends include:

Open platform growth: Open-platform body worn solutions can be integrated into any VMS, increasing accessibility within a previously closed, subscription-based market.

Sector diversification: In addition to policing and corrections, body worn cameras are now used in retail, healthcare, transportation, and regulatory inspections to enhance staff safety, deter aggressive behavior, and document incidents.

Regulatory and legal drivers: Governments and oversight bodies increasingly mandate video documentation to support compliance and improve public trust.

Operational efficiency and evidence management: Cloud-connected body worn systems support centralized evidence storage and retrieval, streamlining workflows and incident resolution.

Return on investment: Despite upfront costs, reduced legal exposure, improved incident response, and better workforce protection generate long-term ROI.

Market outlook: Omdia forecasts 100% penetration of body worn cameras among frontline officers in multiple countries by 2028. Adoption in commercial markets continues to grow, favoring compact, cost-effective models with streamlined features.

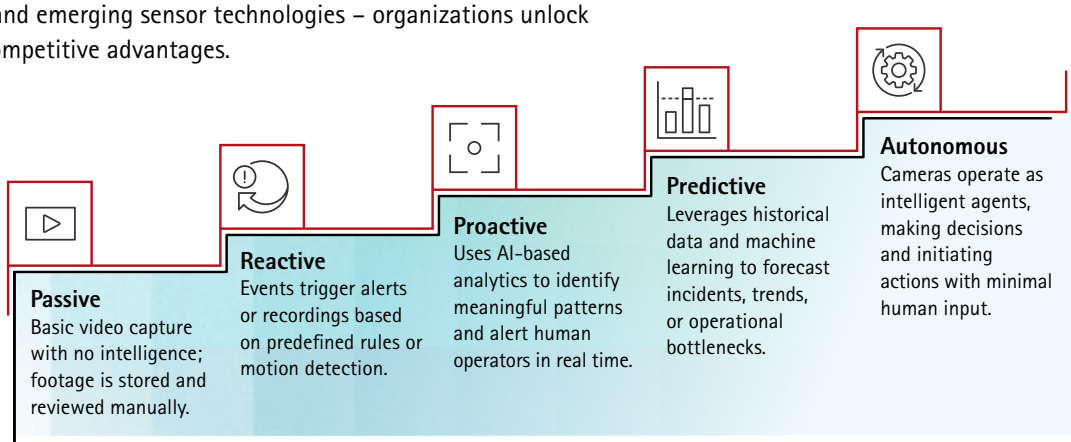
This evolution underscores the broader trend toward intelligent, wearable surveillance as part of integrated safety and accountability ecosystems.

The body worn camera market demonstrates steady technological and operational evolution. Consistent advancements have driven dual expansion: attracting new end user markets while deepening applications within established sectors.

– Paul Bremner, Principal Analyst, Physical Security, Omdia

A clear shift: intelligent IP cameras as strategic enterprise assets

The expanding role of IP cameras fundamentally transforms them from passive observation tools into dynamic, value-generating assets that enhance security, business intelligence, and operational efficiency. By embracing IP cameras as multifunctional enterprise resources – integrated with AI, IoT, and emerging sensor technologies – organizations unlock significant competitive advantages.



	Passive	Reactive	Proactive	Predictive	Autonomous
	Basic video capture with no intelligence; footage is stored and reviewed manually.	Events trigger alerts or recordings based on predefined rules or motion detection.	Uses AI-based analytics to identify meaningful patterns and alert human operators in real time.	Leverages historical data and machine learning to forecast incidents, trends, or operational bottlenecks.	Cameras operate as intelligent agents, making decisions and initiating actions with minimal human input.
Key capabilities	• Continuous recording • Live viewing • Manual video retrieval	• Motion detection • Basic event-based recording • Rule-based alerts	• Object classification (human, vehicle, etc.) • Behavioral analysis • Real-time alerts with contextual relevance	• Anomaly detection • Predictive modeling • Pattern recognition over time	• Real-time decision-making • Integration with automated systems (e.g., access control, robotics) • Self-learning capabilities
Value to business	• Documentation • Post-incident review • Evidence collection	• Reduced monitoring burden • Faster response times • Event filtering	• Prevent incidents • Improve safety and operational awareness • Focus attention on critical moments	• Risk mitigation • Operational optimization • Data-driven decision-making	• End-to-end automation • Reduced human workload • Scalability and responsiveness in complex environments

Enabling technologies and considerations

What's driving intelligence at the edge?

04

The transformation toward intelligent edge video solutions is being propelled by a powerful convergence of enabling technologies: AI, advanced imaging, cloud integration, and edge computing. Recent Axis data also reveals strong alignment among end users and system integrators around upgrading existing infrastructure, improving cybersecurity, integrating siloed systems, and leveraging emerging technologies. For system integrators, expanding beyond traditional security use cases to deliver operational and business insights is a growing differentiator. Together, these market drivers and technical capabilities are redefining surveillance.

Imaging advancements

Continued advancements in imaging technology have substantially enhanced how edge cameras perform, especially under challenging conditions. Notable developments include:

- **Resolution and detail preservation:** Higher-resolution image sensors now deliver sharper, more detailed imagery, enabling better object identification and broader coverage. This is increasingly important as AI analytics depend on clean, high-quality visual data for accurate interpretation.
- **Light sensitivity and dynamic range:** Enhanced low-light capabilities and wide dynamic range (WDR) imaging are improving visibility in scenes with backlight, glare, or deep shadows – common in applications like parking lots, entrances, and industrial yards.
- **Color accuracy:** Improvements in color fidelity support better distinction of objects and materials, aiding recognition tasks and operator interpretation.
- **Lens and optical improvements:** Advances in lens technology – such as wider apertures, motorized varifocal lenses, and multi-element optics – contribute to sharper, clearer images as well as flexible camera deployment.
- **Image stabilization:** Integrated stabilization reduces blurring caused by vibration or movement, important for cameras in dynamic or outdoor environments.
- **Advanced encoding and smart compression:** Edge devices use advanced encoding (e.g., H.264, AV1) and smart compression technology (e.g., Zipstream) to reduce bandwidth and storage requirements while preserving image quality. Intelligent algorithms dynamically adjust settings based on scene content and network conditions to maintain clarity.

These imaging advancements directly support end users' top priorities – particularly the 64% focused on upgrading existing infrastructure – by delivering enhanced resolution, color accuracy, and dynamic range that improve the reliability and performance of modern security systems. By enabling intelligent edge cameras to capture high-quality video suitable for both human monitoring and AI-driven analysis, even in challenging conditions, these innovations form the visual backbone of today's intelligent surveillance and monitoring solutions.

> AV1 allows for attractive bitrate and extended client compatibility. It's really a win for the industry. The keywords are 'easy access' and 'open.'
>
> – Johan Paulsson, Chief Technology Officer, Axis Communications

Data storage and efficiency

As organizations modernize their infrastructure, scalable and efficient video storage is becoming increasingly important – not only to manage growing data volumes, but also to ensure interoperability with cloud platforms and AI-driven analytics. This trend reflects the priorities of the 37% of end users investing in technologies that enable more intelligent, data-rich systems.

- **Efficient encoding:** The AV1 codec delivers a major advancement in compression efficiency, reducing bandwidth requirements by 30–50% compared to older standards like H.264. This enables equivalent video quality at lower bitrates – minimizing storage needs and enhancing streaming performance, particularly in edge-to-cloud workflows.
- **Adaptive streaming:** Techniques that dynamically adjust video resolution and bitrate based on network conditions ensure smooth playback and efficient bandwidth use, vital for remote viewing and cloud storage.
- **Privacy-safe retention:** As regulations tighten, intelligent systems are incorporating selective recording, metadata extraction, and anonymization, reducing risk while retaining insights.

To keep pace with rising video storage demands, many customers are shifting toward more flexible, scalable storage architectures – such as hybrid and edge cloud solutions. Efficient video storage and transmission will be a cornerstone of sustainable, scalable edge deployments – particularly as AI workloads and retention policies evolve.

For customers, intelligence at the edge means faster, smarter decisions, simplified operations, and stronger security – all delivered through flexible, future-proof platforms.

- Ettiene Van Der Watt, Vice-President, APAC, Axis Communications

AI and edge analytics

AI-powered analytics are revolutionizing how intelligence is generated and acted upon at the edge. By enabling real-time, data-driven insights with minimal latency, reduced bandwidth, enhanced privacy, and scalable deployment across diverse environments, these technologies are reshaping operational workflows and driving significant growth. Key advantages include:

Real-time intelligence: Edge AI enables cameras to analyze video streams locally, enabling low-latency detection, classification, and object tracking without sending raw data to the cloud. Gartner projects that by the end of 2025, over 55% of all deep neural network (DNN)–based data analysis will occur at the point of capture[13] – reinforcing the case for real-time, on-device analytics. Axis survey data shows 37% of respondents are actively investing in AI and IoT to drive automation, actionable intelligence, and operational efficiency.

Data-driven decision-making: Advanced AI models support analytics ranging from facial recognition to behavioral anomaly detection, underpinning automated decisions and operational workflows.

Bandwidth and privacy benefits: Processing data locally reduces network congestion and lowers bandwidth costs by sending only essential metadata, alerts, or annotated video to the cloud. Keeping sensitive information on-site also strengthens privacy, supports compliance, and mitigates data breach risks.

Scalable and distributed processing: Running AI models on heterogeneous edge hardware allows flexible deployment across diverse environments. Gartner notes in Predicts 2025[14]: Edge Computing Platforms Will Accelerate Edge AI, "infrastructure and operations leaders must be proactive in identifying use cases and enable this journey through a platform approach." This reflects a broader trend where edge-AI deployments are reaching a maturity inflection point, making it critical to align hardware, software, and services.

Open architecture and ecosystems

Flexibility and future-proofing are critical in IP camera deployments. Open architectures and ecosystem-based approaches provide that adaptability by enabling seamless integration and evolution. Axis survey findings reveal that unifying disparate security systems into a single cohesive platform ranks among the top three priorities for end customers, as organizations seek to simplify management and improve operational efficiency, with 41% of respondents* emphasizing its importance.

APIs and SDKs: Robust application programming interfaces and software development kits enable cameras and devices to plug into third-party applications, analytics platforms, cloud APIs, and automation workflows.

Vendor-neutral and standards-based platforms: Supporting open protocols and industry standards reduces vendor lock-in and ensures interoperable hardware and software.

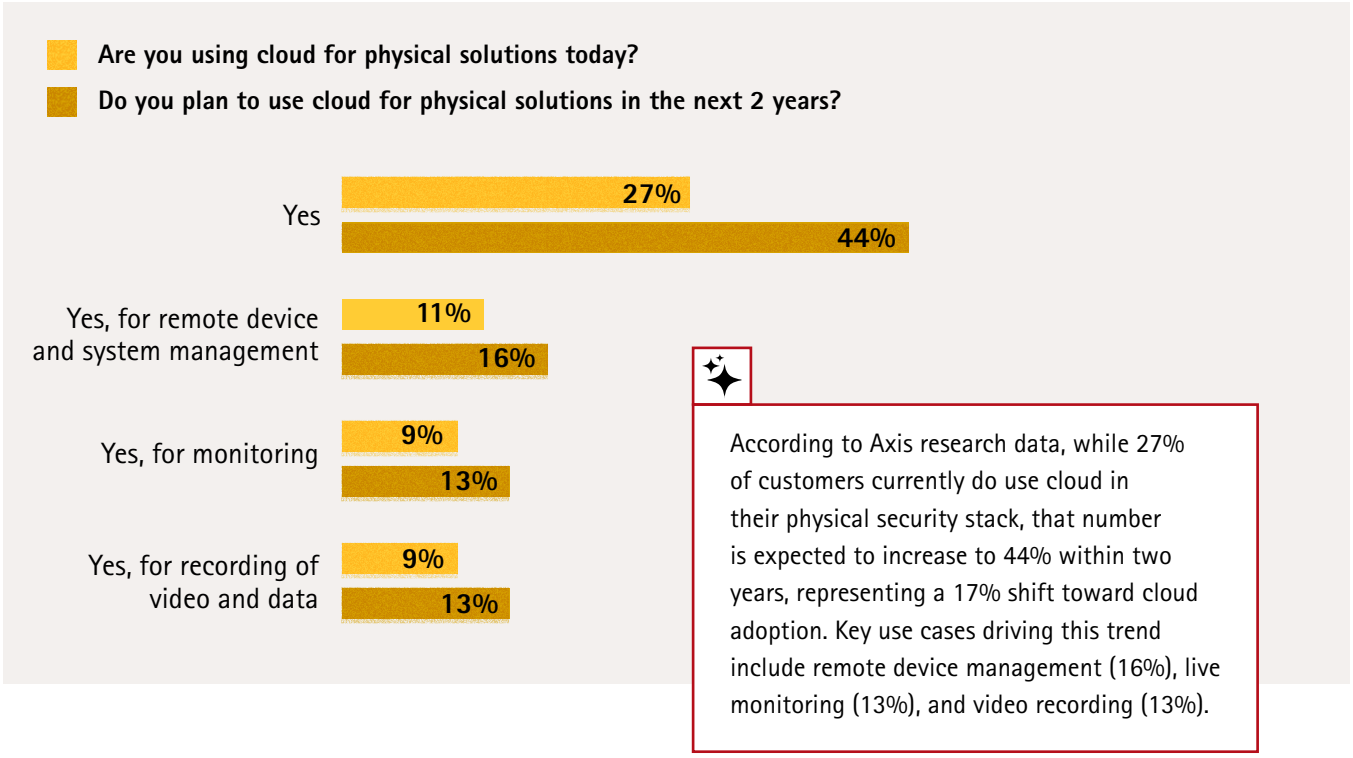
Innovation enablement via ecosystems: Open ecosystems expand partner networks, foster collaboration, and accelerate development of analytic apps, helping meet diverse customer needs.

Modularity and scalable architecture: Modular, scalable system designs simplify integration of emerging technologies while preserving existing investments, ensuring long-term adaptability and future-proofed deployments.

Edge/On premises/Cloud hybrid models: Modern deployments increasingly blend edge, on-premises, and cloud resources to optimize latency, bandwidth, and scalability. Open platforms support distributed architectures, enabling edge-to-cloud streaming, cloud-based AI, and centralized management.

The steady rise in cloud-connected camera deployments – with over 1.5 million Axis cameras now connected via a one-click cloud connection (O3C) service, AXIS Camera Station, Axis Cloud Connect, and partner platforms – further reinforces the market's readiness for hybrid and cloud-integrated architectures at scale.

An open, ecosystem-driven approach reflects industry momentum toward flexible, extensible architectures that foster collaborative innovation in IP camera deployments.



According to Axis research data, while 27% of customers currently do use cloud in their physical security stack, that number is expected to increase to 44% within two years, representing a 17% shift toward cloud adoption. Key use cases driving this trend include remote device management (16%), live monitoring (13%), and video recording (13%).

*see graph on page 12

Cybersecurity and lifecycle management

Security considerations underpin the IP camera ecosystem. As threats targeting connected devices continue to escalate, safeguarding edge deployments has become a strategic imperative. Axis survey data shows that cybersecurity now ranks as the #2 concern among end users, A&Es, and system integrators, highlighting growing awareness of risks tied to connected infrastructure.

#2

Axis survey data shows that cybersecurity ranks as the #2 concern among end users, Architects and Engineers, and system integrators.

- **Device hardening and built-in cybersecurity:** Modern edge cameras incorporate hardware-based security features like physically unclonable functions (PUF), ChipDNA, and secure boot to prevent unauthorized access or tampering. These safeguards are essential in a threat landscape where 99% of IoT exploitation attempts now rely on known CVEs[15] (Common Vulnerabilities and Exposures).

- **Data protection:** Encryption of data at rest and in transit, combined with strong access controls and multi-factor authentication, prevents interception or misuse of video and stored footage. With 78% of security and risk management (SR) professionals reporting potential breaches in the past year[16], these measures are foundational for protecting critical infrastructure.

- **Secure supply chain:** Ensuring device integrity throughout production and deployment is crucial to prevent tampering and counterfeit parts and guarantee devices function as intended. Trusted components, supply chain verification, and secure provisioning help mitigate risks, as insecure onboarding leaves networks vulnerable to unauthorized IoT devices.

- **Zero trust integration:** Cameras and edge systems are increasingly part of zero trust architectures, enforcing continuous verification, strict identity management, and minimal trust assumptions to limit lateral movement within networks and align with the modern cybersecurity principle of "assume breach."

- **Owning the technology:** By using vendors that own the entire technology stack rather than relying on OEM technology, vendors can rapidly develop firmware for all their camera models within a matter of days or even hours, and then efficiently deploy the new firmware.

Lifecycle management: Device management platforms enable secure installation, firmware updates, remote configuration, and system health monitoring throughout the entire product lifecycle. Predictive health analytics enable proactive maintenance, minimizing downtime and extending device longevity. Axis surveys show that upgrading existing infrastructure is a top priority for many organizations over the next 1–3 years, while NIST (National Institute of Standards and Technology) emphasizes that firmware updates and lifecycle visibility are essential for maintaining long-term security.

Total device strategy: Organizations are embracing end-to-end security strategies that span installation, network segmentation, secure onboarding, and long-term device support to ensure resilience. With global cybersecurity spending projected to grow at a 14.4% CAGR to $302.5B by 2029[17], enterprises increasingly prioritize device lifecycle management and cyber hygiene for edge deployments.

Together, these cybersecurity and lifecycle management practices help customers keep their intelligent edge systems protected from evolving threats while ensuring consistent uptime, smoother operations, and easier compliance across even the largest deployments.

05

Looking ahead: the next phase of intelligent video

Intelligent video is entering a new era – one defined not just by smarter cameras, but by a shift in how organizations think about security, data, and enterprise performance. As imaging, AI analytics, hybrid architectures, and secure lifecycle management converge, IP cameras have evolved into powerful edge platforms that deliver real-time insights across the business. Organizations are already moving in this direction, prioritizing modernization, unification, cybersecurity, and the adoption of AI, IoT, and cloud technologies.

What began as a security function is now expanding into broader operational and strategic value, enabling teams to improve safety, streamline processes, optimize resources, and make more informed decisions. This creates new expectations for integrators, technology providers, and end users – demanding deeper expertise, stronger security practices, and seamless integration across ecosystems.

Success from here will hinge on how well organizations bring these technologies together and overcome challenges like legacy integration, data complexity, and workforce adoption. Those that get it right will turn intelligent video into a long-term competitive advantage.

The intelligent camera has become a true strategic asset. And as organizations embrace more connected, AI-enabled, and secure video systems, the question is no longer if video will shape the future of operations and decision-making – but how far its impact will reach.

Appendix

Any mention of external analyst research is not an endorsement of Axis, and use of such information is at the reader's own discretion.

Sources of industry and Axis research data cited in this report:

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About Axis Annual Surveys / Global Research

Axis Global Research refers to the company's global partner, A&E, and end customer surveys conducted on an annual basis during Q2 2025. The Axis sales channel survey targeted Axis distributors and channel partners across 68 countries, resulting in about 3,100 responses after data cleaning. The Axis end customer survey was sent to Axis end customers in 65 countries, gathering about 1,000 responses after data cleaning. The Axis A&E survey targeted the members of Axis A&E (Architect & Engineers) Program across 39 countries, gathering 278 responses after data cleaning.

These online surveys included questions designed to explore business priorities and impactful trends expected to influence respondents in the near future.

Business priorities

For end customers, the question read: *"Over the next 1-3 years, what key areas will require your primary attention to drive success in your role?"*

For distributors and channel partners, the question read: *"Over the next 1-3 years, which areas do you think will be MOST important for you to focus on to remain competitive?"*

Response options included upgrading and modernizing existing infrastructure, improving cybersecurity and data protection, integrating systems into unified platforms, investing in emerging technologies, building strategic partnerships, developing employee skills, accelerating digital transformation initiatives, and providing open-ended responses, with options tailored slightly by respondent group based on their business context. Respondents were allowed to select multiple answers.

Trends

For end customers, the question read: "*Which of the following trends do you consider MOST significant for your business in the near future?"*

For distributors, channel partners, and A&Es, the question read: *"Which of the following trends do you think will be MOST important for our industry in the near future?"*

Response options included AI and analytics, cybersecurity, risk and privacy, system integration, ethics and trust, environmental sustainability, cloud computing, and an open-ended "other" option. Respondents were allowed to select multiple answers.

Cloud use for physical security solutions

Two questions were asked to Axis end customers:

"Are you using cloud for physical security solutions today?

"Do you plan to use cloud for physical security solutions in the next 2 years?"

Response options included no usage, multiple forms usage such as recording, monitoring, and remote device or system management, as well as "other" and "no opinion" selections. Respondents were allowed to select multiple answers.

Use cases / Business drivers

For end customers and A&Es, the question read: *"To what extent do you see video surveillance systems being used for the following purposes?"*

The available response options were identical for both respondent group and included security, safety, business intelligence, and operational efficiency. Respondents were allowed to select multiple answers.

About Axis Communications

Axis enables a smarter and safer world by improving security, safety, business intelligence, and operational efficiency. As a network technology company and industry leader, Axis offers video surveillance, access control, intercoms, and audio solutions. These are enhanced by intelligent analytics applications and supported by high-quality training.

Axis has around 5,000 dedicated employees in over 50 countries and collaborates with technology and system integration partners worldwide to deliver customer solutions. Axis was founded in 1984, and the headquarters are in Lund, Sweden.

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