Certain information and statistics presented in this section and elsewhere in this document were derived from official government publications and other publicly available sources as well as from the Frost & Sullivan Report, a market research report prepared by Frost & Sullivan, an independent global consulting firm that was commissioned by us. We believe that the sources of the information in this section and elsewhere in this document are appropriate sources for such information and reasonable care has been taken in extracting and reproducing such information. We have no reason to believe that such information is false or misleading or that any part has been omitted that would render such information false or misleading. The information from official and non-official sources has not been independently verified by us or any other parties involved in the **[REDACTED]***, or any of our or their respective directors, officers, or representatives, and no representation is given as to its accuracy or completeness. Accordingly, you should not place undue reliance on such information and statistics. For discussions of risks relating to our industries, see "Risk Factors — Risks Relating to Our Business and Industry."*

SOURCE OF INFORMATION

We commissioned Frost & Sullivan to conduct market research on Global and China's spatial intelligence human-centric spatial intelligence system industries and prepare the Frost & Sullivan Report. Frost & Sullivan is an independent global consulting firm founded in 1961 in New York that offers industry research and market strategies. We have contracted to pay RMB860,000 to Frost & Sullivan for compiling the Frost & Sullivan Report.

In preparing the Frost & Sullivan Report, Frost & Sullivan conducted detailed primary research which involved discussing the status of the industry with certain leading industry participants and conducting interviews with relevant parties. Frost & Sullivan also conducted secondary research which involved reviewing company reports, independent research reports and data based on its own research database. Frost & Sullivan obtained the figures for the estimated total market size from historical data analysis plotted against macroeconomic data as well as considered the above-mentioned industry key drivers. Its market forecasting methodology integrates several forecasting techniques with the market measurement-based system and relies on the expertise of the analyst team in integrating the critical market elements investigated during the research phase of the project. These elements primarily include expert-opinion forecasting methodology, integration of market drivers and restraints, integration with the market challenges, integration of the market measurement trends and integration of econometric variables.

The Frost & Sullivan Report is compiled based on the following assumptions: (i) the social, economic and political environment of the globe and China is likely to remain stable in the forecast period; and (ii) related industry key drivers are likely to drive the market in the forecast period.

OVERVIEW OF GLOBAL AND CHINA'S HUMAN-CENTRIC SPATIAL INTELLIGENCE PRODUCTS AND SOLUTIONS INDUSTRY

Introduction of Spatial Intelligence

Spatial intelligence refers to the seamless integration of artificial intelligence (AI) within physical environments, enabling them to perceive, interpret, and coordinate interactions among people, objects, and spaces. Unlike traditional IoT systems that depend on isolated devices and predefined rules, spatial intelligence emphasizes contextual awareness, adaptive learning, and cross-system collaboration. It establishes the foundation for environments capable of continuously learning from spatial data and human behavior, evolving from reactive automation toward increasingly autonomous and intelligent spatial ecosystems.

Introduction and Evolution of Human-Centric Spatial Intelligence

As spatial intelligence continues to advance, human-centric spaces—comprise residential spaces and commercial spaces—have emerged as the most natural and promising foundation for its development. These environments are characterized by a high density of physical interactions, diverse behavioral scenarios, a wide array of intelligent devices, and increasingly complex user demands—all of which create ideal conditions for the application and evolution of spatial intelligence.

Residential spaces focus on daily living, personal comfort, and household-level interactions. Commercial spaces address broader, public-oriented needs related to consumption, work, hospitality, and public services. These include large-scale facilities such as shopping malls, office buildings, hotels, elderly care centers, hospitals, schools, cultural venues, and community centers—each with distinct functional requirements and technical challenges that demand intelligent, adaptive solutions.

A clear reflection of the shift toward human-centric spatial intelligence can be seen in how people interact with information. Previously, users actively searched for the content they needed. Today, with AI advancements, information increasingly finds the user through personalized feeds, predictive recommendations, and context-aware push services—a shift from reactive interaction to anticipatory intelligence. Similarly, in the human-centric spatial intelligence industry, a parallel transformation is occurring in spatial environments, where intelligent systems are evolving from executing preset commands to actively perceiving human contexts and responding in real time. The following chart illustrates the three progressive stages in the evolution of human-centric spatial intelligence.

The Three Stages of the Development of Human-Centric Spatial Intelligence

	Since 2000	Since 2011	Since 2023
	Stage 1	Stage 2	Stage 3
	Single-product Intelligence	Whole-house Intelligence	Proactive AI-driven Spatial Intelligence
Coverage	Individual devices and single rooms	Connected and integrated systems across entire human-centric spaces	Comprehensive proactive AI-driven environmental awareness including user behavior and conditions
Key Characteristics	Isolated device control	Coordinated device control and semi-automation	Multi-dimensional perception and proactive environmental adaptation
User Interaction	Manual control via apps, voice or physical interfaces	Semi-automated through preset scenes and manual activation	Proactive AI-driven anticipatory responses without user intervention
Main Connection Modes	Devices connect independently, mainly enabling simple remote-control functions	A unified gateway device is introduced to enable centralized management of multiple devices and scenario-based automation	Connection methods diversify to enable cross-network and cross-ecosystem integration, while protocols with limited scalability show reduced adaptability
AI Intelligence level	Command execution only	Rule-based automation following preset logic	Proactive AI-driven decision-making
Core Technologies	Standalone smart devices	Central hubs with communication protocols and scene management	Advanced multi-dimensional sensing, AI algorithms and edge computing
Typical Applications	Smart bulbs, smart locks, robotic vacuums, etc.	Preset modes and scenes such as morning routine, home away mode, security mode, etc.	Customizable, intelligent applications across residential and commercial spaces

Source: Frost & Sullivan

These three stages illustrate a clear progression in the capabilities of intelligent environments—from perception to integration, and finally to autonomy. This evolution is paving the way for proactive AI-driven spatial intelligence, which represents the definitive future of the field. The use of proactive AI, representing a key feature of Stage 3, is continuously driving the transition toward fully adaptive, human-centric spatial ecosystems with the increasing penetration rate.

Definition and Classification of Human-Centric Spatial Intelligence Products and Solutions

Human-centric spatial intelligence products and solutions comprise two core segments: spatial intelligence infrastructure and intelligent terminal devices.

Serving as the technological backbone of intelligent environments, ***spatial intelligence infrastructure*** integrates multimodal sensors, intelligent hubs, decision-making modules, and edge controllers into a unified network. This infrastructure provides the foundation for perception, data processing, and control, enabling real-time awareness and adaptive decision-making. It occupies a central strategic position as the foundational layer that supports and coordinates all terminal devices. Once deployed, its embedded nature creates significant switching costs and customer stickiness, fostering strong retention and recurring revenue potential. This segment represents a key driver of future development of spatial intelligence—where scalable, adaptive, and data-driven systems are essential to meeting rising expectations for energy efficiency, convenience, and intelligence.

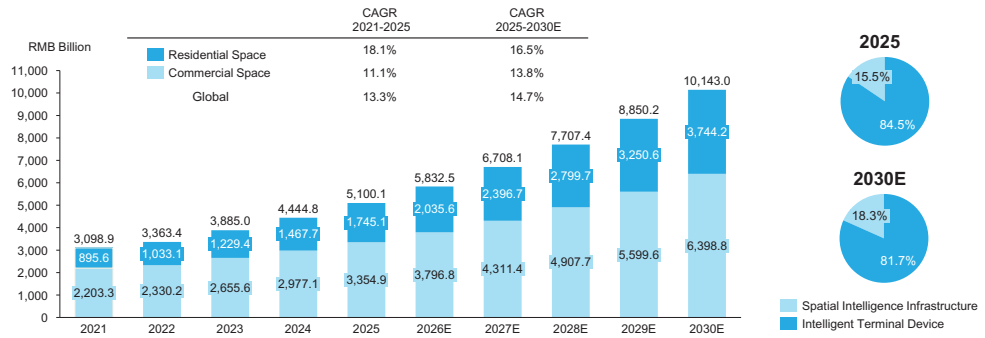
Intelligent terminal devices—including lighting, security systems, appliances, and energy management tools—execute the commands issued by the spatial intelligence infrastructure.

Market Size of Global and China's Human-Centric Spatial Intelligence Products and Solutions

The market size of human-centric spatial intelligence products and solutions represents the total addressable market for intelligent systems deployed across single-product intelligence (Stage 1), whole-house intelligence (Stage 2) and proactive AI-driven intelligence (Stage 3).

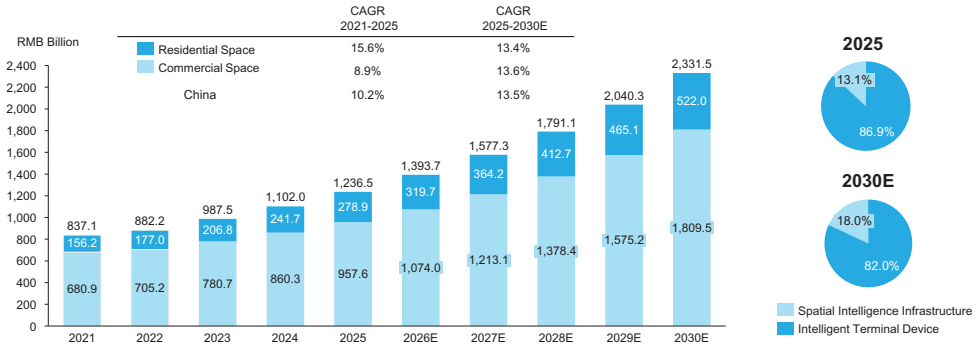
Within the market of human-centric spatial intelligence products and solutions, the infrastructure segment is the fastest-growing submarket, serving as the foundational backbone that supports intelligent terminal device and ensures seamless interoperability. By enabling unified connectivity and system coordination, spatial intelligence infrastructure effectively addresses fragmentation and complexity in intelligent applications.

Global Market Size of Human-Centric Spatial Intelligence Products and Solutions by Revenue, 2021-2030E



Source: International Data Corporation (IDC), Frost & Sullivan

China's Market Size of Human-Centric Spatial Intelligence Products and Solutions by Revenue, 2021-2030E



Source: IDC, National Bureau of Statistics of the People's Republic of China, Frost & Sullivan

Key Application Scenarios of Human-Centric Spatial Intelligence Products and Solutions

Human-centric spatial intelligence products and solutions play a pivotal role in addressing key challenges across both residential and commercial spaces. By integrating infrastructure with intelligent terminal devices, the system forms a comprehensive, closed-loop process—from data sensing and network connectivity to intelligent control. Together, these products and solutions enhance living quality in homes while driving cost reduction, operational efficiency, and intelligent management in commercial environments, supporting scalable, adaptive, and context-aware intelligent services throughout the evolution of spatial intelligence.

In residential spaces, residents frequently face problems such as inadequate comfort, high energy consumption, security risks, complicated and expensive maintenance, and poor device interoperability. The human-centric spatial intelligence products and solutions address these challenges through a unified architecture that autonomously manages lighting, HVAC (heating, ventilation, and air conditioning), and other household appliances. Multiple user interfaces—including mobile apps, voice assistants, and scene panels—simplify interactions, making them more intuitive and accessible. Crucially, in proactive AI-driven spatial intelligence (Stage 3) the embedded AI continuously learns from user behavior and environmental data, anticipating needs and autonomously adjusting device settings—for example, pre-heating or cooling rooms, controlling lighting, or issuing anomaly alerts.

In commercial spaces, users face challenges such as energy inefficiency, high maintenance costs, inconsistent ambient conditions, security risks, and fragmented system management. Human-centric spatial intelligence products and solutions address these challenges through a unified infrastructure integrating multimodal sensing, AI analytics, and intelligent terminal devices. Real-time monitoring of occupancy, environmental conditions, and energy use allows automated adjustment of lighting, HVAC, and other systems, enhancing comfort, efficiency, and safety. Centralized control and predictive AI capabilities enable proactive maintenance, dynamic resource allocation, and anticipatory management, shifting operations from reactive to intelligent. Key examples with high market growth potential include: ***zero-carbon parks***, which optimize energy use and systems like lighting, irrigation, and HVAC to reduce emissions and costs while enhancing visitor experience; ***offices***, where AI-driven monitoring and automation improve energy efficiency, comfort, and productivity; ***smart assisted living***, enabling real-time environmental monitoring, personalized interventions, and data-driven care to enhance resident safety and well-being; and ***commercial properties*** such as retail centers, hotels, and hospitals, where AI optimizes comfort, energy use, security, and operations to boost customer satisfaction and operational efficiency.

OVERVIEW OF GLOBAL AND CHINA'S HUMAN-CENTRIC SPATIAL INTELLIGENCE INFRASTRUCTURE INDUSTRY

Product and Technology Architecture of Human-Centric Spatial Intelligence Infrastructure

The human-centric spatial intelligence infrastructure not only enhances operational efficiency, safety, and security within spaces but also empowers terminal device with advanced sensing and autonomous decision-making capabilities. By enabling real-time data exchange and inter-device collaboration, the infrastructure transforms traditionally isolated devices into a coordinated system, allowing terminal device to evolve from passive responders into active, intelligent nodes capable of perceiving environmental changes and making autonomous decisions. This closed-loop, adaptive system continuously learns and optimizes itself, driving performance improvements across the entire spatial intelligence ecosystem.

The infrastructure operates through a coordinated framework of four key capabilities:

1) *Recognition & Perception Layer* utilizes multimodal sensors to capture multidimensional data—including presence (1D data), movement (2D data), audiovisual inputs (3D data), and time-based environmental changes (4D data). This rich, structured data provides comprehensive input to the system, enabling accurate understanding of both spatial and temporal contexts. By ensuring robust and precise data acquisition, this layer forms the essential foundation for downstream cognitive processing and intelligent decision-making.

2) *Cognition & Decision-making Layer* transforms raw sensory data into intelligent actions by integrating inputs through intelligent hub and decision-making products and the cloud platform. It standardizes diverse data formats, extracts key features, and applies cloud-based AI algorithms for deep analysis and scenario modeling. Through continuous learning, the system refines its understanding of context and formulates adaptive strategies. Final decisions are translated into actionable instructions and dispatched to the execution layer, enabling real-time, context-aware responses across complex environments.

3) *Execution & Reshaping Layer* translates decisions into real-world actions through intelligent controllers, which carry out targeted functions across environments. These controllers ensure real-time responsiveness and coordinated operation. Continuous feedback from the system supports a closed-loop optimization process, allowing AI models to refine their parameters, enhance adaptability, and dynamically evolve in response to changing conditions. This capability enables the environment not only to respond efficiently but also to anticipate and adapt to future needs.

4) *Connectivity & Convergence Layer* ensures the seamless operation of human-centric spatial intelligence infrastructure by providing stable, multi-protocol connectivity that enables real-time collaboration and data interoperability among diverse intelligent devices. This interconnected framework ensures continuous data flow between cloud, edge, and control nodes, forming the foundation for AI-driven intelligence, automation, and adaptability. By integrating data, connectivity, and AI, the infrastructure can perform real-time perception, context-aware decision-making, and adaptive execution, transforming traditional spaces into dynamic, self-optimizing environments. This layer enhances infrastructure operational efficiency, enables precise coordination of resources, and delivers highly personalized and responsive experiences for users.

Governance is a key aspect of the human-centric spatial intelligence infrastructure, implemented through the policies component of spatial ontology framework. These policies define principles such as privacy, data minimization, user consent, and compliance, ensuring that all system actions operate within regulatory and ethical boundaries.

In the infrastructure architecture, data is not only an information carrier but also the core resource driving proactive AI-driven intelligence (Stage 3). Controlling and analyzing data provides strategic insight into the physical world, enabling effective decision-making and optimized operations. AI algorithms process massive, multi-modal data into four types of structured information: objects—physical entities in space; relations—connections between objects; actions—potential operations of objects or systems; and policies—decision rules for different scenarios. Leveraging this structured framework, the human-centric spatial intelligence infrastructure converts complex, multi-dimensional environmental information into actionable cognitive models, supporting AI training, analysis, personalized instruction generation, real-time decision-making, and adaptive optimization. The deep integration of data and AI enables the transformation of static environments into dynamic, self-optimizing, and user-customized intelligent spaces, completing a closed loop across the four layers and achieving proactive sensing and adaptive management.

Analysis of Human-Centric Spatial Intelligence Connectivity Protocols and Compatibility Development

The realization of human-centric spatial intelligence with proactive AI capabilities relies on a robust infrastructure that supports multi-protocol convergence. By accommodating diverse connectivity standards, the infrastructure ensures stable interconnection and seamless collaboration among intelligent devices across different brands, types, and functions. This interoperability forms the backbone of the system, enabling real-time data exchange, coordinated operation, and adaptive intelligence. Mainstream connectivity protocols for spatial intelligence generally fall into two categories:

- ***Wired protocols*** offer communication between devices through physical cables. They offer high stability and security, making them suitable for core control scenarios requiring real-time performance and reliability. However, they involve complex wiring, higher costs, and are difficult to upgrade or modify. Major wired protocols include KNX and PLC.

- ***Wireless protocols*** provide communication between devices via wireless signals. They provide flexible deployment and lower costs, making them ideal for dense device networks and scenarios needing frequent expansion or upgrades. As the technology continues to mature, they are increasingly applied in diverse scenarios such as homes, smart buildings, and commercial complexes. Major wireless protocols include Zigbee, Wi-Fi, and Bluetooth Mesh.

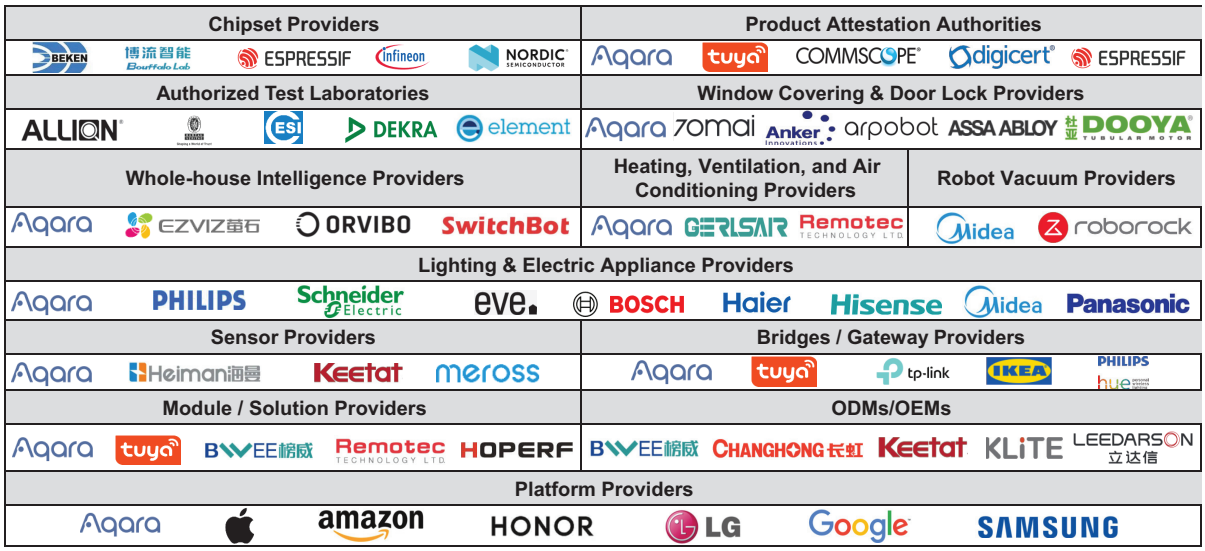
As human-centric spatial intelligence advances to proactive AI-driven spatial intelligence (Stage 3), connectivity protocols must meet increasingly complex requirements. Hybrid wired and wireless approaches are widely adopted. Wired protocols are essential in scenarios with high device density or strict requirements for connection stability, such as large commercial buildings or mission-critical systems, providing reliable, low-latency communication. Wireless protocols enable flexible deployment, scalability, and rapid integration, suitable for dynamic or expanding networks. Advanced protocols such as Zigbee 3.0, Wi-Fi 6/7, and 5G/6G support mesh networking, low power consumption, and high-bandwidth communication, enabling large-scale, adaptive environments.

As spatial intelligence evolves, the industry is moving toward unified, standardized connectivity frameworks that integrate wired and wireless technologies. This convergence ensures cross-device interoperability, simplified system management, and scalable deployment, supporting fully adaptive, context-aware spatial intelligence in residential and commercial spaces.

Matter, an open-source, IP-based IoT protocol led by the Connectivity Standards Alliance and supported by major players such as Apple, Amazon, and Google, provides secure, cross-brand interoperability across Ethernet, Wi-Fi, and Thread. Leveraging Thread mesh networking and supporting multiple underlying protocols, Matter balances cost, performance, and scalability, laying a foundation for widespread adoption of human-centric spatial intelligence. As of March 2026, over 270 global companies participated in the Matter ecosystem, with more than 5,700 certified devices, and projections indicate a

400-fold increase by 2030. Matter not only standardizes secure device connectivity but also simplifies setup and enhances user experience, driving ecosystem integration, fostering innovation, and supporting sustained industry growth.

Global Major Market Participants in Matter Ecosystem, 2025



Source: Frost & Sullivan, CSA

Note: Only a selected subset of representative companies is listed above.

Penetration Rate of Proactive AI in Global and China's Human-Centric Spatial Intelligence Infrastructure

Proactive AI in Stage 3 human-centric spatial intelligence anticipates user intent, interprets environmental context in real time, and autonomously adapts system behavior, transforming devices from passive automation into intelligent, adaptive systems.

In residential spaces, proactive AI adoption within infrastructure remains in its early stage, with penetration rates of 8.0% globally and 8.6% in China as of 2025. However, as consumer demand for seamless automation grows and intelligent infrastructure becomes more affordable, penetration is expected to rise sharply to 62.5% globally and 66.0% in China by 2030, reflecting its accelerating mainstream adoption.

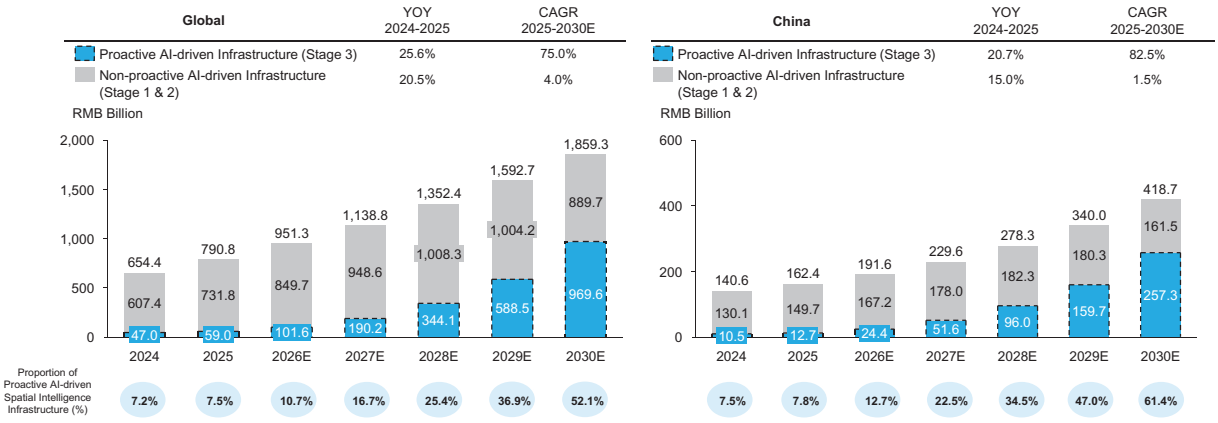
In commercial spaces, proactive AI infrastructure adoption currently shows lower penetration, at 7.2% globally and 7.6% in China in 2025. Its deployment is concentrated in high-value scenarios such as intelligent building management, energy optimization, smart retail, and predictive facility maintenance. Commercial users benefit from stronger ROI drivers, large-scale implementations, and deep integration with enterprise IT systems. Additionally, growing demand for green, low-carbon buildings and stricter sustainability and regulatory requirements are further accelerating adoption. By 2030, proactive AI penetration in commercial space infrastructure is projected to reach 46.0% globally and 60.0% in China, driven by the need for operational efficiency, predictive service delivery, and AI-native facility management.

Market Size of Global and China's Human-Centric Spatial Intelligence Infrastructure

The global market size is experiencing explosive growth, fueled by the rising demand of proactive AI-driven human-centric spatial intelligence infrastructure for adaptive and intelligent environments. In

residential spaces, intelligent infrastructure autonomously adjusts to user behavior and environmental conditions in real time, improving comfort, safety, and energy efficiency without manual input. In commercial spaces, intelligent infrastructure enables proactive AI-driven automation and predictive analytics to optimize energy usage, enhance operational workflows, and strengthen security.

Market Size of Global and China's Human-Centric Spatial Intelligence Infrastructure by Revenue, 2024-2030E



Source: IDC, National Bureau of Statistics of the People's Republic of China, Frost & Sullivan

Market Drivers and Developing Trends Analysis of Global and China's Human-Centric Spatial Intelligence Infrastructure Industry

Policies Support

Policy initiatives are playing an increasingly critical role in shaping and accelerating the development of human-centric spatial intelligence infrastructure industry worldwide. In China, the State Council's "Opinions on Deeply Implementing the AI+ Initiative" (《关于深入实施"人工智能+"行动的意见》), released in August 2025, advocates for the "intelligent interconnection of everything." This strategy promotes the widespread adoption of intelligent terminal device and, more importantly, the development of a comprehensive intelligent infrastructure system to support full-scenario intelligent interaction. It targets key sectors including AI-powered products and spatial intelligence infrastructure, with penetration of AI-driven intelligent devices expected to exceed 70% by 2027 and reach 90% by 2030. Complementing this, the "Guiding Opinions on Vigorously Developing Digital Consumption and Creating a Better Life in the Digital Era" (《关于大力发展数字消费共创数字时代美好生活的指导意见》), released in September 2025, outlines a clear roadmap for accelerating infrastructure innovation in human-centric spaces—emphasizing interoperability, security, and ecosystem integration. As of March 2026, the "15th Five-Year Plan"(《十五五规划》) has formally designated AI as the strategic core of frontier technology.

In the United States, the "AI Action Plan" (July 2025) focuses on developing national AI standards and regulatory frameworks, aiming to integrate AI-driven infrastructure into education, work, and daily life. This underscores the importance of standardized, reliable, and scalable infrastructure as a prerequisite for AI-driven applications. Meanwhile, the European Union's "Artificial Intelligence Act" (effective August 2024), the world's first comprehensive AI legislation, sets clear legal and ethical standards for AI deployment. This regulatory clarity is accelerating responsible and trustworthy integration of AI-driven infrastructure into spatial intelligence systems, reinforcing the European Union's leadership in human-centric, sustainable AI development. Taken together, these policy frameworks reflect a global trend: moving beyond isolated smart devices toward infrastructure-centered, interconnected spatial intelligence ecosystems.

Frontier Technologies Enabling Development

The advancement of human-centric spatial intelligence products and solutions fundamentally relies on the construction of intelligent infrastructure that integrates multiple enabling technologies—IoT, edge computing, 5G, digital twins, and most critically AI. IoT provides comprehensive environmental data, edge computing ensures low-latency processing, and AI embedded in infrastructure enables data aggregation, analysis, and intelligent coordination across devices and systems. Digital twins support real-time virtual simulations and scenario modeling. Together, these technologies form a scalable, interoperable, and robust foundation that transforms spatial intelligence from passive automation into responsive, human-centric ecosystems. In practical deployment, intelligent infrastructure serves as the backbone for spatial intelligence applications. As human-centric spatial intelligence evolves toward stage 3, proactive AI is increasingly embedded across cloud, edge, and endpoint nodes, enabling autonomous decision-making, anticipatory actions, and context-aware personalization. By orchestrating these capabilities through a unified infrastructure, stage 3 systems transform raw data into adaptive, self-optimizing behaviors, establishing the strategic core of next-generation spatial intelligence ecosystems.

Data-Driven Value Creation

With the rapid development of human-centric spatial intelligence infrastructure, physical space data—scarce and highly valuable—has become a key driver of industry innovation and competition. Automated data collection and processing enable the system to efficiently capture multi-source, multi-modal information, which, through a semantic operating system, is structured and mapped to unify the management of objects, relations, actions, and policies, creating reusable data assets with long-term value. The accumulation and intelligent utilization of these assets also drive diversified revenue streams, including hardware sales of smart products, platform subscriptions for enterprise and consumer data services, customized industry solutions, and revenue sharing through open platforms and partner ecosystems. These capabilities allow spatial intelligence systems to move from passive response to proactive optimization, achieving real-time perception and dynamic adaptation to environments and user needs, and delivering personalized, intelligent space management and superior user experiences.

Ecosystem Openness and Cross-Platform Interoperability

The evolution of human-centric spatial intelligence is entering a critical stage, increasingly centered on infrastructure-level interoperability to address rapidly rising user expectations for seamless intelligent experiences and the industry's growing demand for upstream–downstream integration. While traditional local protocols such as ZigBee and Bluetooth Low Energy (BLE) provide stable device-level connectivity, emerging open standards like Matter elevate interoperability to the platform layer, enabling unified control across heterogeneous systems and significantly reducing integration complexity. At the system level, intelligent infrastructure serves as the connective backbone, supporting open APIs (Application Programming Interface) and standardized data interfaces that enable real-time data sharing, remote orchestration, and cross-system intelligence. Leading industry participants are actively building open cloud-based ecosystems, empowering third-party developers to create customized applications, automate workflows, and access granular device telemetry.

Entry Barrier and Key Success Factor Analysis of Global and China's Human-Centric Spatial Intelligence Infrastructure Industry

Technology Barrier

The human-centric spatial intelligence infrastructure industry faces high technology barriers due to the complexity of integrating IoT, edge computing, 5G, digital twins, and AI into cohesive, scalable systems. Proactive AI-driven human-centric spatial intelligence requires infrastructure capable of autonomous decision-making, anticipatory actions, and context-aware personalization. Delivering this level of

intelligence demands multimodal sensing, real-time data processing, analyzing, controlling, and optimized AI algorithms across cloud, edge, and device layers. Achieving seamless interoperability among diverse devices and platforms, while meeting stringent standards for reliability, security, and data privacy, further increases the technical challenge.

Product and Data Barrier

The human-centric spatial intelligence infrastructure industry has high entry barriers due to product complexity and data demands. Solutions require integrating advanced AI with diverse hardware, robust multimodal sensing, and real-time processing, supported by massive, high-quality, continuously updated data. Leading companies turn fragmented data into structured assets through a unified semantic layer, enhancing value and deployment, with interoperability, evolving standards, and strict security and privacy further reinforcing these barriers.

Distribution Channel Network Barrier

The human-centric spatial intelligence infrastructure industry faces high distribution channel network barriers, as building extensive, multichannel networks requires significant time and effort. New entrants risk disruptions and higher costs, while leading players leverage established networks to ensure availability, service quality, and resilience, reinforcing competitive advantages.

Ecosystem Barrier

The human-centric spatial intelligence infrastructure industry is defined by a complex ecosystem, where the primary barrier to entry lies in establishing and sustaining open, interoperable networks driven by unified standards, protocols, and open APIs. Leading players invest heavily in creating inclusive environments that support third-party developers, device manufacturers, and service operators, fostering innovation while ensuring compatibility and security. For new entrants, the challenges are significant: gaining ecosystem trust, achieving interoperability, and attracting partners without mature platforms or adherence to standards is difficult.

Competitive Landscape of Global Human-Centric Spatial Intelligence Infrastructure Industry

The human-centric spatial intelligence infrastructure industry is represented by four key types of players, each characterized by distinct business models. These diverse approaches highlight the broader need for an integrated model to deliver seamless spatial intelligence across complex environments.

- ***Traditional Hardware Providers***: specialize in reliable, scenario-focused components such as environmental sensors, intelligent hub and controlling products. Their expertise in manufacturing and quality control delivers dependable product performance. However, their intelligent capabilities are usually limited to embedded rule-based control, and they have minimal deployment of proactive AI across devices or infrastructure.

- ***Scenario-specific Integrated "Equipment + Platform" Providers***: offer integrated hardware–software systems tailored for specific verticals such as security. While their solutions ensure reliability and recurring service potential, their relatively closed and scenario-bound platforms exhibit limited openness, constraining scalability and integration within broader spatial intelligence ecosystems.

- ***System Integrators***: deliver customized, high-performance solutions for commercial and premium residential markets. They excel in complex deployments requiring strong network management and tailored service logic. However, these solutions are typically resource-intensive, which may affect flexibility for broader adoption of proactive AI-driven infrastructure.

- ***Human-centric Spatial Intelligence Product and Solution Providers***: focus on the development of human-centric spatial intelligence products and solutions. Leading providers have evolved from single-product intelligence to holistic spatial intelligence systems. Building on strong capabilities in IoT connectivity, AI, and low-power technologies, they are now advancing into Stage 3—the proactive AI-driven era—developing next-generation intelligent infrastructure that integrates proactive AI algorithms, multimodal perception, and real-time computing to enable adaptive, connected, and sustainable environments.

In 2024, our Company ranked seventh globally, capturing a 1.5% share of the market. Notably, our Company ranked first among China-based companies and is the only player within the global top 7 providers as a comprehensive human-centric spatial intelligence products and solutions provider—spanning human-centric spatial intelligence infrastructure products, and integrated software and services.

Top 7 Global Proactive AI-driven Human-Centric Spatial Intelligence Infrastructure Providers by Revenue, 2024

Ranking	Headquarters	Type of Provider	Brand Name	Global Revenue (RMB Billion)	Market Share (%)
1	U.S.	System integrator	Company A	3.0	6.4
2	U.S.	System integrator	Company B	2.5	5.3
3	Switzerland	System integrator	Company C	2.0	4.3
4	U.S.	Scenario-specific integrated "equipment + platform" provider	Company D	1.2	2.6
5	France	System integrator	Company E	1.0	2.1
6	Germany	Traditional hardware provider	Company F	0.8	1.7
7	**China**	**Human-centric spatial intelligence product and solution provider**	**Our Company**	**0.7**	**1.5**
		Top 7		11.2	23.8

Source: Frost & Sullivan, annual reports of listed companies

Notes:

Company A was founded in 1906 and listed on the NASDAQ. It is primarily engaged in the development and manufacturing of aerospace products and services, building and industrial control technologies, performance materials, and safety and productivity solutions;

Company B was founded in 1885 and listed on the New York Stock Exchange. It is primarily engaged in providing building technologies and solutions, covering smart building management systems, HVAC equipment, industrial refrigeration, fire and security products, and energy storage solutions;

Company C was founded in 1988 and listed on the SIX Swiss Exchange, Nasdaq Stockholm, and the New York Stock Exchange. It is primarily engaged in electrification and automation technologies, serving customers in utilities, industry, transport & infrastructure, including robotics, motion, and industrial drives;

Company D was founded in 2003 and listed on the NASDAQ. It is primarily engaged in the design and development of comprehensive home automation solutions, covering unified control of lighting, audio, video, climate, and security systems;

Company E was founded in 1836 and listed on the Paris Stock Exchange and the London Stock Exchange. It is primarily engaged in energy management and industrial automation, providing integrated products, software, and services for power distribution, building automation, and digital transformation;

Company F was founded in 1847 and is listed on the Frankfurt Stock Exchange. It is a global technology powerhouse focused on industrial, infrastructure, transport, and healthcare markets.