NTT DATA

NTT DATA Technology Foresight 2025

Trend 2: Ambient intelligent experiences

Envision unlocking personalized customer journeys at every touchpoint, transforming interactions into lasting relationships.

Contents

Introduction

Ambient intelligent experiences are redefining how customers and brands interact across different touchpoints and reshaping customer engagement.

Driven by technologies like AI, spatial computing and automation, these experiences fundamentally change how organizations connect with their audiences. Beyond improving customer service, they help organizations proactively anticipate needs, optimize interactions and nurture meaningful emotional connections — crucial for building customer satisfaction and loyalty.

Significance and impact on business

Some 73% of customers cite experience as a key factor in their purchasing decisions. Organizations that strategically embrace this trend can reduce churn and cultivate dedicated brand advocates, strengthening their reputation and deepening customer trust.

Key drivers

Ambient intelligent experiences are made possible by several critical elements. AI-driven chatbots facilitate real-time, responsive interactions, offering efficient support. Predictive analytics helps businesses anticipate customer preferences and tailor their offerings. Omnichannel strategies create a seamless experience across all touchpoints, ensuring consistency in engagement. Hyperpersonalization — using data insights to meet individual needs — will be vital for fostering deep, immersive interactions. Connected products will blend their physical and digital features into a single, consistent and natural flow of interactions.

As the future unfolds, data privacy concerns and personalization fatigue may present challenges, underscoring the need for ongoing innovation to keep pace with evolving customer expectations. Businesses that invest in advancing ambient intelligent experiences will set new benchmarks in customer satisfaction, driving sustainable growth.

Technical explanation

Ambient intelligent experiences transform business–customer and product–user interactions by using advanced technologies to create integrated, personalized and intuitive interactions across platforms. This shift is built on key concepts that enable businesses to anticipate and meet customer needs effectively:

1. Natural user interfaces (NUIs)

Utilizing gestures, voice and touch, NUIs create intuitive experiences that simplify digital interactions, making them more human-centric and accessible.

2. AI-driven customer interfaces

These interfaces use machine learning to analyze behavior in real time, adapting to user needs and providing personalized interactions through natural language understanding and emotion detection.

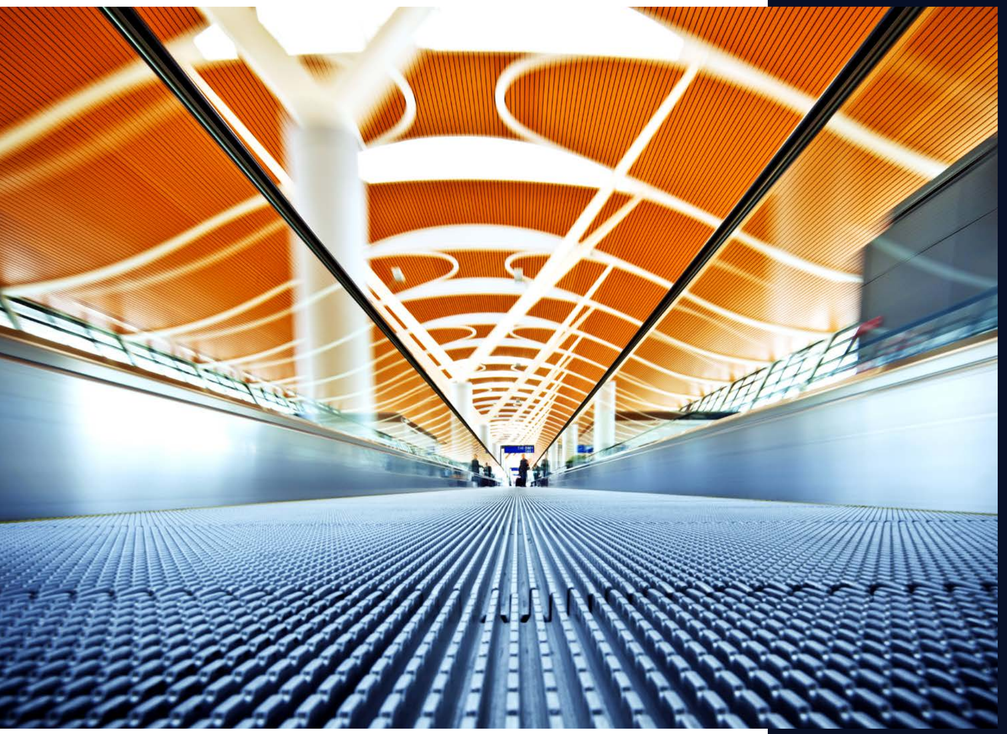
3. Intelligent personal assistants (IPAs)

AI-powered assistants provide conversational support, recommendations and solutions across platforms, improving user engagement with seamless, real-time assistance.

4. Omnichannel integration

Omnichannel integration unifies customer data and interactions across all touchpoints, supporting smooth transitions between platforms and improving engagement.

> By applying these concepts, organizations can deliver adaptive customer journeys that boost customer satisfaction and loyalty, and build a competitive advantage through immediate, relevant interactions in an evolving digital world.



Technology

Emotion AI and sentiment analysis technologies capture user emotions through voice, facial and behavioral data, enabling real-time adaptation to customer sentiment. Cogito AI, for example, detects stress in voice signals during support calls, helping organizations tailor responses in the moment and enhance customer satisfaction.

Recommendation engines use advanced ML models to dynamically tailor content, products and services based on user behaviors and preferences. Inflection AI's Pi represents the latest in recommendation technology, offering personalized, contextually relevant interactions that evolve based on conversation history and user needs.

Speech and gesture recognition brings intuitive control and interaction capabilities by interpreting voice commands and gestures in real time. Google's Project Starline uses 3D imaging for natural, holographic conversations, while Ultraleap's Leap Motion Controller delivers precise, touch-free gesture control in virtual reality/augmented reality (VR/AR) spaces, enhancing accessibility and engagement.

Smart sensors and radio frequency identification (RFID) technology enable real-time data collection and tracking across physical and digital touchpoints, improving the flow of information throughout the customer journey. Advanced RFID systems and smart sensors capture location, movement and engagement patterns, allowing businesses to seamlessly connect in-store and online behaviors.

Business explanation

The ambient intelligent experiences trend represents a significant transformation in how businesses interact with customers and streamline operational processes. It uses advanced technologies to create cohesive, intuitive and personalized interactions across various platforms.

By focusing on user-centric design and intelligent automation, organizations can boost engagement and satisfaction while increasing efficiency.

Ambient intelligent experiences can redefine customer experience and operational success in several areas:

Improved customer engagement

By integrating AI and ML, businesses can analyze customer behavior in real time and tailor interactions to meet individual needs, preferences and expectations.

Enhanced operational efficiency

Seamless experiences minimize process friction, enabling faster response times and smoother transitions between different touchpoints. This efficiency can significantly reduce operational costs and improve service delivery.

Data-driven insights

The continuous collection and analysis of customer data across various interfaces provides organizations with valuable insights that can inform strategy, product development and marketing efforts.

Personalization at scale

With intelligent systems, businesses can automate personalized content and offers, ensuring each customer receives relevant experiences that foster loyalty and retention.

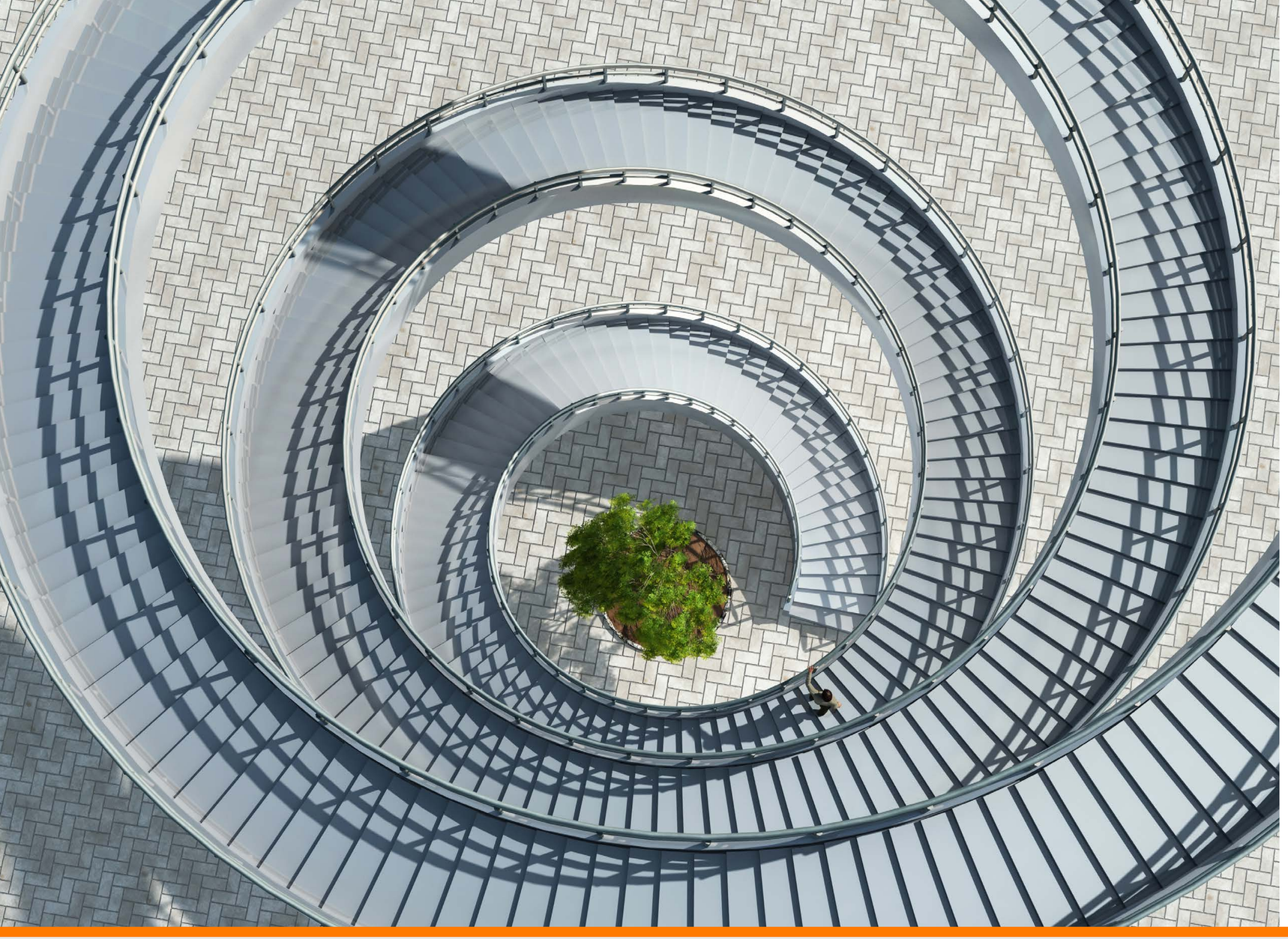
Ease of use

When a product's physical and digital features are blended, natural interactions with a product (for example, touch and gestures) can trigger contextually relevant digital functions, resulting in reduced training requirements, fewer handling errors and a more frictionless experience.

Competitive differentiation

Organizations that successfully implement ambient intelligent experiences will distinguish themselves in the marketplace, attracting more customers and building their brand reputation.

Underlying concepts



Underlying concepts

Ambient intelligent experiences are characterized by the seamless combination of intuitive user interfaces, AI-powered customer engagement tools, smart virtual assistants and cross-channel integration. The result is an effortless and unified interaction that anticipates user preferences, offers tailored solutions across multiple platforms and stays aligned with evolving customer expectations and market dynamics.

Ambient intelligent experiences

Natural user interfaces

- Enhanced user experience
- Adaptive contextual awareness
- Interaction modalities
- User-centric design
- Design philosophy and principles

AI-driven customer interfaces

- Intelligent feedback analysis
- Predictive customer service
- Adaptive interface evolution
- Omnichannel engagement
- Personalized marketing automation
- Enhanced customer analyticcs

Intelligent personal assistants

- Immersive cross-platform experiences
- Dynamic decisions support
- Natural and engaging interactions
- Personalized and contextual assistance

Omnichannel integration

- Seamless customer experience
- Digital–physical convergence
- Business transformation
- Innovation and insight

Figure 1: Ambient intelligent experiences — underlying concepts and supporting trends

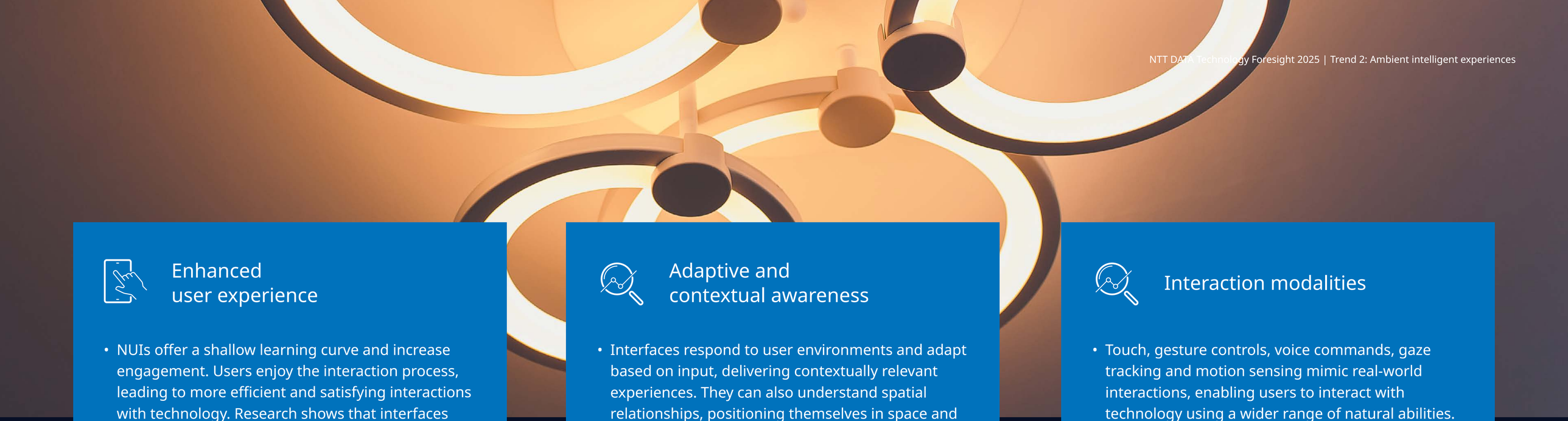
Underlying concepts

Natural user interfaces

Natural user interfaces (NUIs) facilitate intuitive human–computer interactions by drawing on natural human abilities such as touch, gesture and voice. These interfaces minimize the learning curve, allowing users to engage with technology without extensive training. By improving user experience and accessibility, NUIs can broaden market reach and create a competitive advantage. They're applicable across various sectors, including customer service, retail, healthcare, manufacturing and education.

NUIs present a significant opportunity for improving user engagement and operational efficiency in a rapidly evolving digital landscape.

> "However, organizations must carefully consider user needs, ongoing technological developments, and potential challenges such as development costs and privacy concerns.



Enhanced user experience

- NUIs offer a shallow learning curve and increase engagement. Users enjoy the interaction process, leading to more efficient and satisfying interactions with technology. Research shows that interfaces designed for emotional engagement increase user retention rates significantly.
- The deep integration of the Apple Pencil in iPadOS demonstrates how natural interactions can enhance user experiences. By allowing users to write, draw and navigate with precision and fluidity, the Apple Pencil transforms digital tasks into intuitive and enjoyable processes, showcasing the power of performance aesthetics to drive engagement.

Adaptive and contextual awareness

- Interfaces respond to user environments and adapt based on input, delivering contextually relevant experiences. They can also understand spatial relationships, positioning themselves in space and time for more fluid interaction.
- We estimate that most internet-connected devices will be context-aware by 2025, allowing for smarter, more personalized user experiences. This shift is already transforming the automotive industry, where in-car systems can adapt to drivers' preferences and driving habits, making vehicles smarter and safer.

Interaction modalities

- Touch, gesture controls, voice commands, gaze tracking and motion sensing mimic real-world interactions, enabling users to interact with technology using a wider range of natural abilities. For example, the latest developments in speech recognition allow systems to process speech with up to 95% accuracy, nearly matching human capabilities.
- Gaze-tracking technology, once considered futuristic, is now being implemented in devices like VR headsets, allowing users to navigate and select content simply by looking at it. These natural interaction methods reduce reliance on traditional input devices, making engagement with technology more fluid and accessible to diverse user groups.

User-centric design

- Interfaces will need to be intuitive and reduce cognitive effort by leveraging natural human skills. The goal is to make interactions feel seamless and allow users to focus on content without noticing the interface itself.
- Studies show that reducing visual complexity can improve task performance by up to 20%. This emphasizes the importance of simplicity in design.
- Apple Vision Pro exemplifies design simplicity, combining spatial computing with a minimalist interface. By enabling users to interact with content using natural gestures, voice and eye tracking, Vision Pro minimizes cognitive effort and distraction, embodying the essence of seamless and intuitive design.

Design philosophy and principles

- Direct manipulation, content serving as the interface, and logically extending objects to enhance functionality are all shaping NUI design. Subtle design elements guide users through interactions, creating intuitive, context-aware environments. This approach taps into human instincts and abilities, making interactions feel natural and engaging.
- Emotional design is becoming increasingly vital in shaping user and customer experiences, particularly as AI technologies evolve. This approach focuses on how users feel when interacting with products and services and aims to create positive emotional responses that boost satisfaction and loyalty.

Underlying concepts

AI-driven customer interfaces

AI-driven customer interfaces revolutionize how businesses engage with customers by delivering personalized and efficient interactions. These interfaces incorporate voice of the customer (VoC) applications and sentiment analysis to collect insights, enabling organizations to elevate customer experiences based on real-time feedback. They can anticipate customer needs and evolve over time, improving service delivery and boosting user satisfaction. By maintaining consistent engagement across diverse channels, including social media, these interfaces cultivate stronger brand loyalty.

> AI-driven customer interfaces empower organizations to meet increasing customer demands for relevance and immediacy, thereby driving satisfaction and fostering business growth in a competitive environment.

1 Intelligent feedback analysis

AI-driven interfaces excel at collecting and analyzing customer feedback through VoC applications. These systems utilize sentiment analysis to understand customer emotions and opinions, providing businesses with valuable insights. A continuous learning process enables organizations to refine their services and create more personalized, satisfying customer journeys, ultimately improving customer satisfaction and loyalty.

For example, major banks use AI to analyze customer feedback from surveys and social media. This allows them to tailor services like loan recommendations and fraud prevention.

2 Predictive customer service

Businesses can anticipate customer needs and behaviors by leveraging AI to identify trends and optimize interactions. This predictive capability enables proactive problem-solving and personalized recommendations, reducing customer frustration and improving the overall experience. As these systems evolve, they will become increasingly adept at anticipating customer requirements, allowing organizations to stay one step ahead in meeting expectations.

Retailers like Amazon use AI to manage inventory more effectively, ensure popular products are always available and optimize shipping times.

3 Adaptive interface evolution

AI-driven customer interfaces are evolving based on user behavior, becoming more intelligent and tailored over time. This adaptive nature ensures that interactions become more efficient and satisfying as the interface learns from past experiences and adjusts its responses accordingly. The result is a continuously improving customer experience that becomes more personalized with each engagement.

Music-streaming services like Spotify adapt to users' evolving preferences, updating personalized playlists to reflect recent listening trends.

4 Omnichannel engagement

AI-driven customer interfaces extend beyond traditional channels to include social media monitoring and management, ensuring consistent engagement across all customer touchpoints. By maintaining a cohesive presence across platforms, businesses can build stronger brand recognition and customer trust. This comprehensive approach allows for a seamless customer journey, regardless of the chosen interaction channel.

Retailers like Zara integrate online inventory data with in-store availability and analyze social media activity to predict demand trends, optimizing stock levels in real time. Before visiting a store, customers can check the app to see if items are in stock.

5 Personalized marketing automation

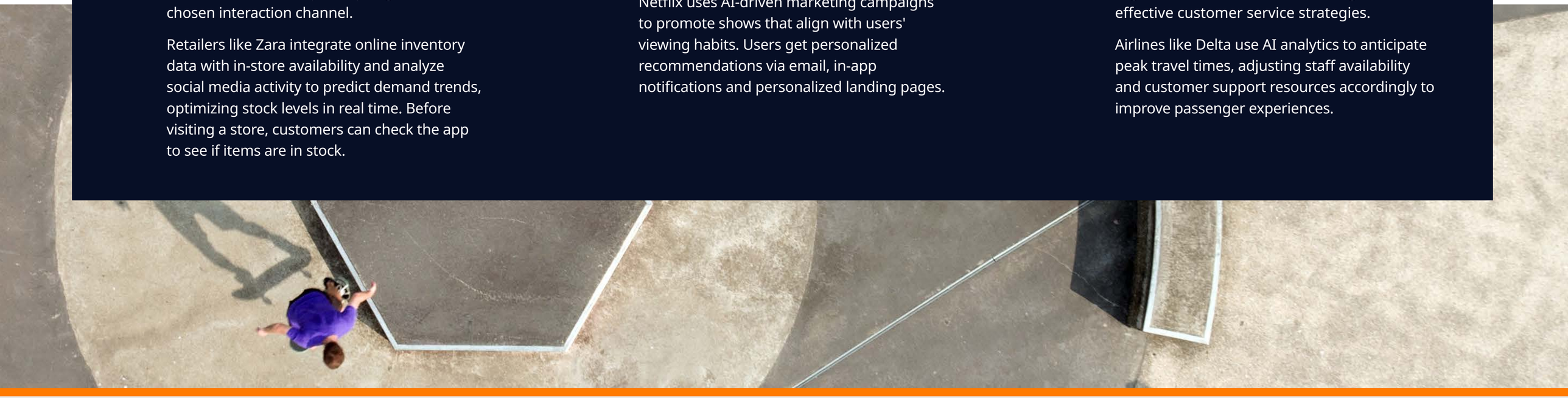
Through-channel marketing automation uses AI insights to deliver cohesive and personalized experiences across different marketing avenues. This ensures that customers receive relevant content and offers tailored to their preferences and behaviors, increasing the effectiveness of marketing efforts and improving customer engagement.

Netflix uses AI-driven marketing campaigns to promote shows that align with users' viewing habits. Users get personalized recommendations via email, in-app notifications and personalized landing pages.

6 Enhanced customer analytics

AI-powered customer service analytics provide deep insights into customer behavior, preferences and emotions. These analytics help businesses continually refine their services, optimize customer interactions and make data-driven decisions to improve overall customer satisfaction. By understanding customer needs at a granular level, organizations can create more targeted and effective customer service strategies.

Airlines like Delta use AI analytics to anticipate peak travel times, adjusting staff availability and customer support resources accordingly to improve passenger experiences.



Underlying concepts

Intelligent personal assistants

Intelligent personal assistants (IPAs) use advanced AI to provide personalized, context-aware support in various personal and professional scenarios. These AI-driven platforms, including generative conversational AI and AI avatars, offer natural, engaging interactions that adapt to user preferences and market conditions in real time, enhancing decision-making and user experiences.

> By integrating with immersive technologies like the metaverse and addressing crucial ethical considerations, IPAs are poised to revolutionize customer engagement, operational efficiency and human–computer interaction across multiple industries.

Personalized and contextual assistance

- IPAs leverage generative conversational AI to provide highly personalized support. These systems learn from interactions, adapting to user preferences and context over time. This enables IPAs to offer tailored assistance in various scenarios, from daily tasks to complex queries, improving user experience in both personal and professional settings.
- For example, Google Assistant integrates with productivity tools like Google Calendar and corporate scheduling applications, helping users manage their schedules seamlessly across devices and platforms.

Natural and engaging interactions

- AI avatars and enterprise conversational AI platforms enable more human-like interactions between users and technology. By using advanced NLP, IPAs can engage in interactive conversations, making technology more accessible and user-friendly. This approach significantly improves user engagement and satisfaction across multiple enterprise platforms.
- For example, AI avatars in virtual meetings can translate conversations in real time, breaking down language barriers and enhancing global collaboration.

Dynamic decision support

- IPAs incorporate contextualized real-time pricing, allowing for dynamic adjustments based on customer context and market conditions. This capability extends beyond simple task execution, enabling IPAs to provide valuable decision support in areas such as purchasing, financial planning and resource allocation, adapting in real time to changing environments.
- Online investment platforms use digital advisors to monitor market changes and notify users of opportunities, offering guidance based on real-time data.

Immersive cross-platform experiences

- Integrating IPAs into immersive technologies, such as the metaverse in manufacturing, creates new possibilities for customer experiences. These assistants can guide users through virtual spaces, allowing for interactive product exploration and support. This approach blends the digital and physical worlds, enhancing customer engagement and decision-making processes across various platforms.
- For example, virtual shopping assistants in metaverse retail spaces can help users "try on" clothing in a digital space, providing a unique shopping experience that blends virtual and physical realities.

Evolving roles and ethical considerations

- As IPAs become more sophisticated, their roles are expanding from simple task executors to intelligent companions and collaborators. This evolution raises important ethical considerations, including privacy concerns, data security and the need for transparency in AI decision-making. Addressing these aspects is crucial for building trust and ensuring the responsible development of IPA technologies.
- Companies like Apple focus on data privacy and aim to build trust through transparency, for example, by allowing users to manage the information digital assistants can access.

Underlying concepts

Omnichannel integration

Omnichannel integration is a comprehensive business strategy that seamlessly unifies customer experiences across multiple digital and physical platforms. It uses AI-powered commerce solutions and metaverse-ready networks to create consistent, personalized interactions while driving digital transformation through dedicated initiatives and product innovation based on customer insights.

> “This approach enables businesses to adapt to evolving consumer expectations, providing a cohesive brand experience that transcends traditional boundaries between online and offline channels.

Seamless customer experience

- Omnichannel integration focuses on providing a consistent and fluid customer journey across all platforms. AI-powered commerce solutions ensure that customers have a uniform experience, whether they're shopping online, in-store or through mobile apps.
- For example, McDonald's uses geolocation data in its mobile app to offer personalized promotions and allow customers to place orders directly from their tables. This turns self-service into service while lowering operational costs, as meal production can be optimally sequenced.

Digital–physical convergence

- This theme emphasizes the creation of metaverse-ready networks that support immersive experiences spanning both digital and physical environments. The goal is to blur the lines between online and offline interactions, offering a cohesive brand experience across all touchpoints.
- Retailers like Sephora use AI-driven AR tools, such as their Virtual Artist, to let users try on makeup virtually before purchasing, bridging the gap between online browsing and in-store experiences.

Business transformation

- Successful omnichannel integration requires significant organizational change. Digital transformation officess should therefore lead initiatives to help businesses adapt and provide unified, AI-powered customer experiences. This involves aligning various departments and processes to create a cohesive omnichannel strategy.
- Nike's loyalty program integrates data from online and in-store purchases, allowing customers to earn rewards for activities like workouts and creating a unified brand experience across different touchpoints.

Innovation and insight

- With AI-powered product innovation platforms, businesses can continuously improve and adapt based on customer insights and trends. By analyzing data from various channels, organizations can develop more targeted and relevant offerings to stay ahead in a competitive omnichannel landscape.
- Netflix adapts its recommendations based on users' viewing habits across devices, offering a consistent experience whether customers are streaming on their phones, tablets or smart TVs.

Tech radar

Tech radar

In the constantly changing tech landscape, keeping up with the latest developments is essential, not just advantageous.

Continually analyzing technology trends and tracking their evolution will help you anticipate changes and prepare yourself for upcoming shifts.

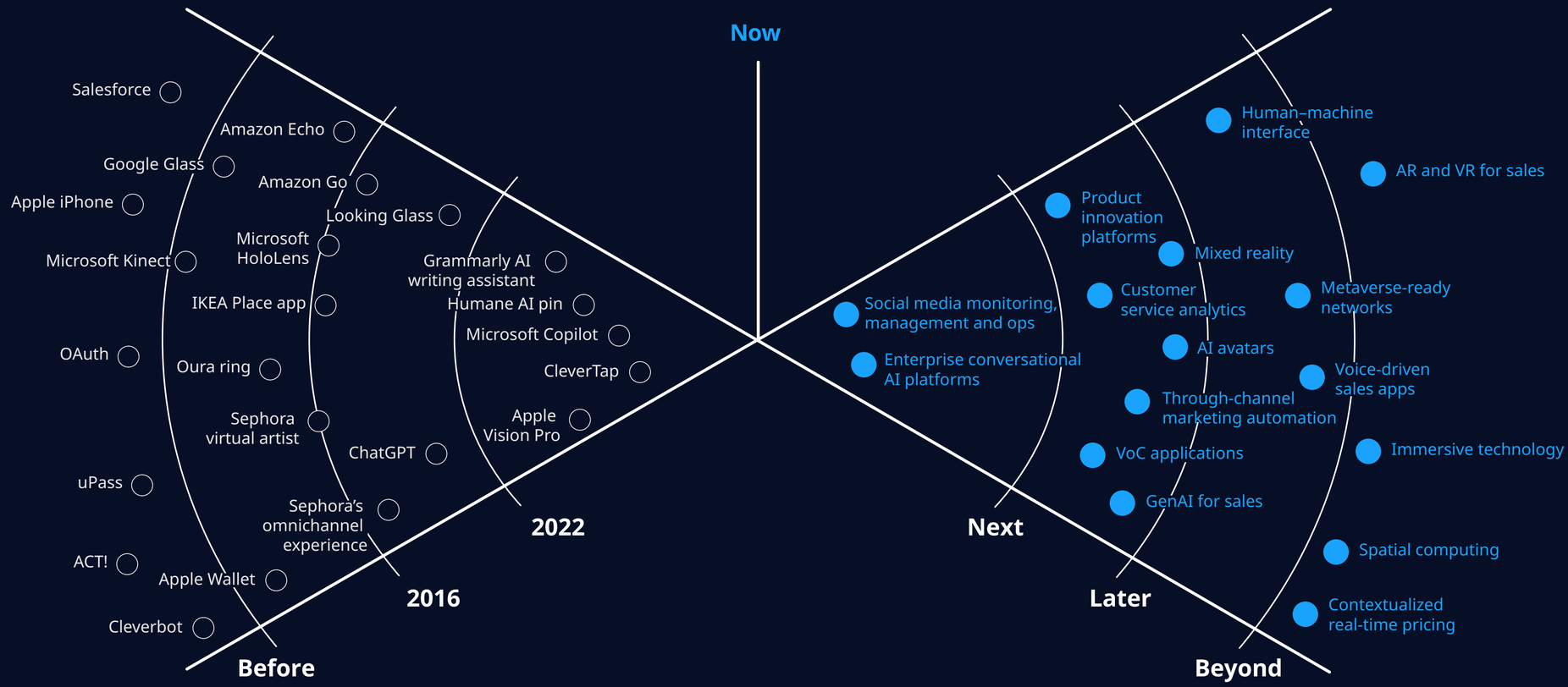


Figure 2: Tech radar — past and future technology

Future tech: now and next

A **Social media monitoring, management and operations**
These tools support social media strategies and facilitate engagement between organizations and their audiences.

B **Enterprise conversational AI platforms**
Enterprise platforms create scalable chatbots and virtual assistants using no-code tools for diverse use cases like customer service and IT automation.

C **Product innovation platforms**
Cloud-based platforms enable continuous product innovation through collaborative IT infrastructure.

D **Customer service analytics**
Analytics combining real-time and historical data optimize customer interactions and improve service delivery.

E **VoC applications**
These applications integrate feedback channels to provide actionable insights from direct and indirect customer feedback.

F **GenAI for sales**
AI creates content and strategies by learning from existing data, aiding customer engagement and training.

G **Through-channel marketing automation**
These solutions streamline content distribution and marketing execution across partner networks.

H **Mixed reality**
This digital experience that blends real and virtual elements and enables interaction through devices like smartphones, tablets and headsets.

I **AI avatars**
AI avatars are human-like digital personas created with AI technologies like CGI, NLP and emotion AI. They facilitate more immersive and interactive experiences in metaverse and virtual environments. AI avatars include virtual influencers, which are autonomous, interactive digital humans.

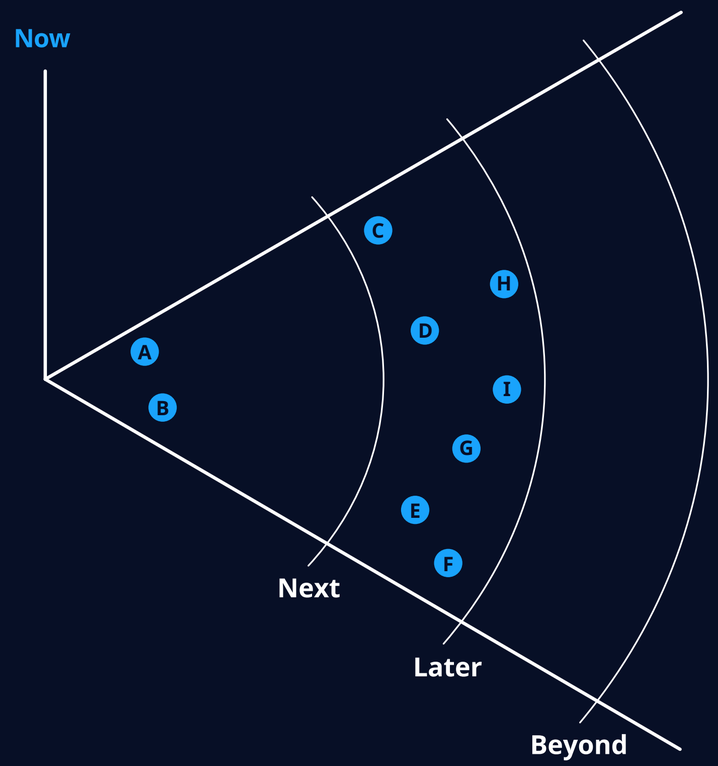


Figure 3a: Tech radar – future technology

Future tech: later and beyond

J **Human–machine interfaces**
Interfaces in autonomous vehicles use screens and voice assistants to communicate with passengers and other road users.

K **Voice-driven sales apps**
These sales apps use conversational interfaces and AI to streamline processes like ordering, check-out, data retrieval and record management.

L **Metaverse-ready networks**
These networks provide the low latency and high bandwidth needed for immersive digital experiences in the metaverse.

M **AR and VR for sales**
AR overlays digital information onto reality, while VR immerses users in digital environments for enhanced sales experiences.

N **Immersive technology**
Technologies like AR, VR and MR blend digital and physical worlds to enhance user experiences.

O **Spatial computing**
Computing environments integrate physical and digital objects, essential for immersive digital content.

P **Contextualized real-time pricing**
Pricing can be dynamically adjusted in real time based on factors like demand, competition and customer loyalty.

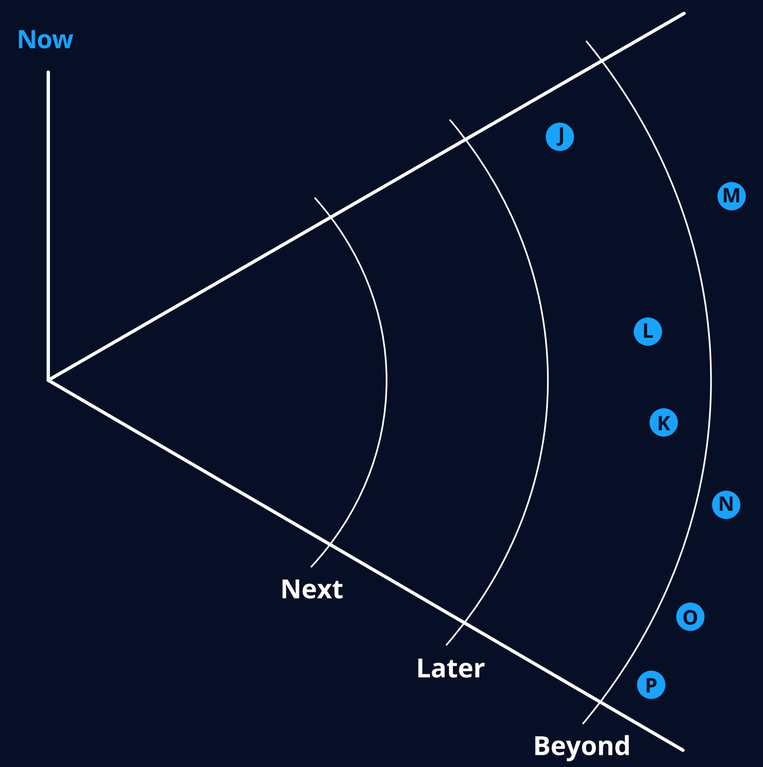


Figure 3b: Tech radar – future technology

R&D highlight

R&D highlight

Nurturing true humanity

NTT Human Informatics Laboratories leads the way in creating innovations that integrate the real and digital worlds to augment human experiences.

Its guiding mission is to develop technologies based on a human-centered approach that respects and enhances a range of human functions. This vision encompasses six key human characteristics — senses, sensitivities, thoughts, behaviors, body and environment — and translates them into data to enhance information and communication processing.

The Laboratories' key research efforts align with the evolving landscape marked by the emergence of GenAI, the advanced miniaturization and accuracy of brain-computer interfaces, and broader societal shifts such as disillusionment with the metaverse and postcapitalism.

In response, they've highlighted several critical actions:

- Accelerate research using general-purpose AI with different approaches to understanding the brain as both a "black box" and a "white box".
- Explore the essential and universal value of the metaverse.
- Promote research that's closely aligned with humanistic disciplines.

The Metaverse Project envisions a future where wellbeing is ubiquitous. It strives to merge the real and cyber worlds through ultrareal virtual spaces and avatars with identity and autonomy. The goal is to:

- Transcend space–time and physical constraints to enable a wide range of immersive experiences that aren't confined to a single metaverse.
- Promote individual wellbeing and improve societal integration by enabling richer, more meaningful encounters and exchanges within virtual environments.

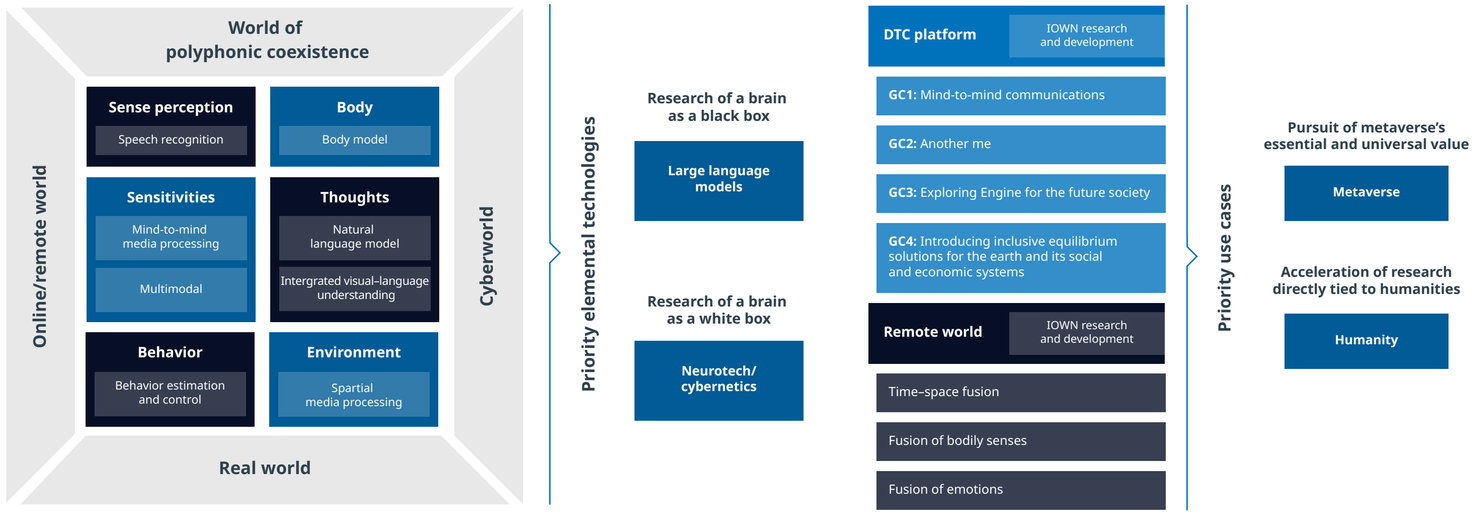


Figure 4: NTT Human Informatics Laboratories' key research

Adapted from: *NTT Technical Review* Vol. 22 No. 4 Apr. 2024

Quantification

Relevant financials

Ambient intelligent experiences

Market size, 2024:

$82.8 billion

Market size growth, 2023–2024 (YoY):

+24%

Forecast CAGR, 2024–2030:

22.7%

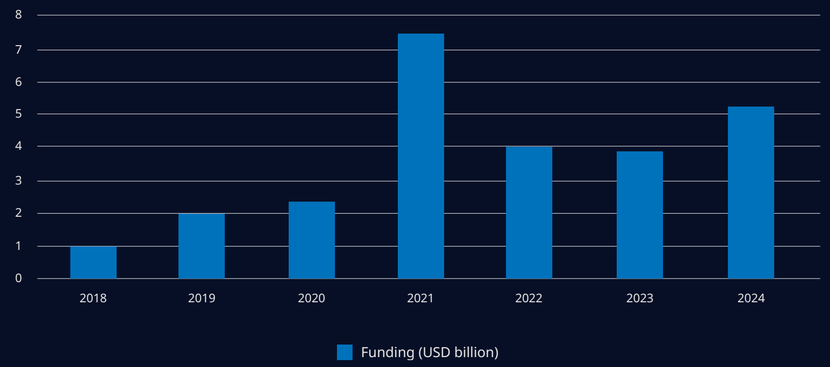


Figure 5: Funding in ambient intelligence startups

> 51% of respondents prefer advanced chatbots, a defining feature of intelligent customer experience, for immediate response.

Impact of AI on ambient intelligent experiences

In the next two years,

70%

of CX leaders plan to integrate GenAI into many of their touchpoints.

75%

of consumers who have experienced GenAI believe the technology will completely change how they interact with companies in the next two years.

Nearly

90%

of contact centers report measurable improvements in complaint-resolution speed and call-volume processing using AI.

Companies using NLP for sentiment analysis have seen a

20%

increase in customer satisfaction and a **25% reduction** in customer service costs.

Research shows that Chatbot-led customer service interactions cost

30%

less than agent-led interactions.

Research and development

2,500*

Patents registered 2023

390,000*

Patent applications pending worldwide

*Approximate figures

Use cases

AI-powered predictive maintenance for cars

Industry: **Automotive**

Manufacturers leverage AI to provide proactive maintenance alerts and automated service scheduling. This keeps vehicle owners informed and engaged, reduces the need for reactive maintenance and improves the overall customer experience.

Business value

1. Competitive advantage in reliability and new features
2. Minimize vehicle downtime
3. Enhance customer trust, for example, by automated alerts
4. Improve service frequency
5. Reduce service costs for owners and dealerships

> “AI-powered maintenance keeps customers informed and worry-free, setting a new standard for reliability.

Digital twins for enhanced retail operations

Industry: **Retail**

Digital-twin technologies create a virtual replicaof retail environments, enabling retailers to simulate scenarios like store layout changes, product placements and customer flow. Analyzing this data improves stores’ performance and customer experiences, and helps retailers make informed inventory and marketing decisions.

Business value

1. Use data to improve decision-making and uncover insights
2. Improve inventory management and reduce stockouts
3. Increase operational efficiency and performance

AI-driven emotional intelligence

Industry: **Cross-industry (B2C)**

With advancements in NLP, sentiment analysis and facial recognition, AI can increasingly detect customer emotions. This emotional awareness helps brands address not only customer queries but also the emotional context behind them, fostering more empathetic, human-like interactions.

Business value

1. Better assess the need for human intervention
2. Improve and evaluate patients' psychological wellbeing in healthcare
3. Achieve greater retail effectiveness

AI-assisted home energy management

Industry: **Energy**

A smart interplay between predictive analytics and GenAI helps customers manage their energy usage more efficiently. The technology analyzes individual consumption patterns and continuously offers tailored advice using natural language.

Business value

1. Lower energy bills by optimizing usage
2. Personalize advice to foster customer loyalty
3. Promote sustainable consumption
4. Balance demand to ease grid strain and enable "prosumer-based" smart grids

> "AI-assisted energy systems empower customers with advice for smarter consumption and seamless integration with future smart grids.

Use cases

Success case

DACH | Automotive

Digital customer twin

Business need

Our client wanted to provide customers with personalized offers and services in both online and live settings. Suboptimal data quality, primarily a result of disparate and duplicate data sources and human error, hampered its ability to do so.

Solution

NTT DATA implemented a cloud-based solution for customer data management based on Dabelia, our digital-twin customer platform.

Dabelia automatically merges customer master data from different systems, delivering a complete and accurate rendering of every customer data record. A database collects account and contact data from sales and after-sales systems and supplements it with additional customer-specific information.

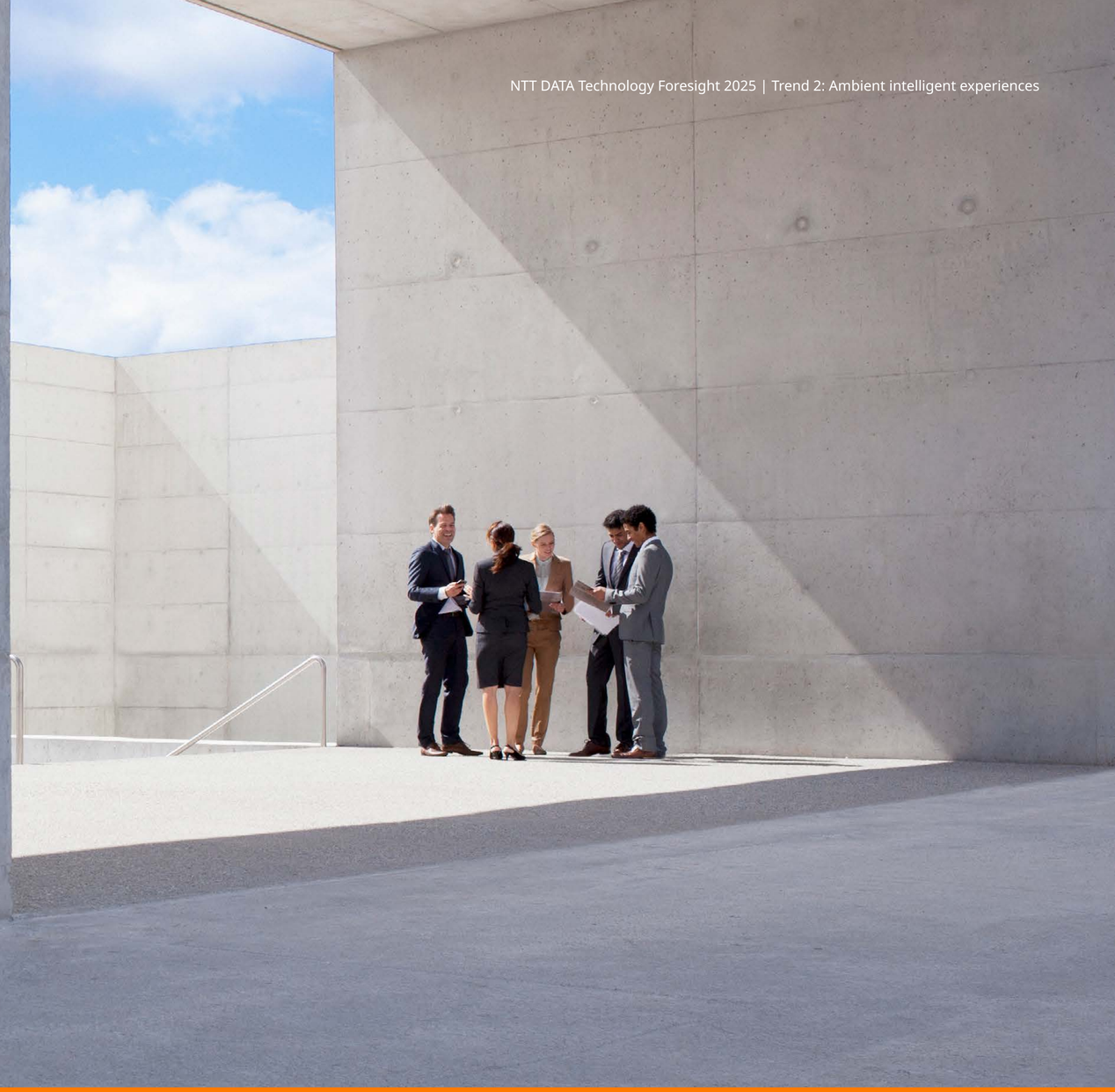
Outcomes

Thanks to its digital customer twin and accurate, transparent and easily accessible data, the client is well positioned to develop personalized offers and services and reduce service costs. The new solution also aligns with GDPR processes, serves as a database for self-service functionalities and delivers the best possible data quality for sales and after-sales processes. Additionally, the solution's powerful automation features have reduced data-handling costs and effort.

Technologies

Azure Cloud, Docker, Python

Startups



Startup radar

In this section, we review a selection of startups relevant to the ambient intelligent experiences trend, based on our observations, partnerships and investments.

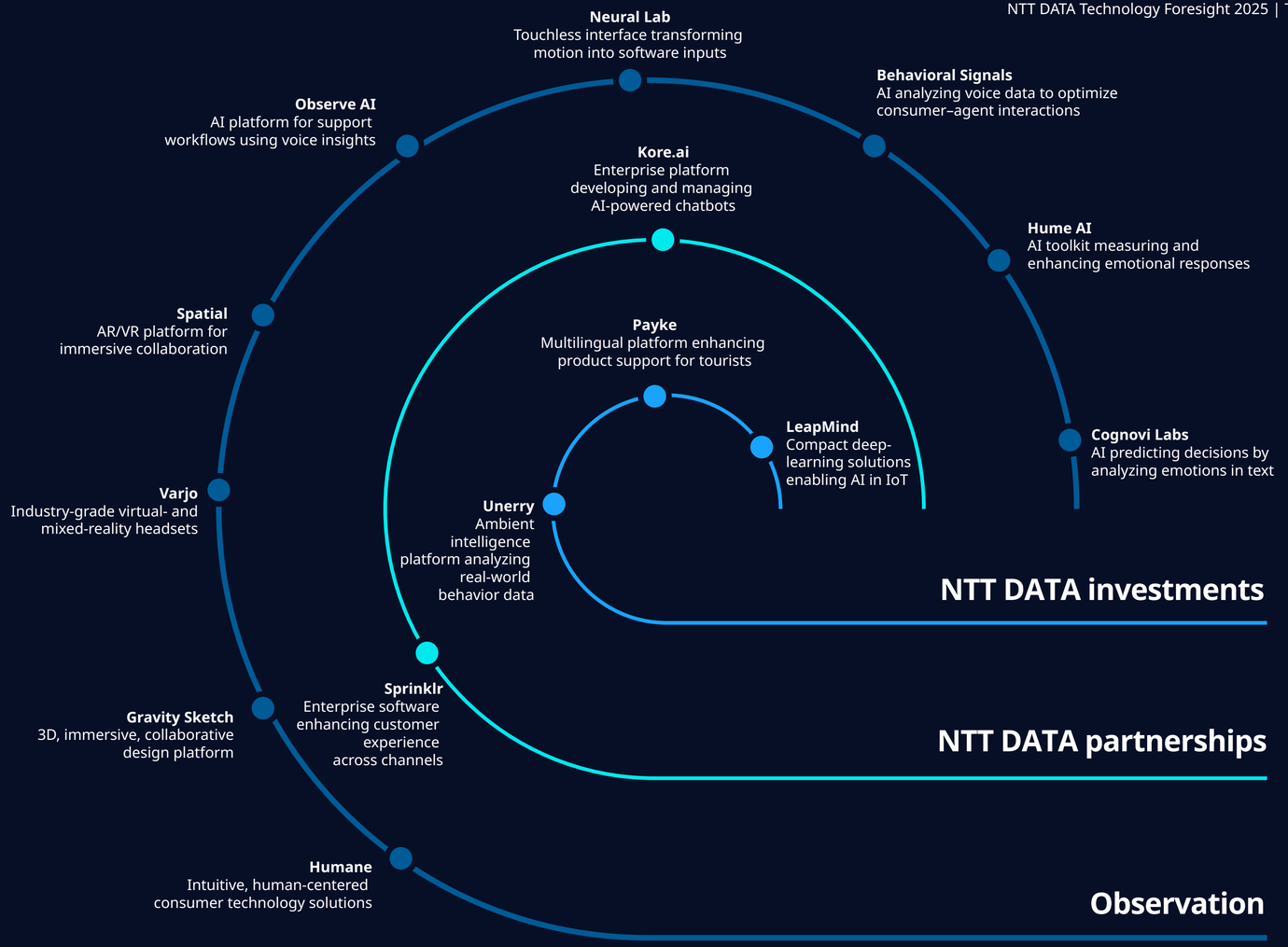


Figure 6: Investment in ambient intelligent experiences startups

Startups

Observation

Humane

Founded in 2017, Humane is a platform that creates and sells consumer hardware, software and services that feel familiar, natural and humane.

Stage
Series C

Funding
$230 million

Valuation
$850 million (2023)

Industry
Cross-industry

Gravity Sketch

Founded in 2014, Gravity Sketch provides 3D design and collaboration tools for the technology sector. Its core offerings include immersive 3D sketching and design software that allows designers to create, communicate and share their ideas in a virtual studio environment. The software is used in the transportation, industrial design, product design and concept art sectors.

Stage
Series A

Funding
$38.66 million

Valuation
Not disclosed

Industry
Cross-industry

Varjo

Founded in 2016, Varjo develops virtual- and mixed-reality headsets for professional use across various industries. Its products are designed to deliver experiences with photorealistic visual fidelity and are suitable for training, design and research applications. Varjo's headsets, including the XR-4 series, offer features such as gaze-driven autofocus and are available in secure editions for classified environments.

Stage
Series D

Funding
$162 million

Valuation (approximate)
$400 million

Industry
Cross-industry

Spatial

Founded in 2016, Spatial has developed an AR/VR platform for collaboration in virtual environments, specifically immersive remote workspaces.

Designers, marketers and business teams use this platform for seamless virtual collaboration.

Stage
Series A

Funding
$30 million

Valuation
Not disclosed

Industry
Cross-industry

Observe.AI

Founded in 2017, Observe.AI applies deep learning and NLP to automate support workflows. Its voice AI platform gives agents feedback on customer sentiment and guides them through customer calls by providing recommendations for the next steps.

Stage
Series C

Funding
$213.12 million

Valuation
$500 million–$1 billion

Industry
Cross-industry

Neural Lab

Founded in 2021, Neural Lab has developed a patent-pending hardware-neutral touchless user interface that uses any camera to turn motion into inputs for any software application, on any device. Use cases include critically sterile environments, shared public devices and mixed-reality immersion for gaming or training. The products improve the limitations of the traditional mouse-keyboard-controller combination and many more.

Stage
Pre-seed

Funding
$100,000

Valuation
Not disclosed

Industry
Cross-industry

Behavioral Signals

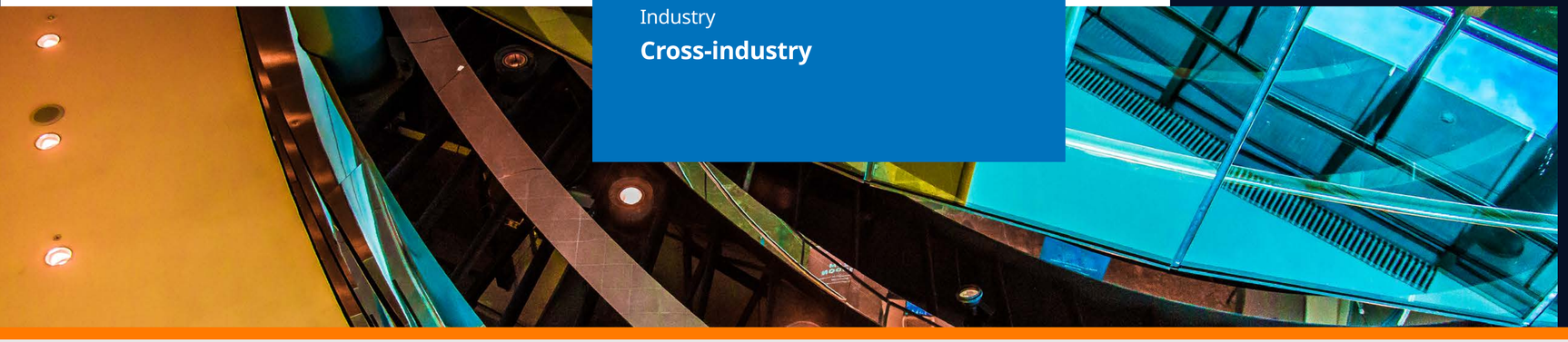
Founded in 2016, Behavioral Signals (Behavioral Signal Technologies, Inc.) develops technology to analyze human behavior from voice data. With AI-MC, their flagship product, enterprises can automatically match customers to agents best suited to them, using voice data and emotion AI. This improves the overall performance and outcomes of contact center conversations, leading to higher productivity.

Stage
Series A

Funding
$7 million

Valuation
Not disclosed

Industry
Cross-industry



Hume AI

Founded in 2021, Hume AI provides an AI toolkit to measure, understand and improve how technology affects human emotion. Organizations use Hume's science-backed API to measure human expressive behavior in images, videos, audio and text, and build applications that better predict users' intents, preferences, experiences and outcomes.

Stage
Series B

Funding
$67.7 million

Valuation
Not disclosed

Industry
Cross-industry

Cognovi Labs

Founded in 2016, Cognovi Labs has developed a proprietary AI solution that integrates deep ML with behavioral psychology to measure emotions from textual and transcribable data to predict people's decisions and help shape the outcome. Cognovi's psychological AI scientifically anticipates human decisions and provides prescriptive tools to change outcomes, from accelerating revenues and increasing prescription growth to identifying future threats.

Stage
Series A

Funding
$8.9 million

Valuation
Not disclosed

Industry
Cross-industry

Startups

NTT DATA partnerships

Sprinklr

Founded in 2009, Sprinklr provides enterprise software for customer experience management. The solution helps brands understand the conversations that matter most on channels such as social media, messaging, blogs and review sites. Companies like Microsoft and McDonald's rely on Sprinklr to manage customer experiences at scale.

Stage
Series A

Funding
$429 million

Valuation
Not disclosed

Industry
Cross-industry

Kore.ai

Founded in 2014, Kore.ai has developed an enterprise conversational and GenAI platform to help organizations design, develop, test and manage chatbots for internal or customer-facing business scenarios. The platform, no-code tools and solutions deliver end-to-end customer and employee experiences — from automated to human-assisted — and build GenAI-enabled applications. Kore.ai takes an open approach, allowing organizations to choose the LLMs and infrastructure that best meet their needs.

Stage
Series D

Funding
$223.5 million

Valuation
Not disclosed

Industry
Cross-industry

Startups

Investments

Unerry

Founded in 2015, Unerry specializes in ambient intelligence infrastructure and big data analytics, particularly through its Beacon Bank platform. It collects and analyzes real-world behavioral data to enhance retail digital transformation and support smart-city initiatives, processing billions of location logs monthly.

Stage
Series A

Funding
$5.4 million

Valuation
Not disclosed

Industry
Cross-industry; financial services

LeapMind

Founded in 2012, LeapMind makes deep learning “small and compact” and accessible across a broad spectrum of applications, evolving the Internet of Things (IoT) into the “Deep Learning of Things (DoT).” LeapMind specializes in providing ultralow-power AI inference accelerators and deep-learning technology for model-weight reduction, enabling advanced data processing in environments previously unsuitable for AI.

Stage
Incubator/accelerator

Funding
$45.5 million

Valuation
Not disclosed

Industry
Cross-industry

Payke

Founded in 2014, Payke provides multilingual support solutions for products and services used by inbound tourists. Its platform allows users to scan barcodes on products, and displays information in multiple languages. It also provides tools for analyzing inbound consumer data.

Stage
Series B

Funding
$10.79 million

Valuation
Not disclosed

Industry
Retail

Future scenarios

As industries transform, new value chains emerge and technological advancements grow exponentially, companies must navigate complex, evolving landscapes.

Future scenarios and GenAI-powered personas allow organizations to explore possible futures, simulate realistic business environments and minimize risk through scenario-based planning.

Uncertainties represent what we cannot know, but identifying them can reduce the risks of blind spots down the road.

Future scenarios

Uncertainty: technological integration and interoperability

The ambient symphony

What if all your devices and platforms worked together seamlessly, making technology invisible and effortless?

As devices and platforms become fully interoperable, users will be able to transition smoothly between digital environments. AI assistants, AR/VR and IoT will blend into a unified, intuitive experience, making the technology nearly invisible. As a result, users can enjoy frictionless interactions without loyalty to any single ecosystem.

Islands of innovation

What if your digital world was confined to one technology ecosystem, locking you into innovative but isolated experiences?

If technology companies build highly personalized but closed ecosystems, consumers will be immersed in isolated, optimized experiences that offer deep integration within each brand's platform but make switching between systems difficult. This will fuel competition but could stifle cross-platform innovation.

Future scenarios

Uncertainty: consumer acceptance and behavioral changes

Empowered trust

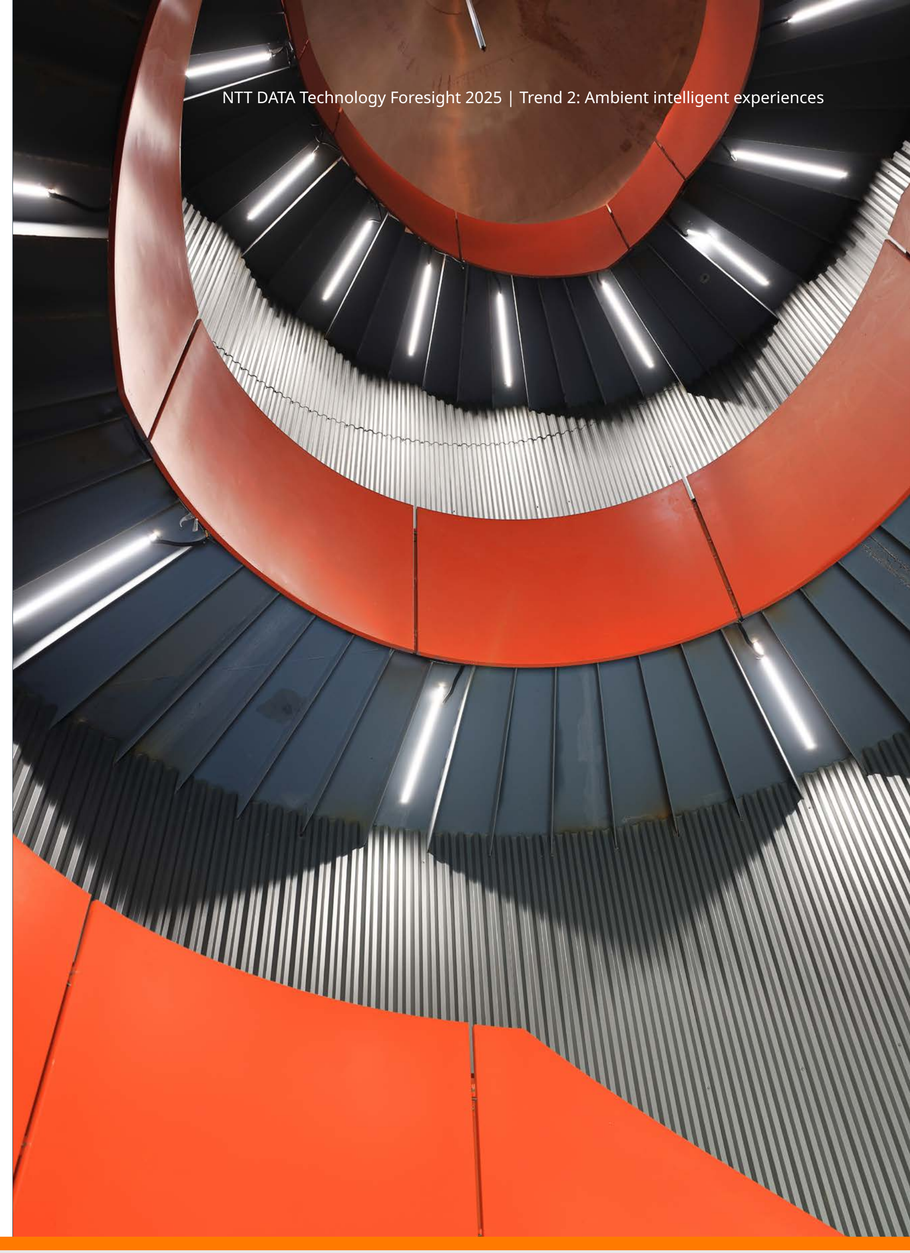
What if your personal data became the currency for trust, and control over privacy was the key to deeper digital experiences?

Some consumers may choose to engage with AI and immersive technology only if they have full control over their data. Organizations will need to be transparent and offer opt-in features for each interaction. In this scenario, trust becomes the cornerstone of engagement, with users demanding strict privacy standards and customizable AI experiences.

Echoes of intimacy

What if AI assistants became emotional companions, offering comfort but creating new dependencies?

AI assistants may evolve into emotional companions, offering advice, comfort and deep personalization. People could begin relying on them for decision-making and emotional support, creating new dependencies. While many will embrace this bond, ethical concerns about manipulation and the loss of human connection will arise.



Conclusion and next steps

Conclusion and next steps

Think about this

As technology creates more seamless and intuitive interactions, organizations must integrate these tools to meet evolving customer expectations.

How effectively are you using NUIs, emotion AI and omnichannel platforms to enhance user engagement?

With personalization driving customer loyalty, real-time data processing and sentiment analysis are essential.

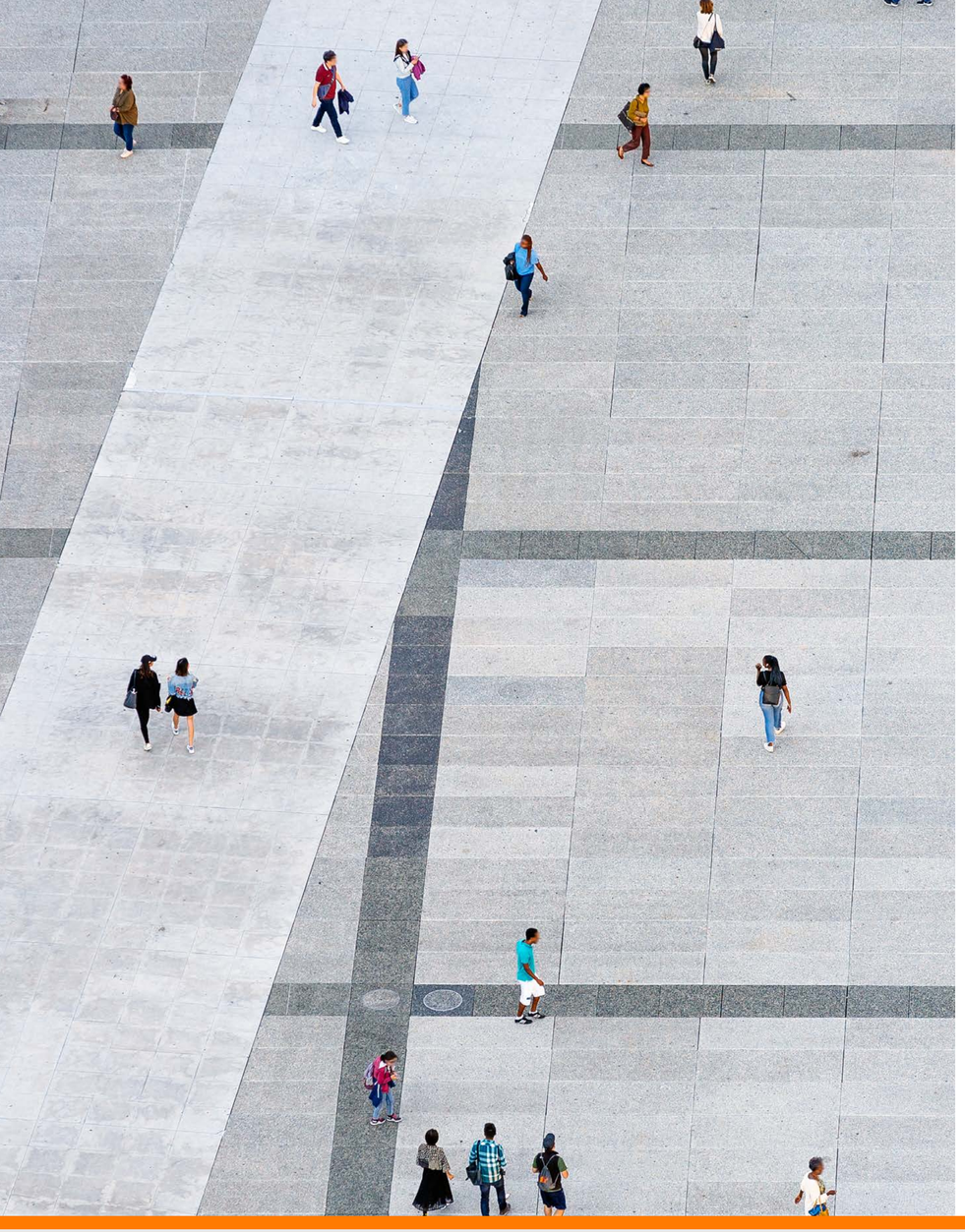
Are your systems equipped to process behavioral data instantly and adapt interactions based on real-time insights?

Ambient intelligent experiences are designed to improve interactions and empower brands to provide relevant, meaningful engagement.

How does your strategy ensure human-centric experiences that feel both intuitive and personal?

Ownership and data privacy concerns become more complex with integrated platforms.

How will you secure customer data while providing cross-platform consistency and personalized support?



Conclusion and next steps

Do this next

5 minutes

Identify high-impact touchpoints

Focus on the top three customer touchpoints that would benefit most from personalized, adaptive responses (for example, support chat or product recommendations). These should serve as the basis for implementing ambient intelligent experiences.

5 days

Set up a sentiment-responsive system

Prototype a customer support system that adjusts interactions based on real-time sentiment analysis, ensuring service responses align with the customer's emotional state.

5 months

Create a cross-functional CX innovation team

Establish a team tasked with identifying opportunities for AI-driven customer experience (CX) improvements. This team can refine use cases, promote platform adoption and deliver a seamless experience across departments.

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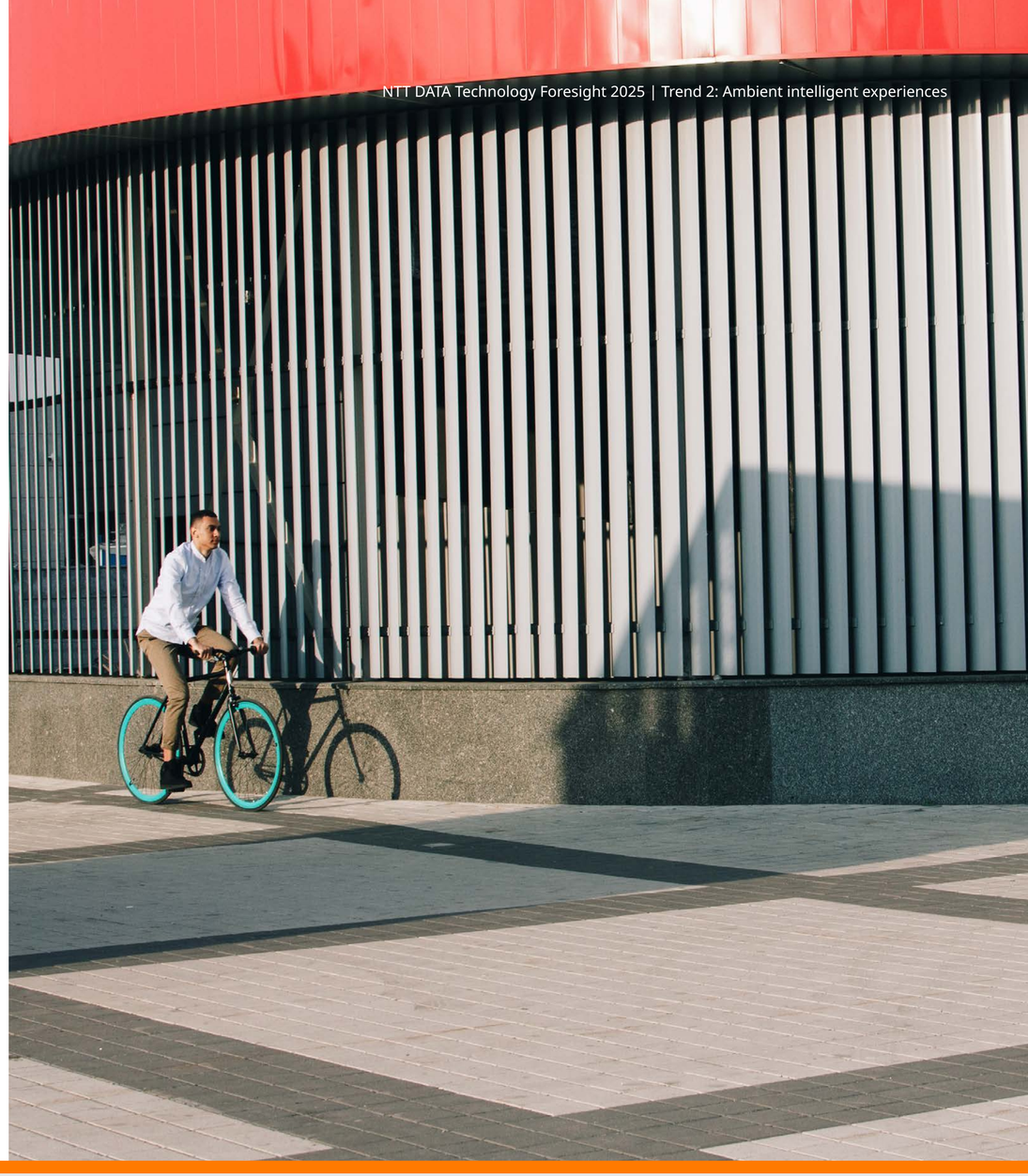

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References and sources

Trend 2: Ambient intelligent experiences

- IBM. Digital customer care in the age of AI: energy service providers must adapt to rising customer expectations.
- MIT Technology Review Insights. Humans + bots: tension and opportunity.
- von Aulock, I. Penfriend.ai. Sentiment analysis: a comprehensive, data-backed guide for 2024.
- World Intellectual Property Organization (WIPO). Metaverse fact sheet.
- Wren. A.V. Zendesk. Intelligent customer experience (ICS): a guide for 2024.

Glossary of key terms

Enhanced humans
People and machines are collaborating to shape a future where human potential isn't limited by time, task or knowledge.

Ambient intelligent experiences
Technologies like AI, spatial computing and automation are fundamentally changing how organizations connect with their audiences across different touchpoints.

Digital sustainability for economic resilience
A new business strategy is emerging where organizations integrate environmental stewardship with economic growth and assign individual and collective responsibility.

Cognitive cloud convergence
By integrating advanced cloud computing technologies with AI and human cognitive abilities, organizations can improve operations, enhance decision-making and understand their data in real time.

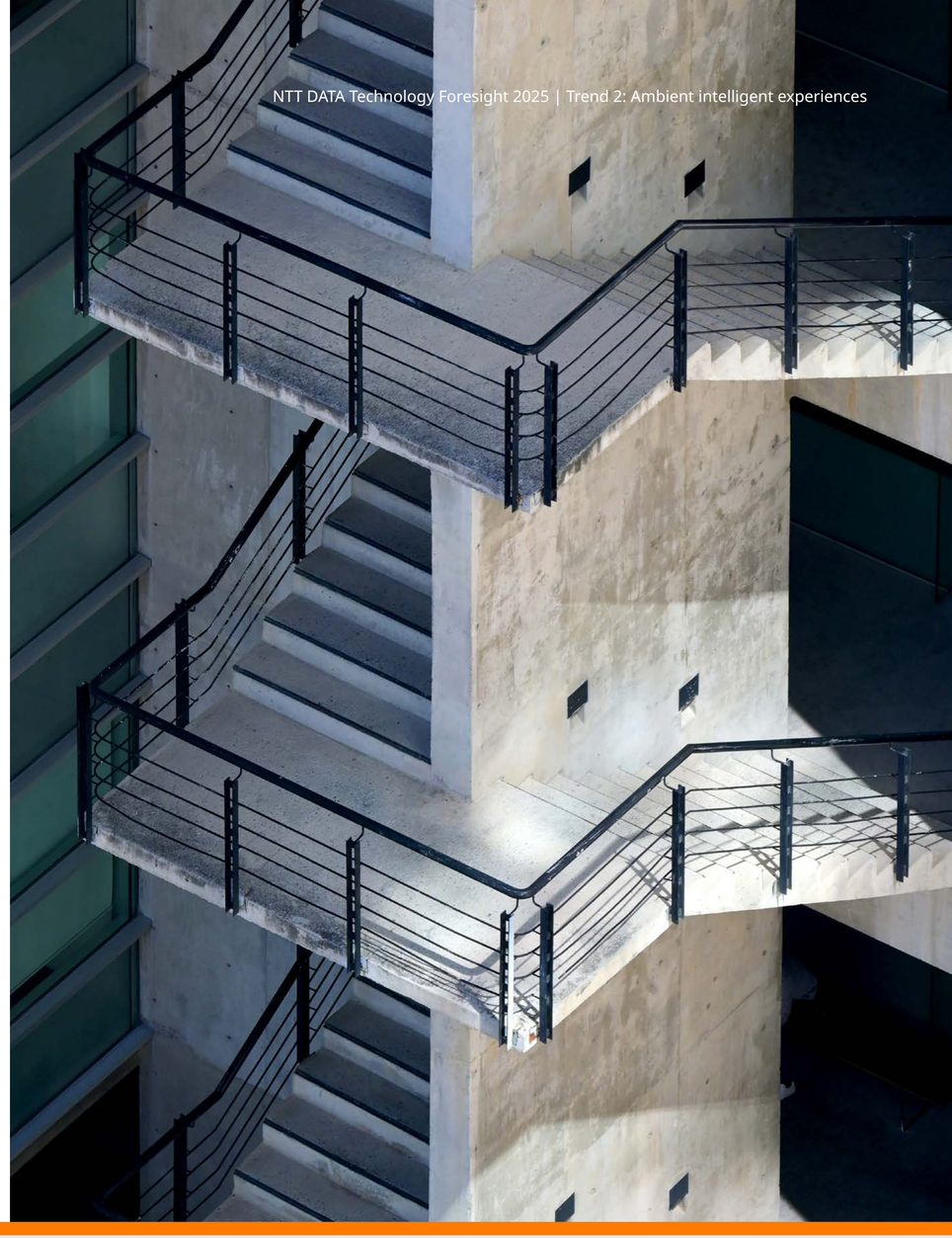
Accelerated security fusion
A new business strategy is emerging where organizations integrate automated incident response and AI-driven threat detection to adapt dynamically to emerging threats and build cyber resilience.

List of abbreviations

ADR	attack detection and response
AGV	automated guided vehicles
AI	artificial intelligence
AIASE	AI-augmented software engineering
AIOps	AI for IT operations
AMR	autonomous mobile robots
API	application programming interface
AR	augmented reality
ASIC	application-specific integrated circuit
AutoML	automated machine learning
AWS	Amazon Web Services
BAS	breach and attack simulation
CDN	content delivery network
CERT	computed emergency response team
CGI	computer-generated imagery
CGM	continuous glucose monitor
CI/CD	continuous integration and continuous delivery or deployment
CNAPP	cloud-native application protection platform
CPS	cyber-physical systems
CPU	central processing unit
CRQ	cyber risk quantification
CSIRT	computer security response team
CSPM	cloud security posture management
CX	customer experience
CVE	common vulnerabilities and exposure
DevSecOps	development, security and operations
DDoS	distributed-denial-of-service
DoT	deep learning of things
DSP	data security platform
EMS	energy management systems
ESG	environmental, social and governance
eVTOL	electric vertical takeoff and landing
FPGA	field programmable gate array
GenAI	generative AI
GPU	graphics processing units
GPT	generative pretrained transformer
IAM	identity and access management
IDE	integrated development environment
IOWN	Innovative Optical and Wireless Network
IPA	intelligent personal assistant
IRM	integrated risk management

List of abbreviations

ITRM	IT risk management
ITSM	IT service management
IoT	Internet of Things
LIME	Local Interpretable Model-Agnostic Explanations
LLM	large language model
MAG	multiagent generative system
MDR	managed detection and response
MFA	multifactor authentication
MLOps	machine learning operations
ML	machine learning
MR	mixed reality
NLP	natural language processing
OEM	original equipment manufacturer
OT	operational technology
PaaS	platform-as-a-service
PET	privacy-enhancing technology
PDE	provider data extractor
PQE	post-quantum encryption
PRM	proactive risk management
RAG	retrieval-augmented generation
RemOps	remediation operations
RPA	robotic process automation
RFID	radio frequency identification
SaaS	software-as-a-service
SHAP	Shapley Additive exPlanations
SSL	secure sockets layer
STEM	science, technology, engineering and math
TPU	tensor processing unit
UAV	unmanned aerial vehicle
VA	virtual assistant
MLOps	machine learning operations
VoC	voice of the customer
VR	virtual reality
XIoT	extended IoT
XOps	cross-functional operations



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