

AI Smartphone White Paper

February 2024

Contents

01 Drivers of the AI smartphone era

Opportunities to the mobile device industry

Device users expect more

Technology will bring new features and form factors

What makes AI smartphone?

02 Characteristics of AI smartphones

Open ecosystem of user-generated service

Context-aware, personalized AI OS

Device hardware supporting generative AI

03 AI smartphone industry outlook

IDC forecast of next-gen AI smartphone shipments

Changes brought by next-gen AI smartphone to the global phone industry

AI smartphone ecosystem

AI has empowered many industries, but the user experience on mobile devices remains complicated

AI has empowered many industries

Manufacturing	Smart production management, automated defect detection	Internet	Intelligent coding assistance, data analysis, root cause analysis, IT operations
Finance	Financial market forecasting, smart customer service, risk control	Transport/Healthcare	Intelligent vehicle and crew scheduling, AI-assisted imaging & diagnosis
Marketing	Image generation, web design, copy creation, user growth strategies, etc. for growth engineering	...	

The mobile device industry



Large user base

54% of the global population (roughly 4.3bn people) owns a smartphone



Close interaction

The phone has evolved from making calls to a wallet, music player, computer, key, and more, integrated into every aspect of lives



Long screen time

OPPO phone users spend 6 hours per day on average; phones are our constant companions

Source: GSMA report 2023

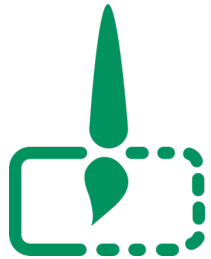
Source: OPPO statistics on phone users

How can AI empower users to focus on more meaningful tasks and live a more interesting life?

Fast-paced lives, fragmented time... Users want technology that frees up their energy and creativity

Phone use needs to be more efficient

Taking a photo should be completed in one click



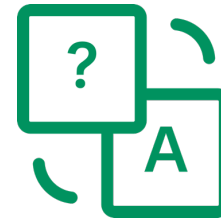
rather than switching between photo editing apps

Online media should be inclusive



rather than streamed with time-wasting ads and scams that discriminate less internet-savvy users

Language & culture should not be barriers



rather than sap our time and energy on translation and understanding culture differences

Time should not be wasted on admin



We still waste time and energy such as noting information and juggling schedules

Mission of AI smartphones : Solve the problems of fragmentation and admin tasks, so that users can focus on themselves and their value

Technology drives the evolution of mobile phones, enabling more productivity and creativity

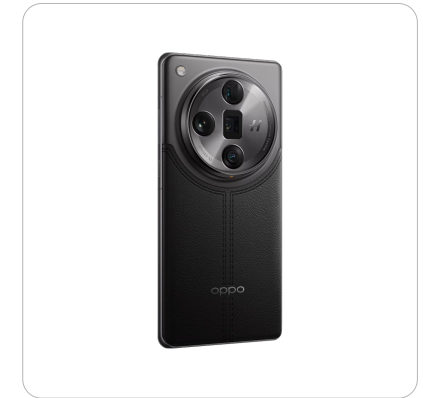
Feature phones

Smartphones

Next-gen AI smartphones

Capacitive touchscreens revolutionized the form factor and the user interface

Large models are transforming the way we use devices again



2008
OPPO A103
First mobile phone: Smiley Face

2013
ColorOS
Integrates hardware, software, and services

2013
OPPO N1
Camera phone

2023
OPPO Find X6
First phone with main cameras

2024
OPPO Find X7
Leading the industry toward next-gen AI smartphones

Music phone
Defines a new industry form

AI opens up endless possibilities in the user experience; OPPO and our industry peers have the opportunity to define what the AI phone will be

What makes AI smartphone?

Efficient computing



Perception of the real world



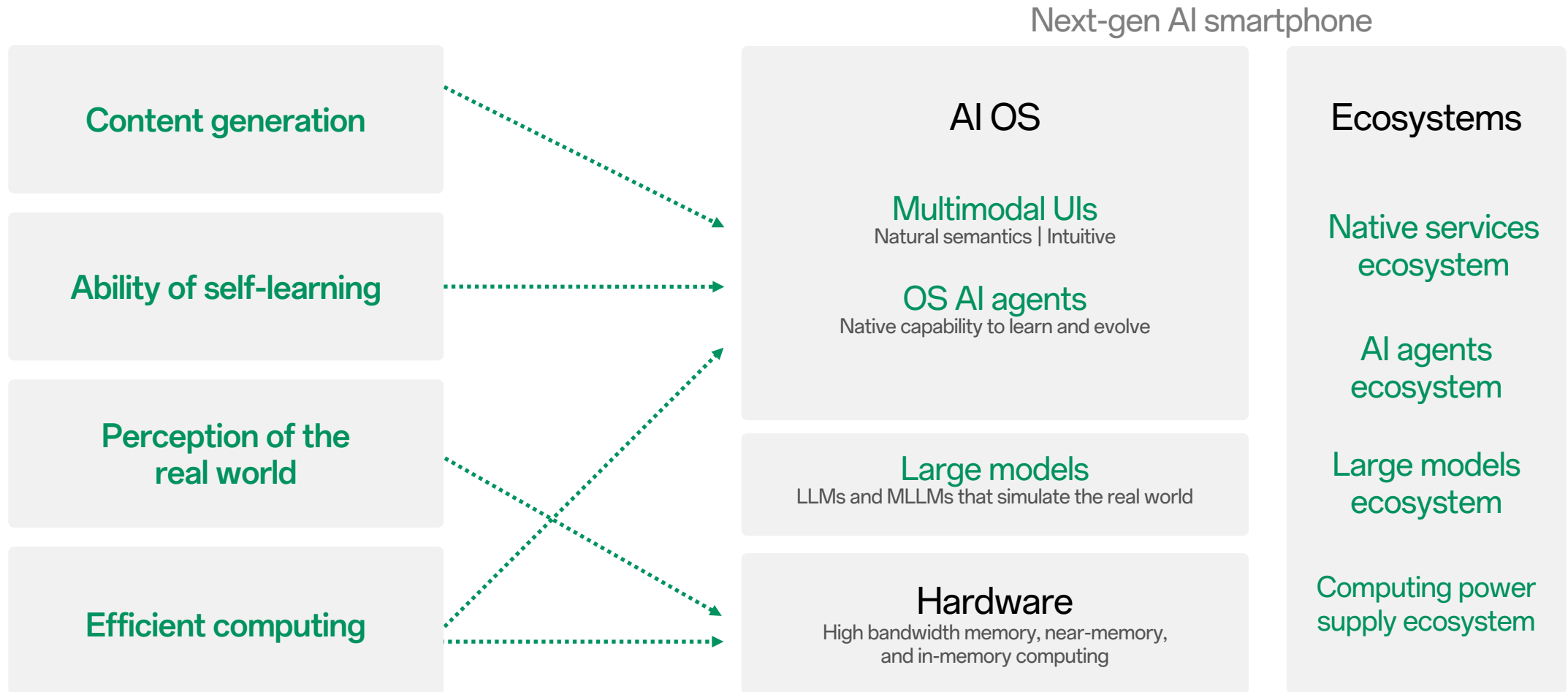
Ability of self-learning



Content generation



Full-stack transformation and ecosystem restructuring of AI smartphones



Characteristics of AI smartphones

Open ecosystem of user-generate service

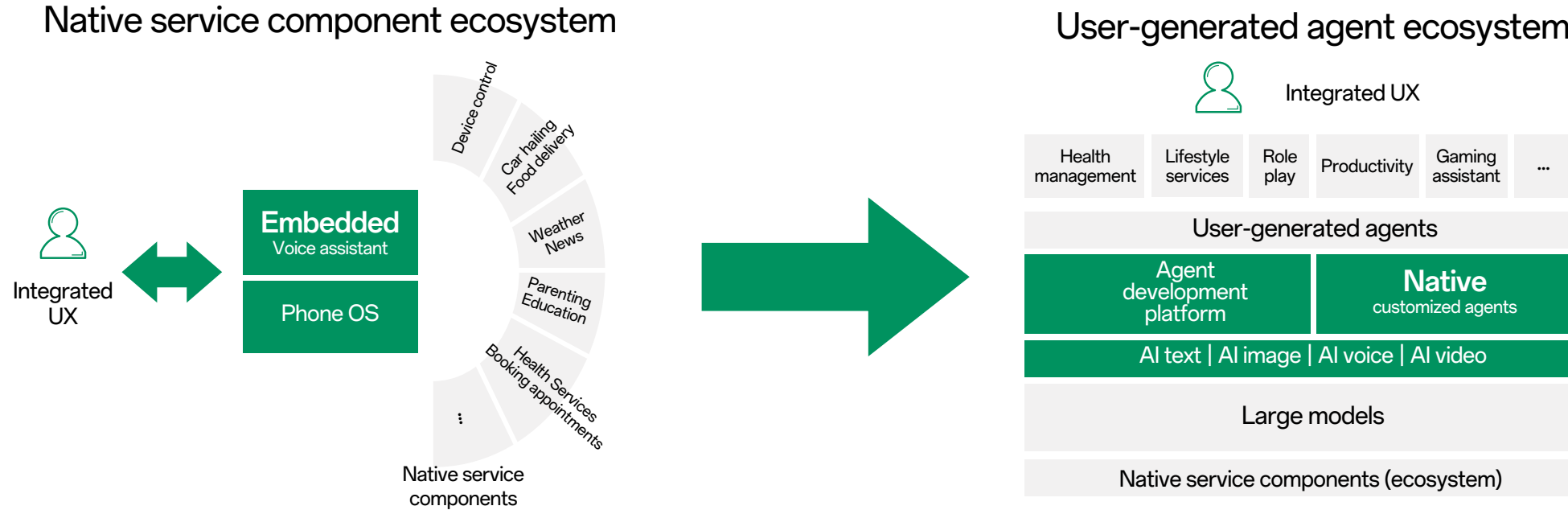
Context-aware, personalized AI OS

All-new multimodal UIs

Native AI agents

Device hardware supporting generative AI

Open ecosystem in both native components and user-generated agents



The open ecosystem of services built on LLMs for AI smartphones will include native service components provided by vendors and AI agents customized by users. For example, AndesGPT as a large model and Breeno as a customized agent.

Smart device manufacturers should build platforms for maximum openness in the AI services ecosystem

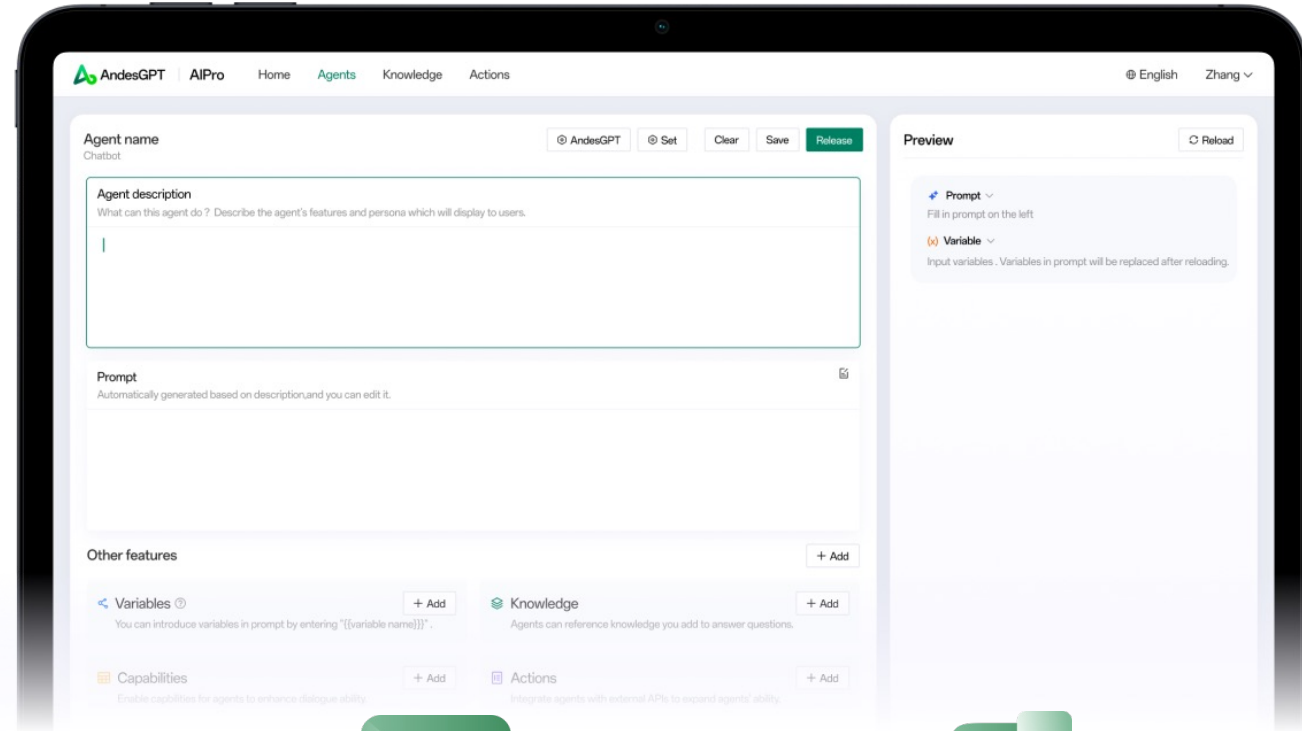
Open computing platforms and technology

Collaborative business models

Ecosystem governance systems & industry alliances

The industry should set standards and ensure zero barriers to entry for developers, so that users can shape the ecosystem they want

Zero-code development | Everyone can define their own agents



Zero-code development

Streamlined app development process with easy prompt definition, data import, and selection of plug-ins



Private domain data

Quick connection with data lakehouses, databases, and local files to enlarge the knowledge base for models



Plug-in components

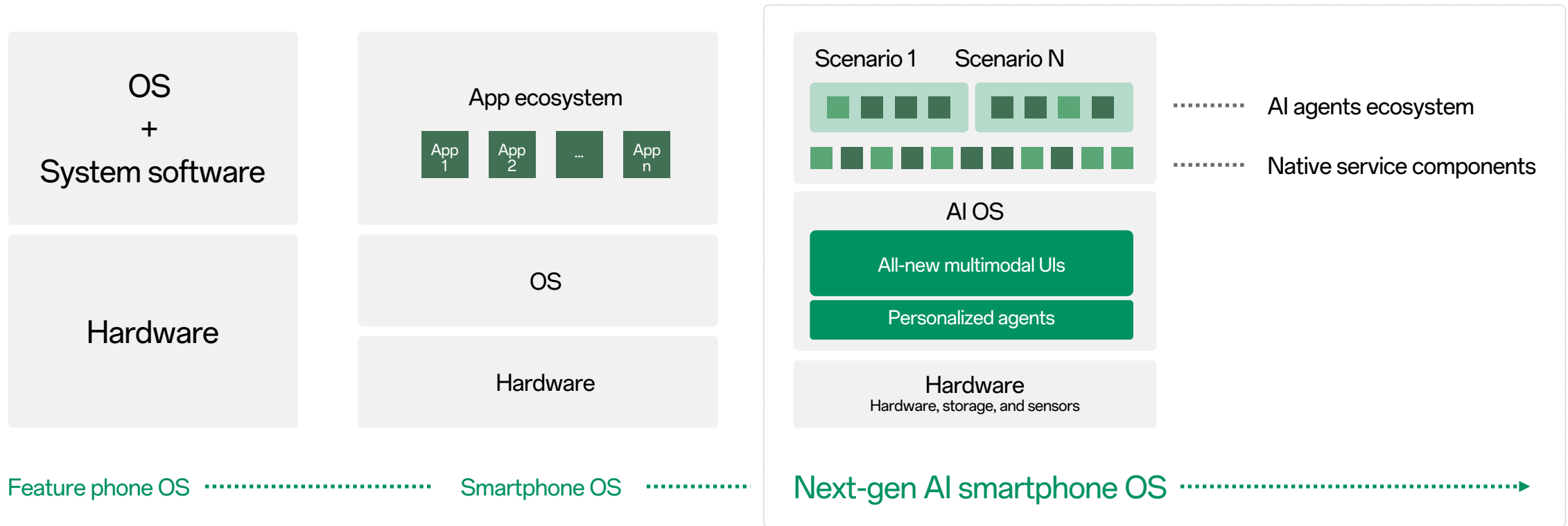
A wide range of plug-ins such as Q&A, online search, lakehouse query, database query, document analysis



Flexible call options

Supports JavaScript embedding and API calls to models

Context-aware, personalized AI OS



The AI OS breaks out of the rigid vertical silo for everyone to have their own customized AI assistant, delivering the benefits of AI to all

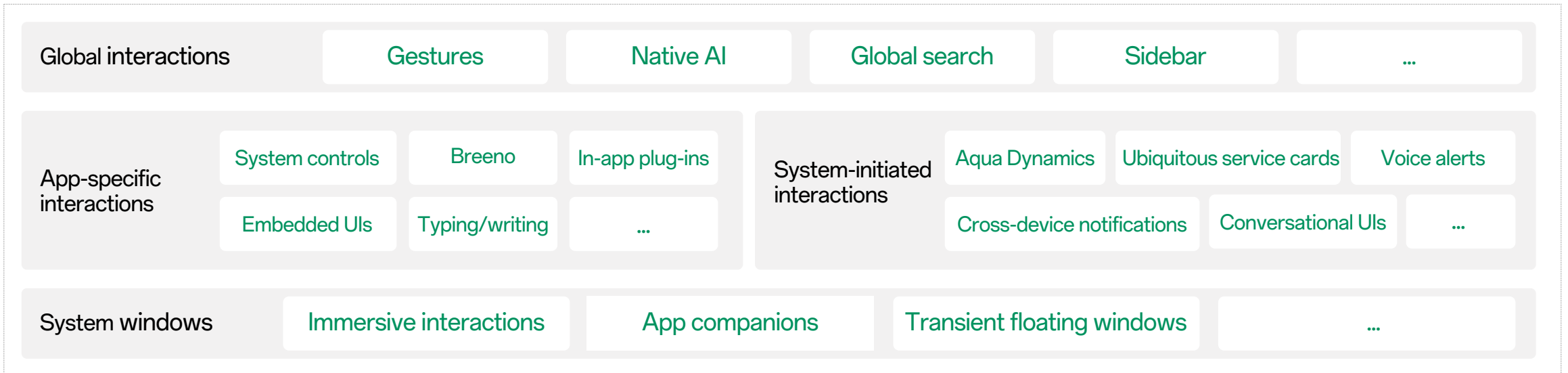
All-new multimodal UIs



Personality | Natural interaction

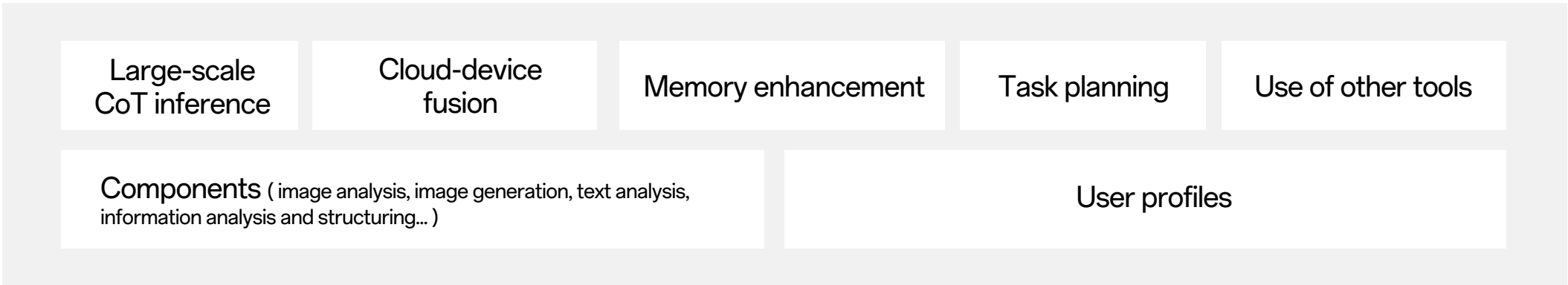
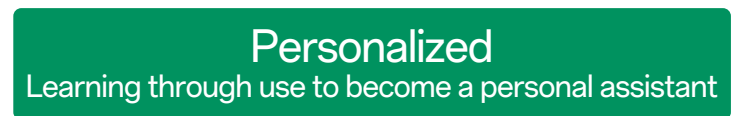
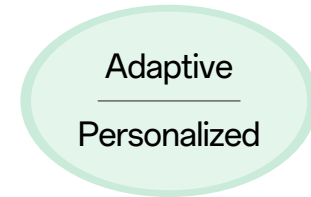
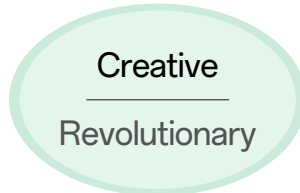
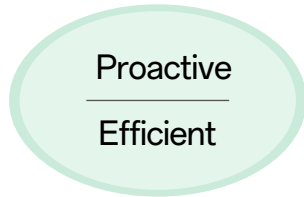
Learning through interaction

Natural language interaction



The new user interface on an AI smartphone makes it a personal assistant at hand, more than just a consumer electronic device

Embedded personalized agents



Native AI agents learn and adapt to user preferences to deliver an intuitive user experience

Example | Personal assistant: From standardized to personalized, from single-modal to multi-modal

An AI-powered personal assistant can understand complex needs and provide smarter, better, personalized services

Example: OPPO Find X7

Content generation
Speeches | Social media texts | Resumes | Slides outlining

Call with Breeno
Identify calls | Answer calls | Generate records

Chat with Breeno
Chit-chat | Open up | Brainstorm

Education
Role play | Tutoring | History Q&A

UI is in Chinese

Trends

Multimodal conversation
 Natural conversation |
 Multimodality integrated to OS |
 Understanding voice, text, imagery, files, and video |
 Control with voice and gestures

Trustworthy, useful, personalized
 Guardrails for content | Hallucination eliminated |
 Complex reasoning |
 Task scheduling | Services ecosystem |
 Customization |
 Personalized answers & recommendations |
 User-specific memory


Content generation
 AI text | AI voice | AI images | AI video |
 Creativity tools | Productivity tools |
 Fun personalized skills

The era of AI smartphones has arrived, and will transform the speed and ease of content creation

Example | System apps: Now tackling complex tasks easily, evolving to cross-device AI


Multimodal AI built into the OS simplifies the process of using the phone

Example: OPPO Find X7



AI Summarizer
 Generate call summaries in one click
 Call logs | Call summaries | To-dos | Sync notes |

UI is in Chinese



AI Eraser
 Snap photos, remove objects, and generate the background in one step
 Smart circling | Removal | Background generation

Before After

Step 1: Add-on AI features (single-mode, single data source)

AI given discretion over interfaces and controls: power button, voice, Aqua Dynamics, ubiquitous service cards, image settings, text, video, and audio can be accessed by single-modal AI.

Step 2: AI embedded into OS (multimodal, single data owner/multiple data sources)

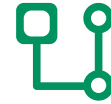
Images, text, video, and audio are combined to generate something new. For example, text and audio can be used to generate call summaries. The AI assistant understands and generates data and invokes personal services.

Step 3: Cross-device AI (multi-dimensional data, multiple data owners/multiple data sources)

Accurately identifies user's intentions using data from multiple sensors on multiple devices; makes intelligent decisions on service orchestration using data provided by different suppliers.

Cross-device AI experience enables seamless transitions between the digital and real worlds

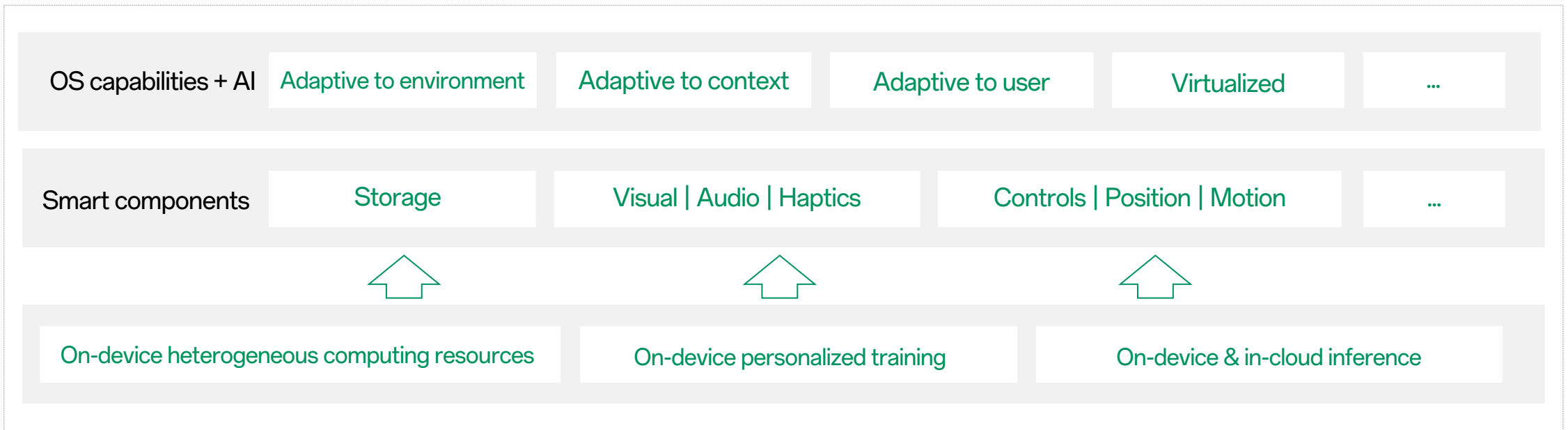
Device hardware supporting generative AI



Accurate understanding of user intentions

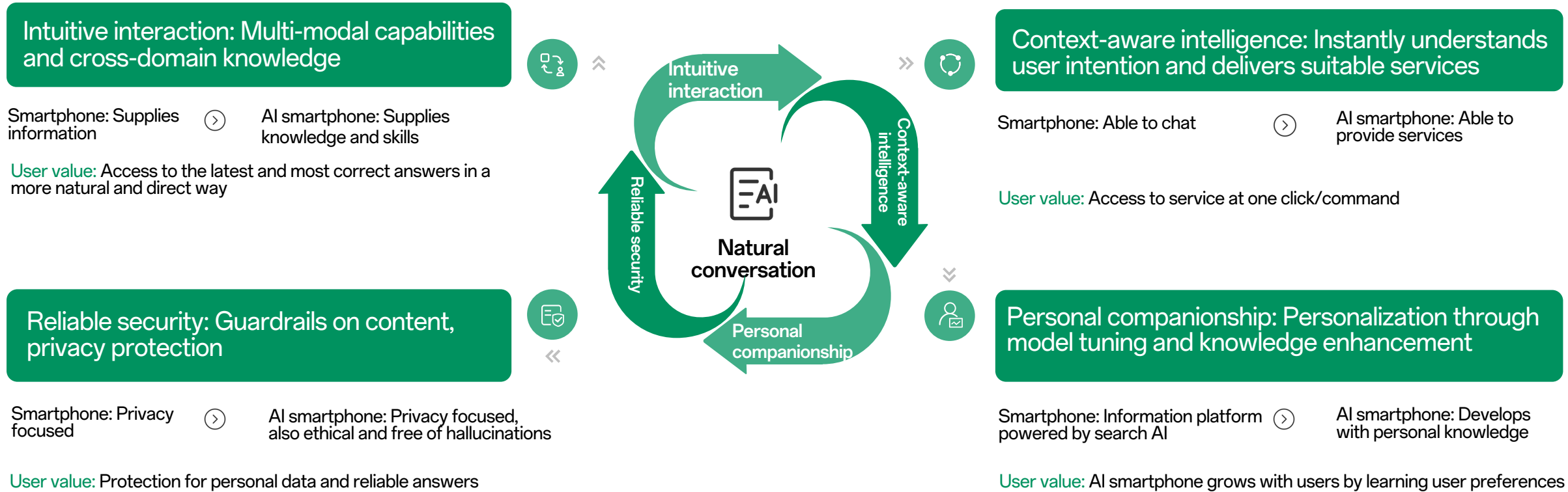
Efficient computing for low power consumption, long battery life

Context-aware understanding of the user



Current hardware does not yet support the new model;
new SoCs and in-memory computing architectures will emerge

Benefits of AI smartphones: A personal assistant that provides intuitive interaction, context-aware intelligence, personal companionship, and reliable security



Reliable security | Innovate to secure data, algorithms, and content; alignment with our values

Build secure, friendly AI with technology

Security compliance and ethical risks related to AI technology



Impact on user privacy

Privacy disclosure



Impact on country governance

Sensitive information compromises national security

Misinformation stirs up the public sentiment

Infringements during AI training

Challenges in delivering AI benefits to all and bridging knowledge gaps



Impact on user experiences

Generation of offensive information

Generation of outdated or inaccurate information

Generation of unwanted content

Data security

Focusing on security, compliance, and objectivity of source data used in training

Security of source data

Compliance of source data

Objectivity of source data

Algorithm security

Developing attack/defense and model calibration schemes

AI firewalls

Attack/defense and evaluation system

Enhancement with knowledge graphs

Content security

Ensuring that compliant and satisfactory content is generated

Traceability of generated info

Labeling of generated content

Evaluation criteria for generated info

Values alignment

Building a complete calibration system to ensure consistency with human values

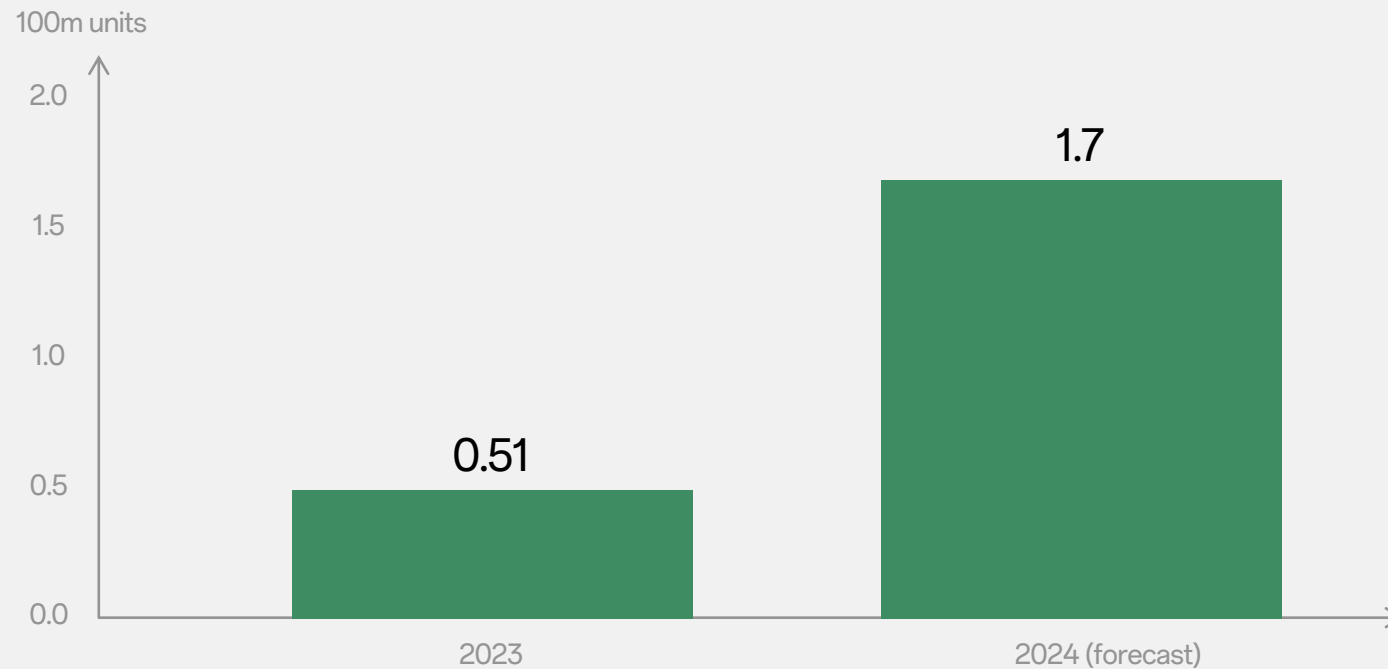
Reinforcement learning from human feedback (RLHF)

Constitutional AI for smart scenarios

Shipments of next-gen AI smartphones forecasted by IDC (global market)

IDC forecasts 170 million next-gen AI smartphones to be shipped in 2024, representing almost 15% of the total smartphone market.

IDC forecast of the next-gen AI smartphone market worldwide



Next-gen AI smartphones to be shipped worldwide in 2024

170 million units

15%

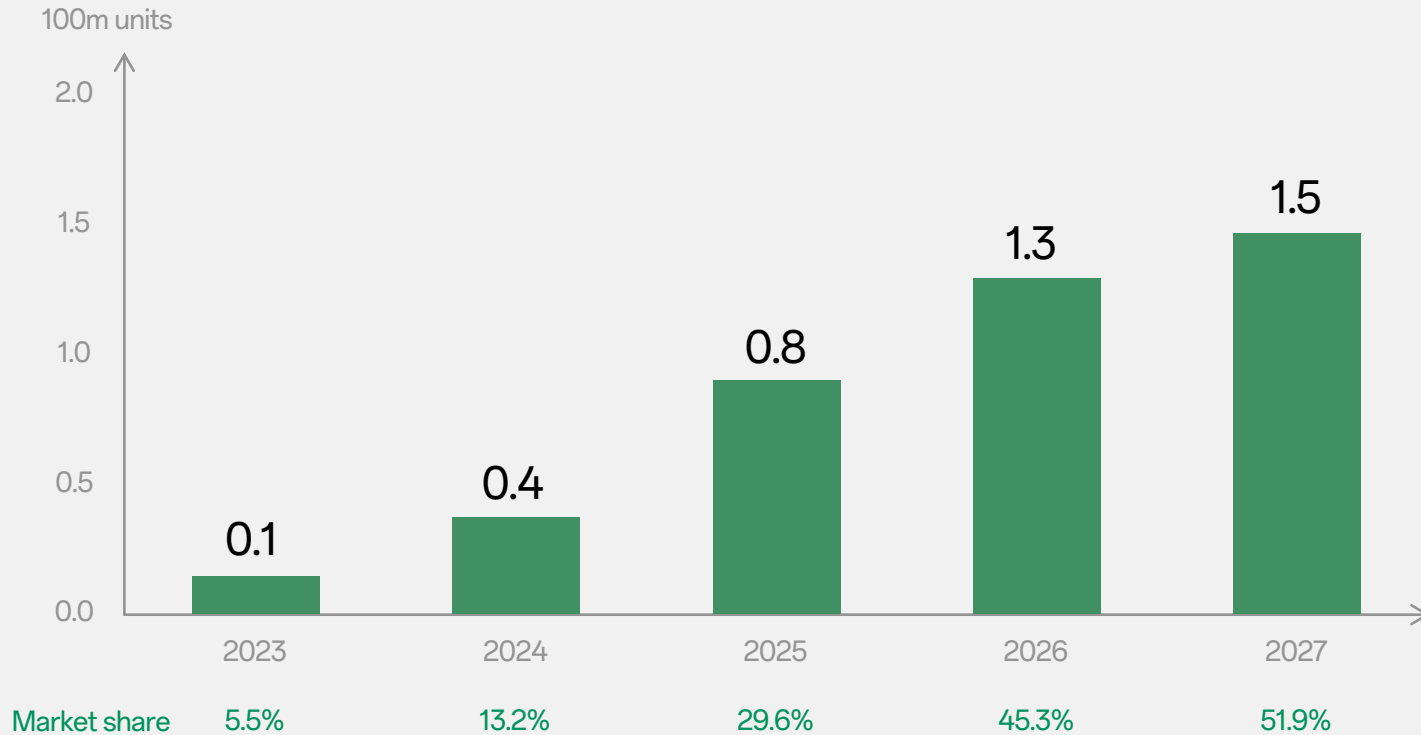
of total smartphone market worldwide

*Next-gen AI smartphones use SoCs capable of running on-device GenAI models more quickly and efficiently and have an NPU with at least 30 TOPS performance. Examples of on-device GenAI include Stable Diffusion and various large language models (LLMs).

Shipments of next-gen AI smartphones forecasted by IDC (Chinese market)

IDC's forecast suggests that the share of next-gen AI smartphones in the Chinese market will surge after 2024 to over 50% in 2027, amounting to 150 million units, as chipsets and user scenarios will iterate swiftly.

IDC forecast of the next-gen AI smartphone market in China



Next-gen AI smartphones to be shipped in China in 2027

150 million units

51.9%

of Chinese smartphone market

*Next-gen AI smartphones use SoCs capable of running on-device GenAI models more quickly and efficiently and have an NPU with at least 30 TOPS performance. Examples of on-device GenAI include Stable Diffusion and various large language models (LLMs).

Next-gen AI smartphones will transform the global smartphone industry

- 2024 onward, next-gen AI smartphone sales will explode, creating **a wave of phone sales**.

- **Flagship phones** will be an important driver of next-gen AI smartphones in the early stages.

- **16 GB RAM** will be the minimum spec for next-gen AI smartphones. SoCs and other hardware also need to be upgraded.

- Upgraded storage, displays, and cameras on next-gen AI smartphones will lead to **changes in hardware** and **higher costs**. Manufacturers may increase the ASP by leveraging technological innovations and AI-related selling points.

- Generative AI will spark a burst of new apps, which will in turn bolster AI smartphone sales. **AI apps deployed on smartphones** will offer more utility compared to existing apps.

- Chip makers, OEMs, and industry players will **accelerate the transformation of user scenarios**, advancing the development of next-gen AI smartphones.

Next-gen AI smartphones will transform content creation

AI interactivity integrating hardware, software, and services

Personal assistant

Customized agents
"AI smartphone that grows with you"

Planning and recommendation

Inquiries and chats

Productivity tool

Efficiency at work and play

File browsing

File editing

Audio/video
summarization

Easy creation

Create with ease, anytime,
anywhere

Photo touch-up

Image generation

Video editing

Fun personalization

Personalized expression with
images, text, and video

Copywriting assistant

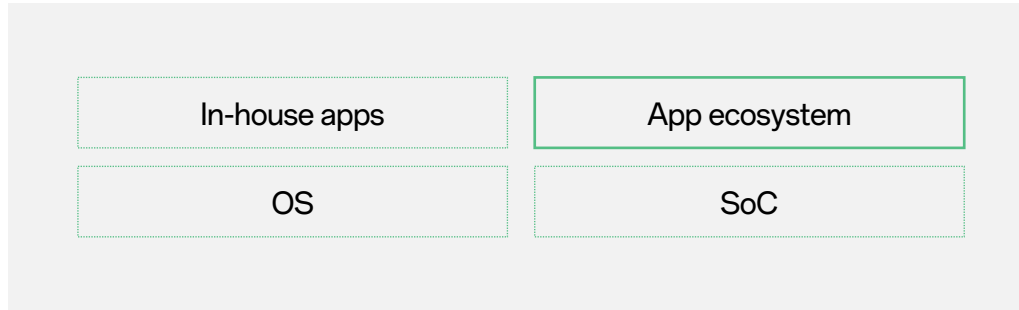
Personalized images

Personalized videos

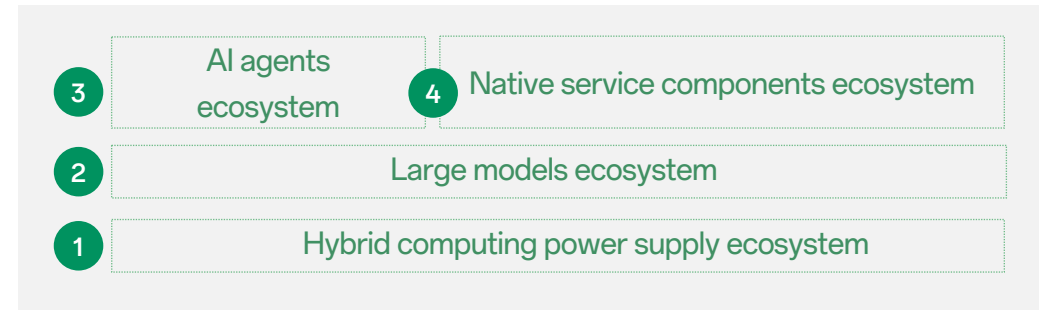
Personal creativity will become a habit, anytime, anywhere

AI smartphone ecosystem outlook

Existing ecosystem



Next-gen AI smartphone ecosystem



1

Hybrid computing power supply ecosystem

- Long-term mismatch between supply of computing power and demand for computing from AI products
- Call for concerted efforts with chipset makers to find satisfactory solutions

2

Large models ecosystem

- Persistent competition among large models
- Large model capabilities channeled by smart device makers to address user needs using hybrid expert models and other solutions

3

AI agents ecosystem

- Lower barriers to entry for agent development compared to app development, which will mean more customization
- Smart device makers with app ecosystem experience can duplicate their existing practices to deliver a richer agent ecosystem

4

Native service components ecosystem

- Large model plug-ins and native OS services will be the most common early applications
- Native services accessible to AI agents will support the growth of the AI ecosystem

OPPO will be an open, collaborative contributor as we kickstart the era of AI smartphone

Acknowledgments

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