AI Influence on The SSD Market in Asia

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FMS the Future of Memory and Storage

SiliconMotion

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Outline

- Introduction: AI and SSD Market in Asia
- AI-Driven Demand for SSDs in Asia
- Technological Advancements in Asian SSD Industry
- Asian SSD Market Trends and Future Outlook

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Overview of AI Development and Adoption in Asia

Country/Region	AI Investment [1] (USD Million, 2022)	AI-related Patents [2] (2020-2022)	AI Talent [3] (Thousands, 2022)	Key AI Application Areas	Government Support [4] (1-10)
China	17200	85000	1700	Manufacturing, Healthcare, Finance	9
Japan	9500	22000	120	Robotics, Autonomous Driving, Industry 4.0	8
South Korea	4800	15000	80	Semiconductors, Smart Cities, Fintech	8
India	3200	8500	600	IT Services, Fintech, Healthcare	7
Singapore	1500	3000	25	Finance, Logistics, Smart Cities	9
Taiwan	950	5500	35	Semiconductors, Manufacturing, Healthcare	7

Source: Internal Marketing Research

1. AI Investment data includes both government and private sector investments.
2. AI-related Patents represent cumulative numbers.
3. AI Talent includes researchers, engineers, and related professionals.
4. Government Support level is based on a composite assessment of policy strength, funding support, and regulatory environment.

Current State Of The SSD Market In Asia

- **China**
  - One of the world's largest SSD consumer markets
  - Rapid rise of domestic brands like Lenovo and YMTC
  - US-China trade tensions accelerating development of local supply chains
- **South Korea**
  - Major global SSD market player, with Samsung Electronics and SK Hynix as leaders
  - Samsung holds about 33% of global SSD market share
  - Continuous investment in advanced NAND flash technology
- **Japan**
  - Strong SSD technology base, with Kioxia (formerly Toshiba Memory) as a key player
  - Steady growth in enterprise SSD market demand

Current State Of The SSD Market In Asia

- **Taiwan**
  - Leading in SSD controller technology, with SiliconMotion holding a significant global market position
  - Key role of contract manufacturers like TSMC in the SSD supply chain
  - Highly competitive consumer SSD market with active brands like ADATA and Transcend
- **India**
  - Major global SSD market player, with Samsung Electronics and SK Hynix as leaders
  - Samsung holds about 33% of global SSD market share
  - Continuous investment in advanced NAND flash technology
- **Singapore**
  - Strong SSD technology base, with Kioxia (formerly Toshiba Memory) as a key player
  - Steady growth in enterprise SSD market demand

Unique Challenges and Opportunities in The Asian Context

Challenges

- Technological Dependence
- Geopolitical Influences
- Data Localization Requirements
- Price-Sensitive Markets
- Talent Shortage

Opportunities

- Market Size
- Government Support
- Digital Transformation
- Innovation Ecosystems
- Edge Computing
- Vertical Market Opportunities
- Regional Cooperation
- Localized AI Solutions

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Role of AI in Driving High-performance Storage Needs

AI Application	Storage Requirement	Impact on SSD Demand (1-10)	Key Performance Metrics
Machine Learning Training	High Capacity, Fast Read/Write	9	Capacity: 10+ TB Read: 5+ GB/s, Write: 3+ GB/s
Real-time AI Inference	Low Latency, High IOPS	8	Latency: <100 µs, IOPS: 1M+
Big Data Analytics	Large Dataset, Parallel Access	8	Capacity: 50+ TB, Parallel Read: 10+ GB/s
Natural Language Processing	Fast Random Read/Write	7	Random Read: 1+ GB/s, Random Write: 500+ MB/s
Computer Vision	High Bandwidth, Large Files	8	Bandwidth: 5+ GB/s, File Size: 10+ GB
AI Model Versioning	Frequent Write, Data Integrity	6	Endurance: 5+ DWPD, End-to-end protection
Edge AI	Compact, Power Efficient	8	Form Factor Power, Capacity
AI-enhanced Cybersecurity	Real-time Processing, Encryption	7	Encryption: AES-256, Speed: 1+ GB/s
Autonomous Vehicles	Rugged, Fast Write	8	Temp: -40 to 85°C, Write: 2+ GB/s
AI in Financial Trading	Ultra-low Latency, High Durability	9	Latency: <10 µs, Endurance: 10+ DWPD

Feature	Importance for AI (1-10)
Capacity	9
IOPS	9
Read/Write Speed	9
Latency	9
Thermal management	8
Endurance	7
Power Efficiency	7
Encryption	7
Form Factor	6
E2E protection	6

SSD Requirements for AI Workloads in Asian Markets

- **China**
  - Largest SSD market in Asia
  - CAGR for ultra high SSD capacity is projected to be 50%

- **India**
  - Fastest growing SSD market
  - Demand for cost-effective/high-performance SSDs

- **South Korea**
  - Home to Samsung and SK Hynix, two global leaders in NAND flash production
  - Leading in AI-optimized SSD controller development

- **Japan**
  - Focuses on high-endurance SSDs for industrial and robotics
  - NVMe adoption rate for AI workloads at industrial SSD is highest in Asia

- **Singapore**
  - Hub for AI in finance, most of SSDs used in financial sector

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The Progression of AI Applications

Early Stage: Machine Learning

- Image Recognition and Speech Recognition
- Specific Task Inference (e.g., AlphaGO)
- Large-scale Data Interpretation and Learning

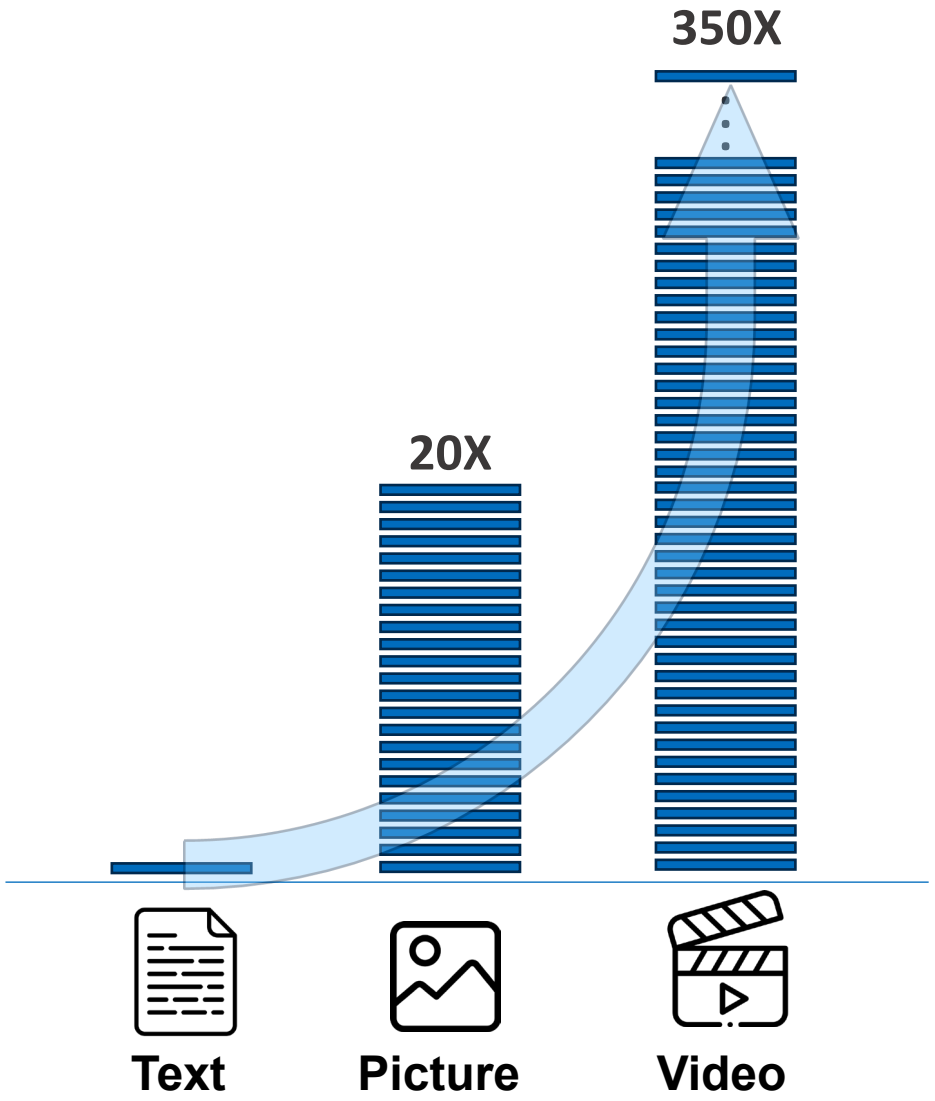
Current State: Generative AI

- GPTs
- Intelligent Virtual Assistants
- Text-to-Text and Text-to-Image Generation
- AI-Powered Video Creation and Editing

Future Outlook

- AGI

Generative AI Induced Data Explosion



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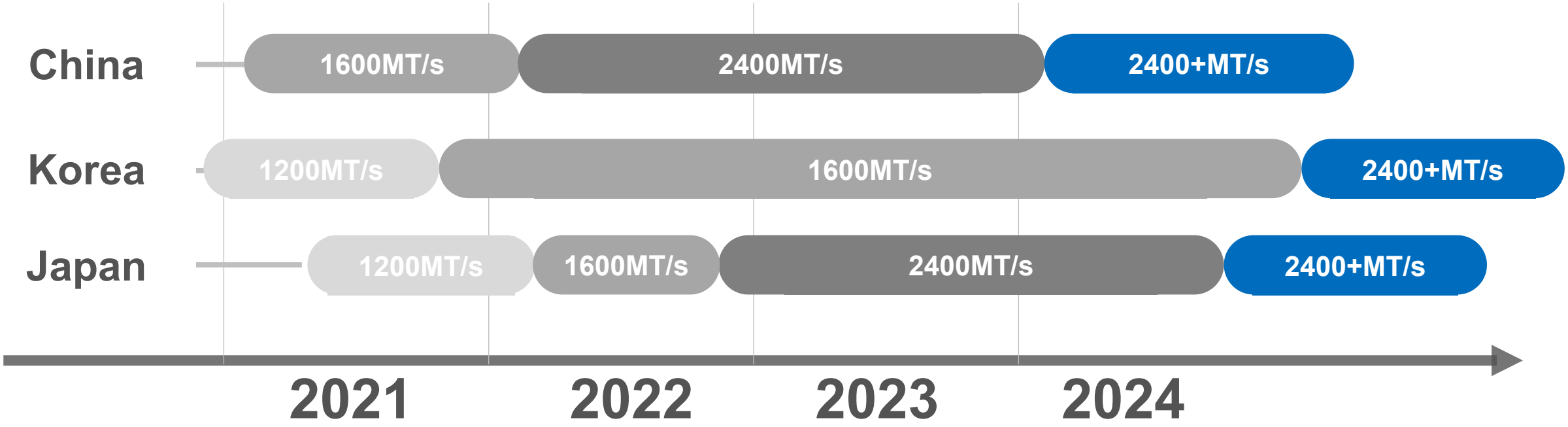
Endurance	7
Power Efficiency	7
Encryption	7
Form Factor	6
E2E protection	6

Key Asian NAND Vendor Technology Roadmap



SiliconMotion PCIe Gen5 Client SSD Controller

- PCIe Gen5x4
- 8th NANDXtend® ECC Technology
- TSMC 6nm process
- 8-channel with 32CEs (3,600 MT/s)
- Quad-core ARM Cortex R8® CPU
- LPDDR4 / DDR4
- AES256 / TCG Opal 2.0
- Seq. R/W: 14.5/14 GB/s

SiliconMotion USB3.2 Gen2x2 Portable SSD Controller

- USB3.2 Gen2x2
- 4KB LDPC for TLC/QLC
- Maximum capacity up to 8TB
- TSMC 28nm process
- 4CH, 8CE/CH
- NAND I/O: 1200MT/s
- Dual ARM Cortex R5®
- Seq. R/W: 2100/2000 MB/s

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Future Directions in AI-driven SSD Technology in Asia

- AI-Optimized SSD Controllers
- Computational Storage Devices
- Advanced QLC NAND Technology
- AI-Enhanced Firmware
- Edge AI-Specific SSDs
- AI-Driven Manufacturing Processes
- Advanced Thermal Management

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Driving AI Innovation in Flash Storage

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