



# **Changing the World:** The Flash Memory Revolution

**Eli Harari**  
Chairman & CEO  
SanDisk Corporation

# Forward Looking Statement

During our meeting today we will be making forward-looking statements.

Any statement that refers to expectations, projections or other characterizations of future events or circumstances is a forward-looking statement, including those relating to revenue, pricing, market share, market growth, product sales, industry trends, expenses, gross margin, production capacity and technology transitions and future products.

Actual results may differ materially from those expressed in these forward-looking statements including due to the factors detailed under the caption “Risk Factors” and elsewhere in the documents we file from time-to-time with the SEC.

We undertake no obligation to update these forward-looking statements, which speak only as of the date hereof.

**In the past twenty years we have  
changed the world**

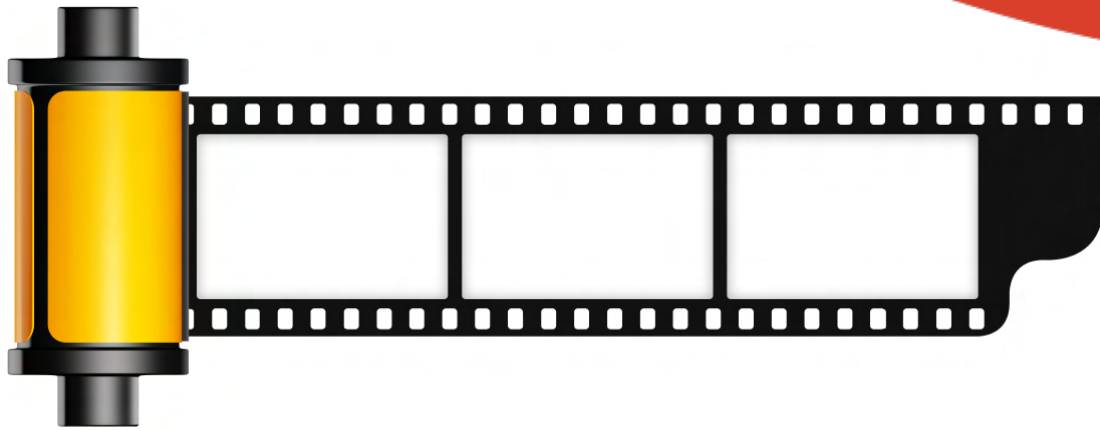


**1988**



**2008**

**From 36 photos on a roll to 5,000  
images in your hand**



1988

2008

# From 1 file on a floppy to 1,000 documents on a Flash drive



1988



2008

# From 20 songs on a tape to 5,000 tunes in your pocket



1988



2008

# The music and video revolution continues

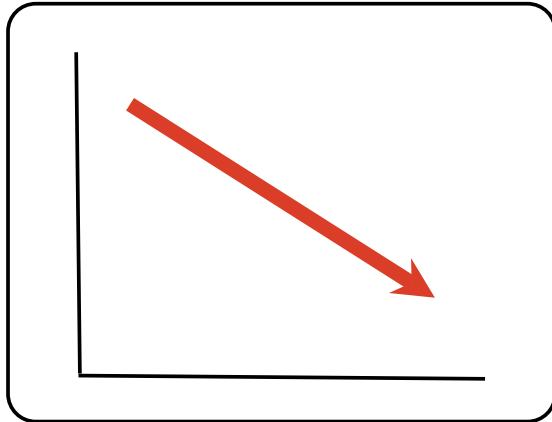


1988

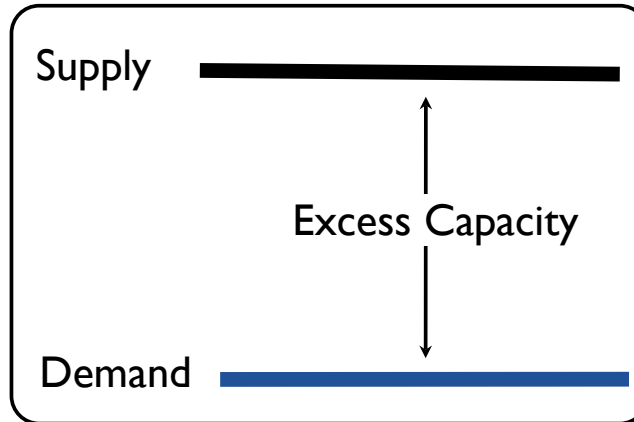
2008

201X

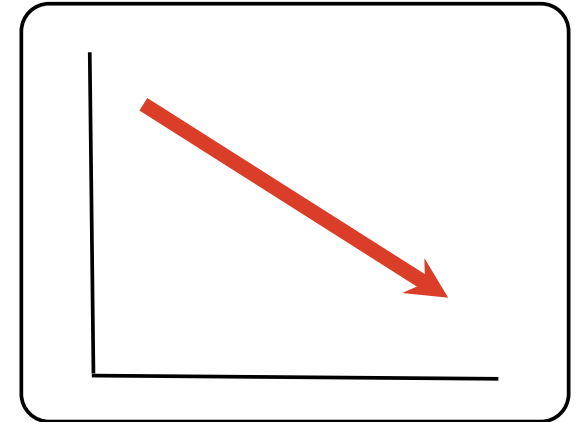
# Our industry is facing some challenging times



**Falling US  
Consumer Confidence**



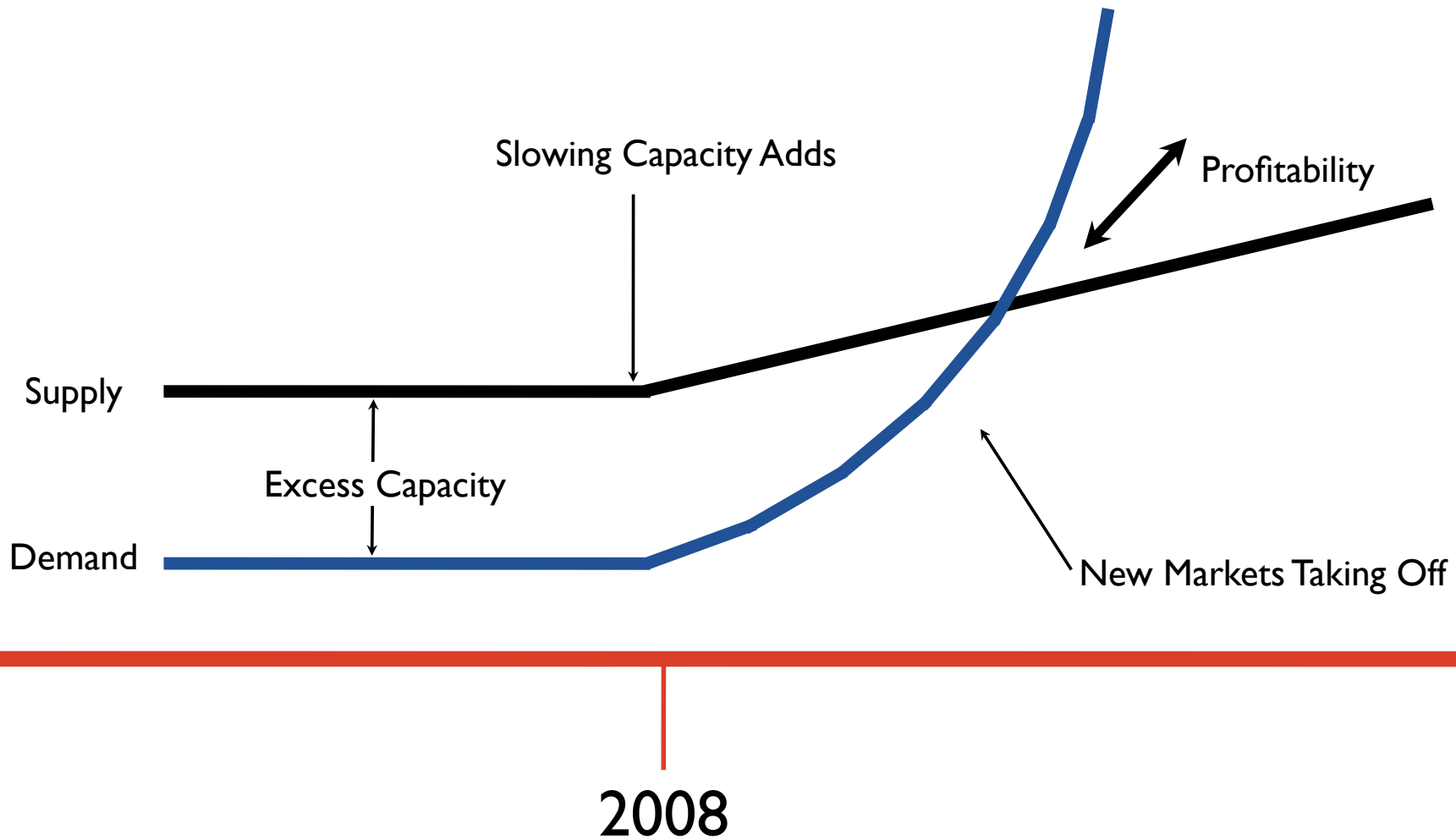
**Excess Supply,  
Commodity Pricing**



**3rd year of ~ 60%  
annual ASP decline**



# Self-correction will lead to growth with profitability in the next decade



# Flash will profoundly transform three huge growth markets



**Consumer Electronics**



**Handsets**



**Computers**

**On board GPS systems will be a multi-billion dollar industry**



# Video is the new photo



# Flash technology is at the heart of online file sharing, social networking

## Capture



## Store



## Share



# Flash is enabling the digital book revolution



**Amazon Kindle:  
the future of  
reading**

**New paradigms require new  
ways of thinking**

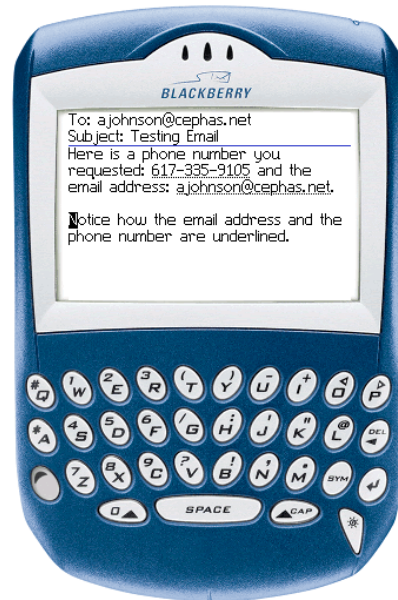


**The world's first  
horseless carriage**

# The changing face of cell phones



**Voice**



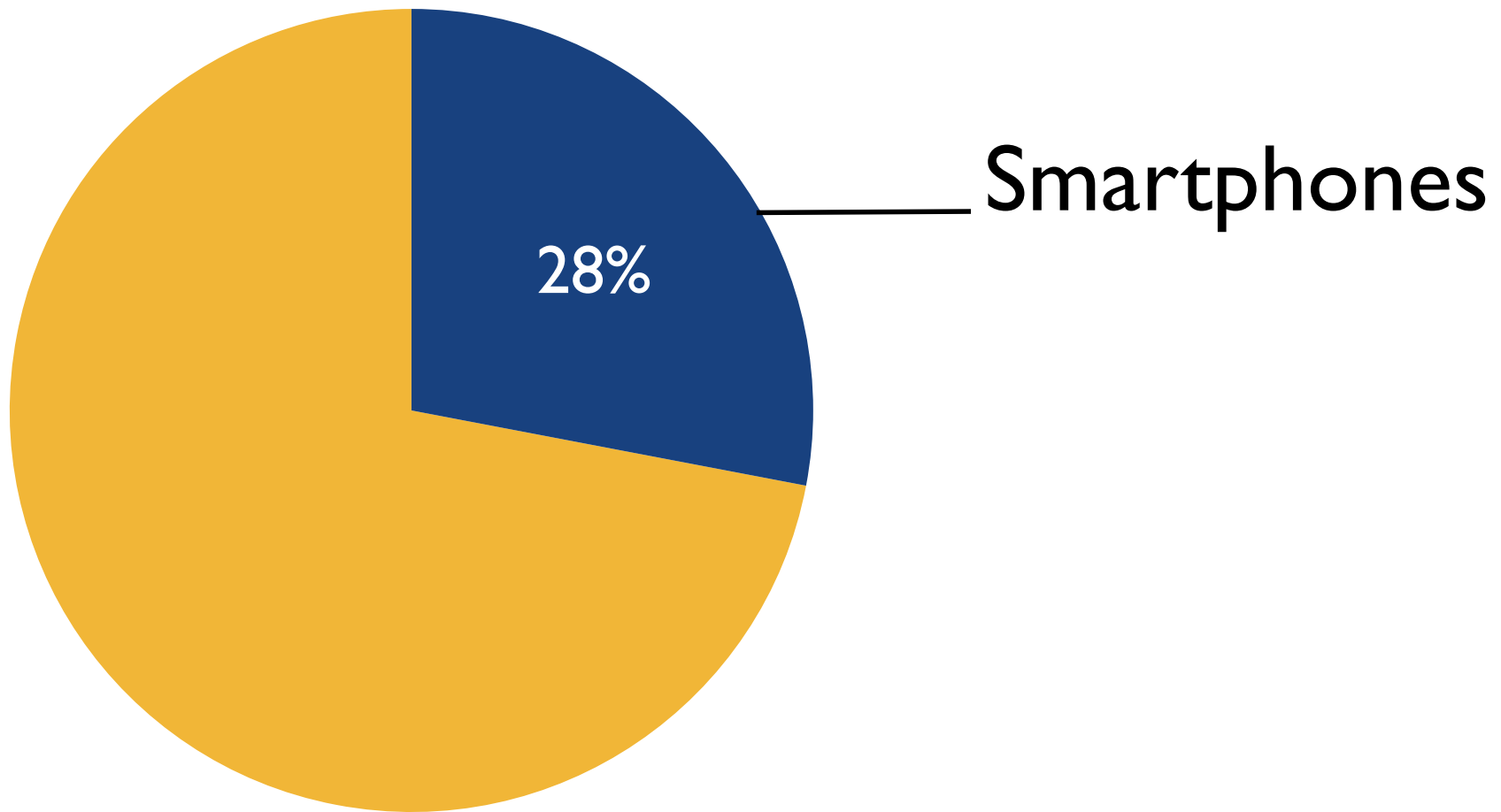
**Data**



**Video**



**Smartphones will account for 28% of wireless shipments in the U.S. this year**



*Source: CEA*

**80% of cell phones will have  
memory slots by 2012**



*Source: Gartner*

# Future of mobile devices: all your content in your pocket



**4G Broadband/Wimax:** always on

**PC OS:** Symbian, Android, Mac, Linux, MS  
Mobile PC

**3rd-party applications:** iPhone 3G

**Local secure flash:** (8GB to 128GB)

**Flash caching**

**MNO competition:** deliver content & services

**Convergence:** Netbook PC, Smartphone,  
Multimedia handsets

# Notebooks continue to lose weight and gain power



1988



2008



2010

# SSD will complement HDD in enterprise performance

	HDD	SSD
Read Performance	x	100x +
Write Performance	x	10x +

Source: Gartner

**One in five computing devices will have solid state drives by 2011/2012**



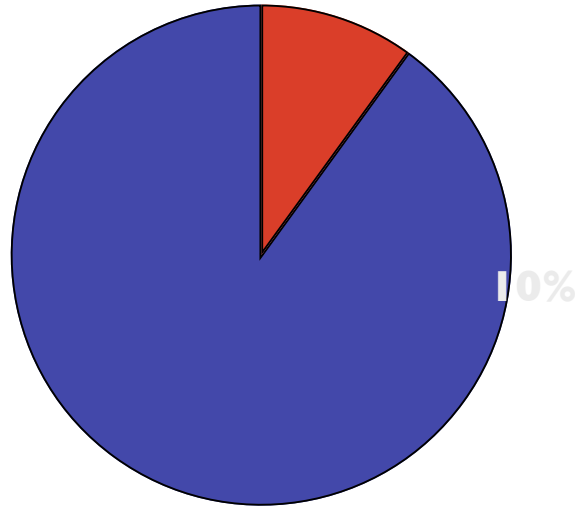
Traditional hard disk drive



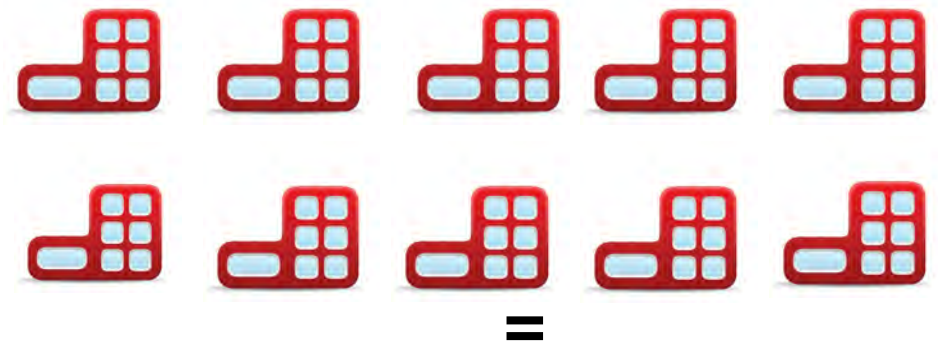
Solid state hard drive

*Source: Gartner*

**10% share of the HDD market =  
huge rise in Flash demand**



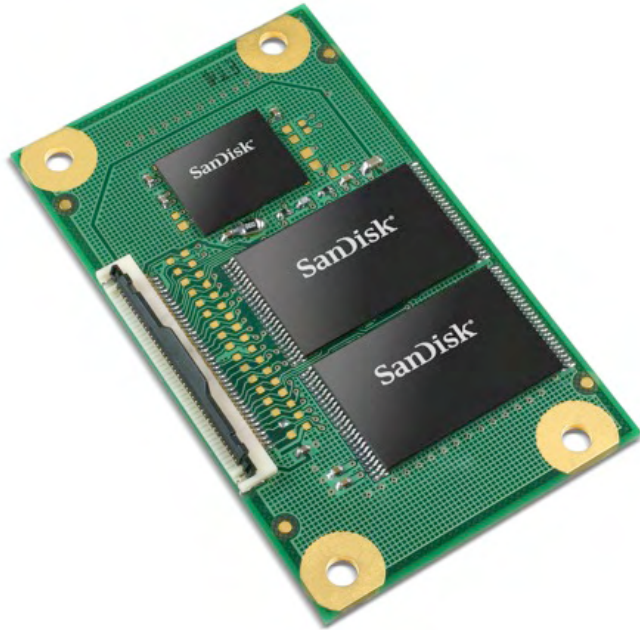
**300mm wafers  
~12.5M wafers/year**



**10 New Flash Mega-fabs**

**HDD Total Storage  
~ 500,000,000 TB/year  
~2012/2013**

# Netbook PCs are taking off



500,000

2007



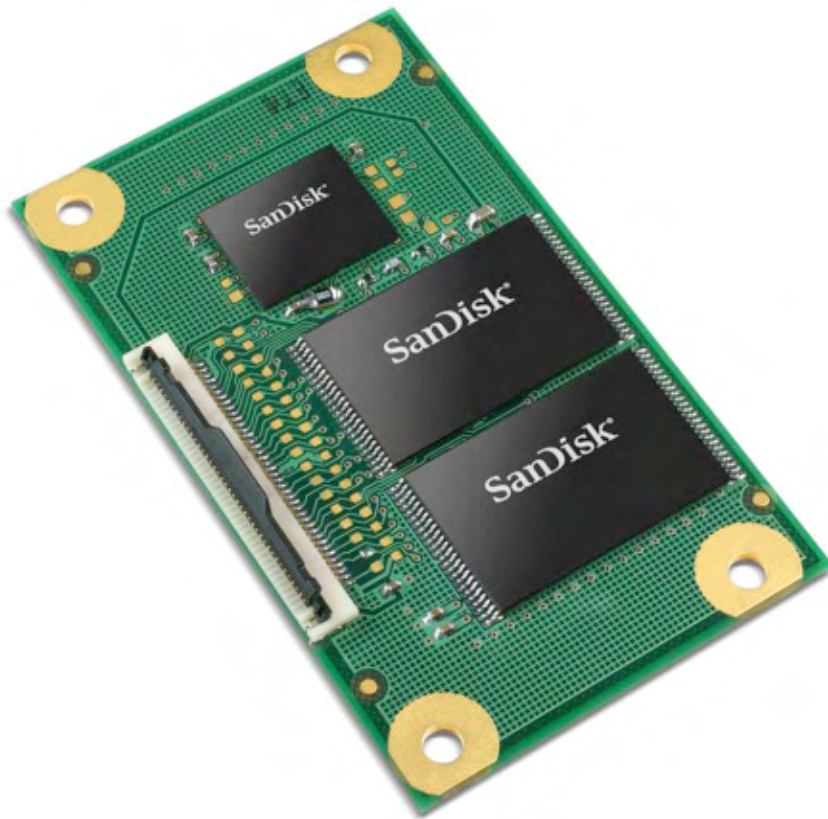
18 million

2009

Source: Taiwan MIC



**Flash has the power to democratize technology**



**A billion new middle class consumers in  
the next ten years**



**Affordable computing for every child in every country**



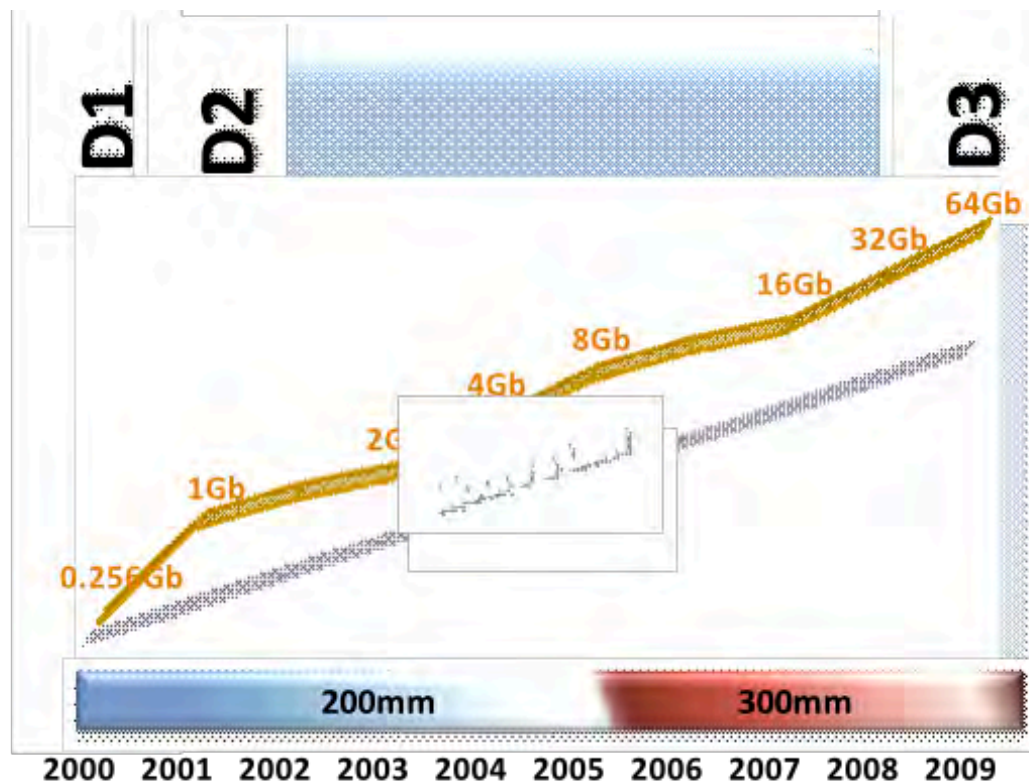
# Building communities through wireless networks



# Making light work of global business travel

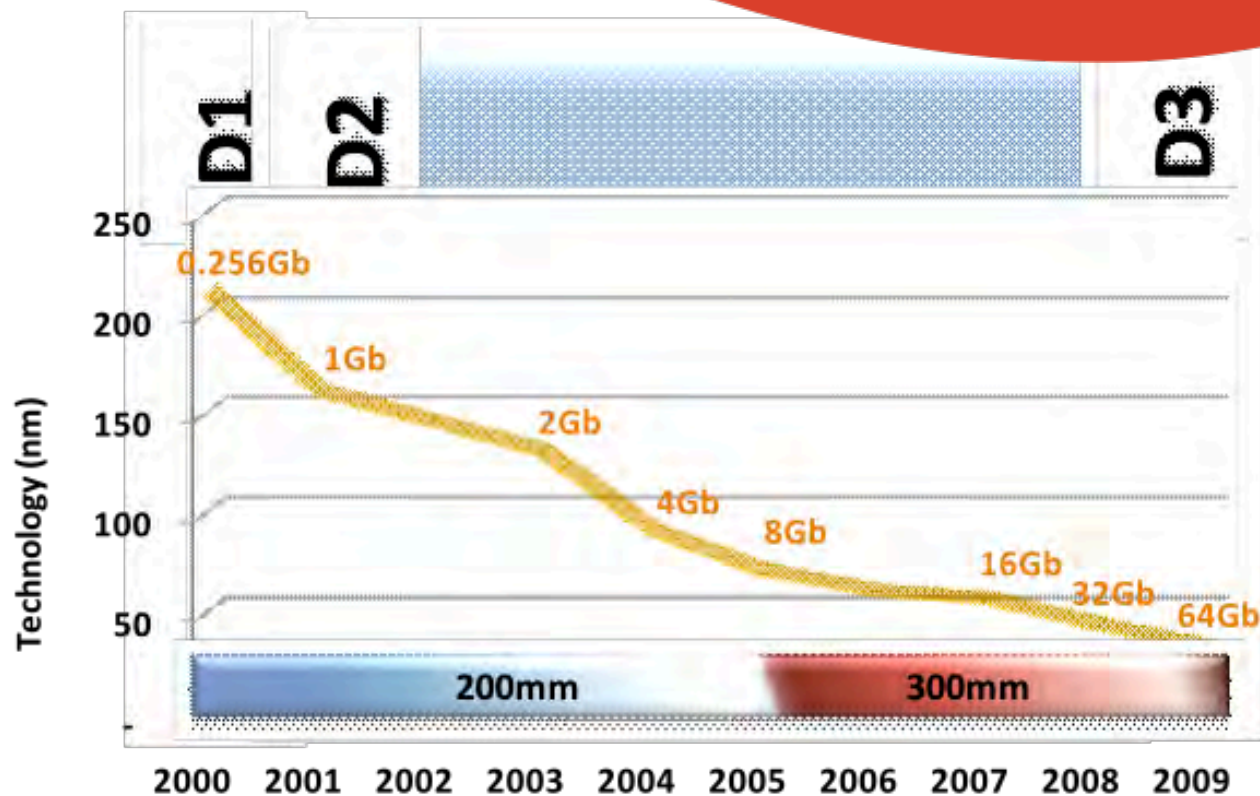


# Flash's growth engine: beating Moore's Law



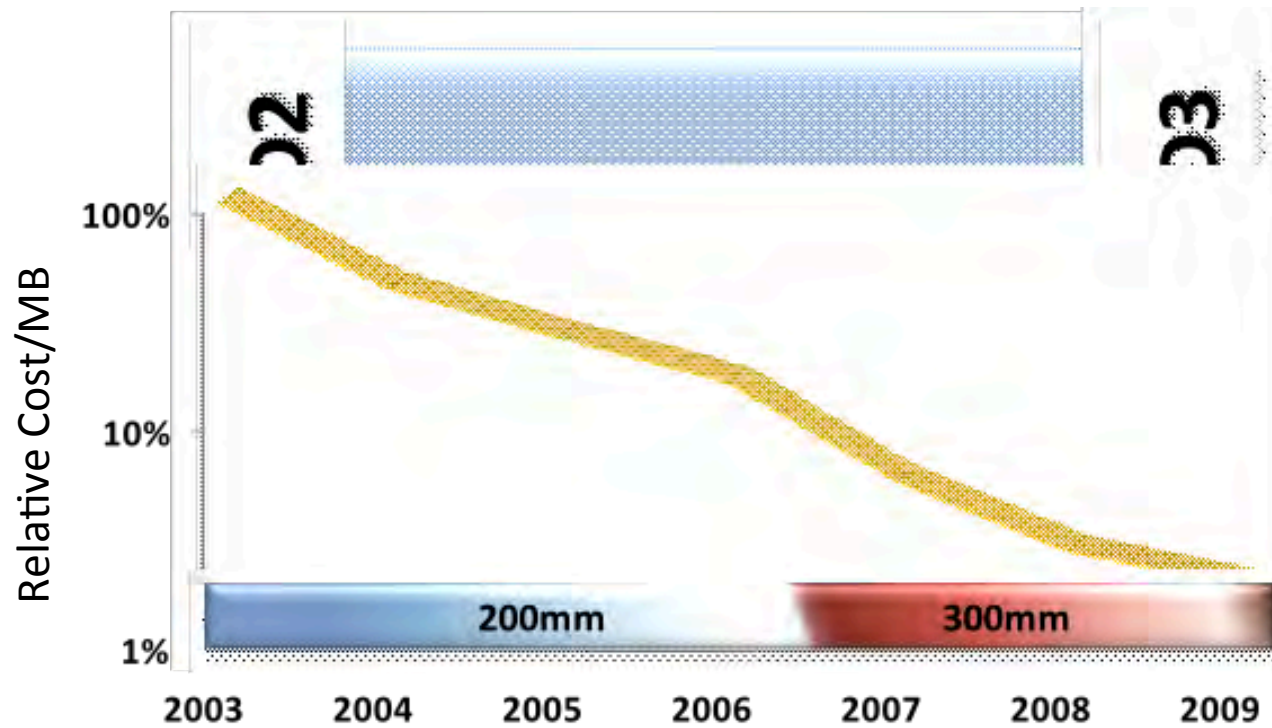
**Faster than a speeding Moore: 9 generations in 10 years**

# Unprecedented pace of Flash technology transitions



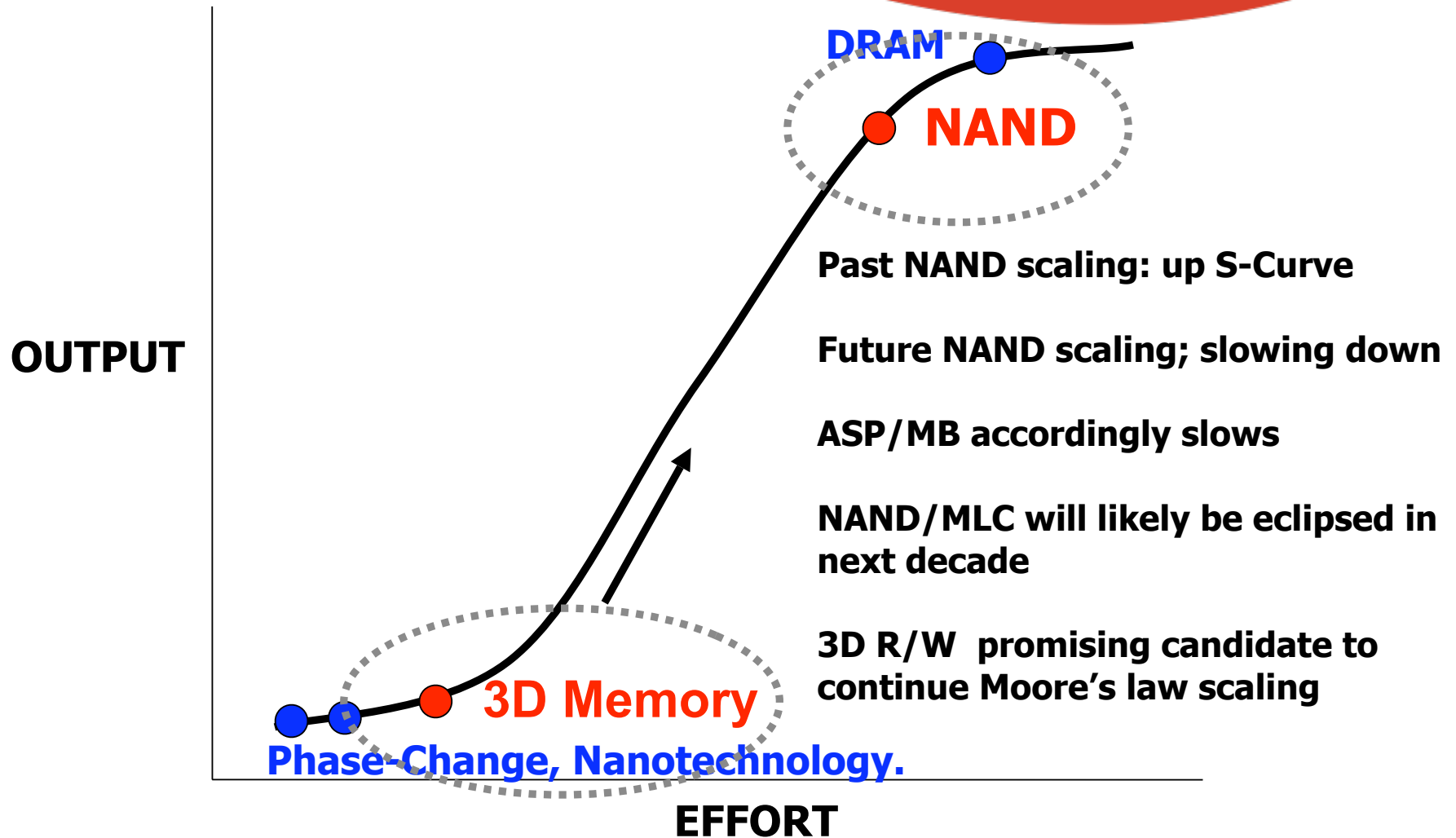
**210nm → 160 → 130 → 90 → 70 → 56 → 43 → 32nm in 9 years**  
**D1 (SLC) → D2 (MLC) → D3 (x3)**

# Dramatic Flash price reductions: key to new markets

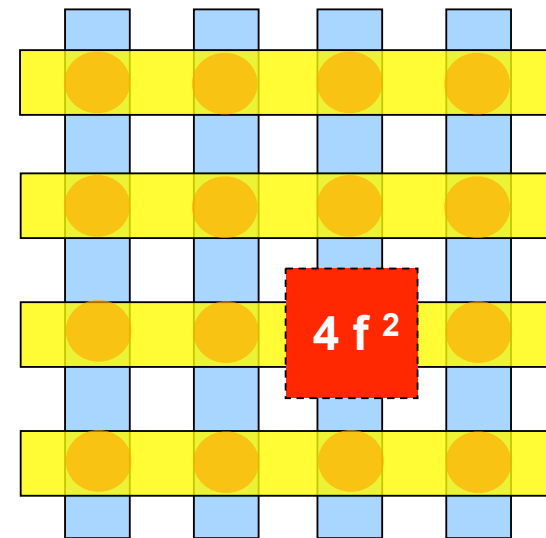
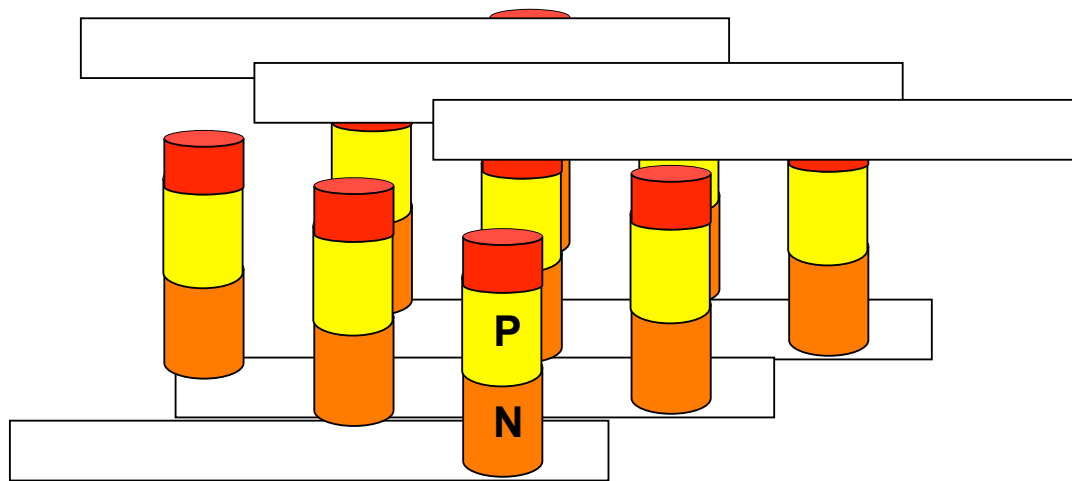




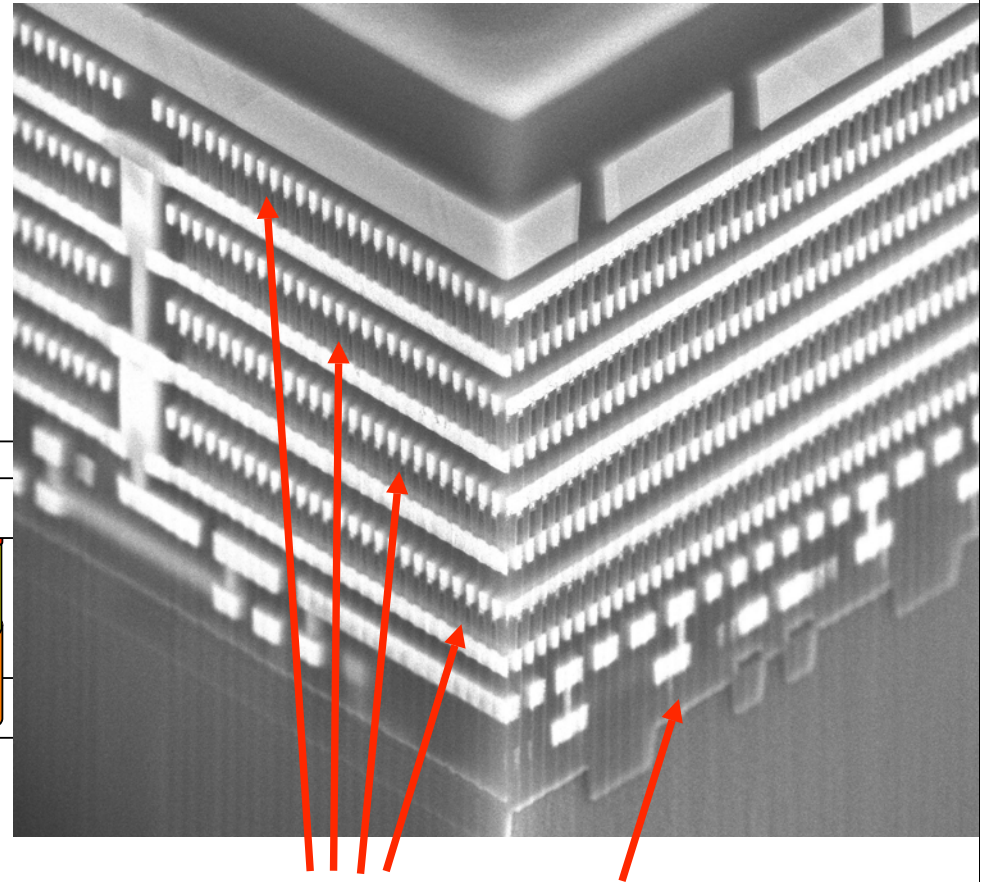
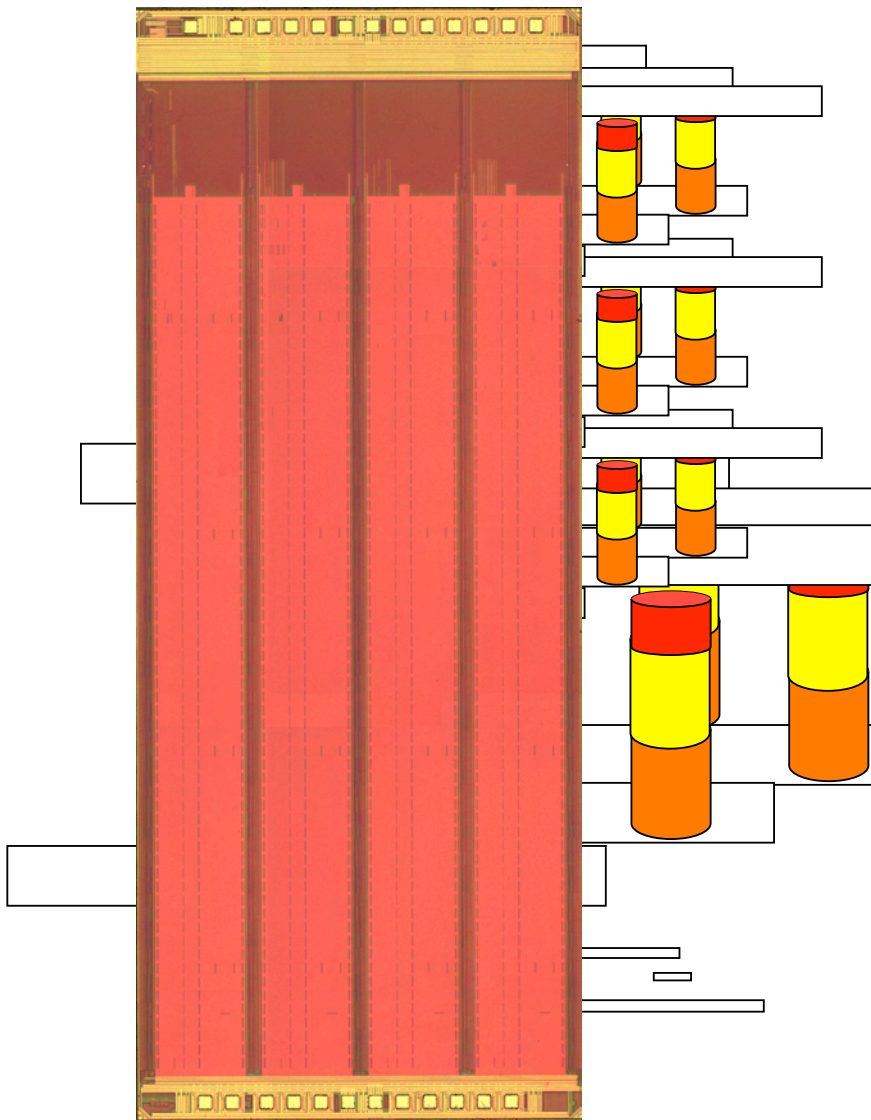
# S-Curve: Memory Scaling Limits



# 3D Diode Memory Arrays



# 3D Diode Memory Arrays



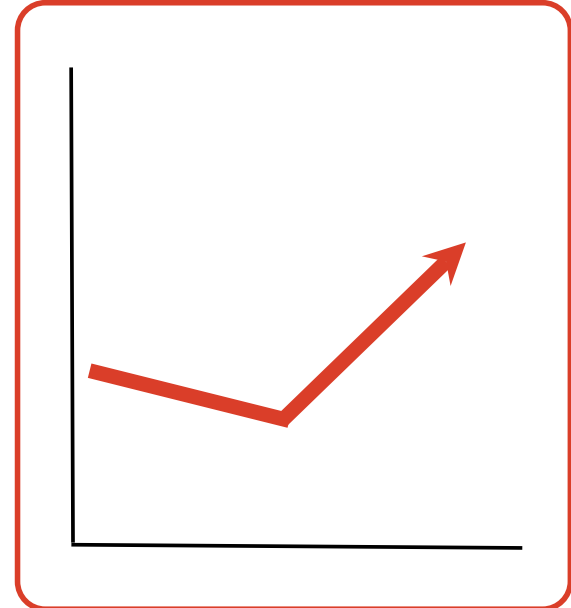
# Conclusion: flash/3D is the place to be in the coming decade



**Transforming  
existing markets**



**Creating new  
mega-markets**



**Returning to  
profitable growth  
thru innovation, IP  
low cost**



# **Changing the World:** The Flash Memory Revolution

**Eli Harari**  
Chairman & CEO  
SanDisk Corporation