

Advanced Mobile Devices - Technology & Market Trends

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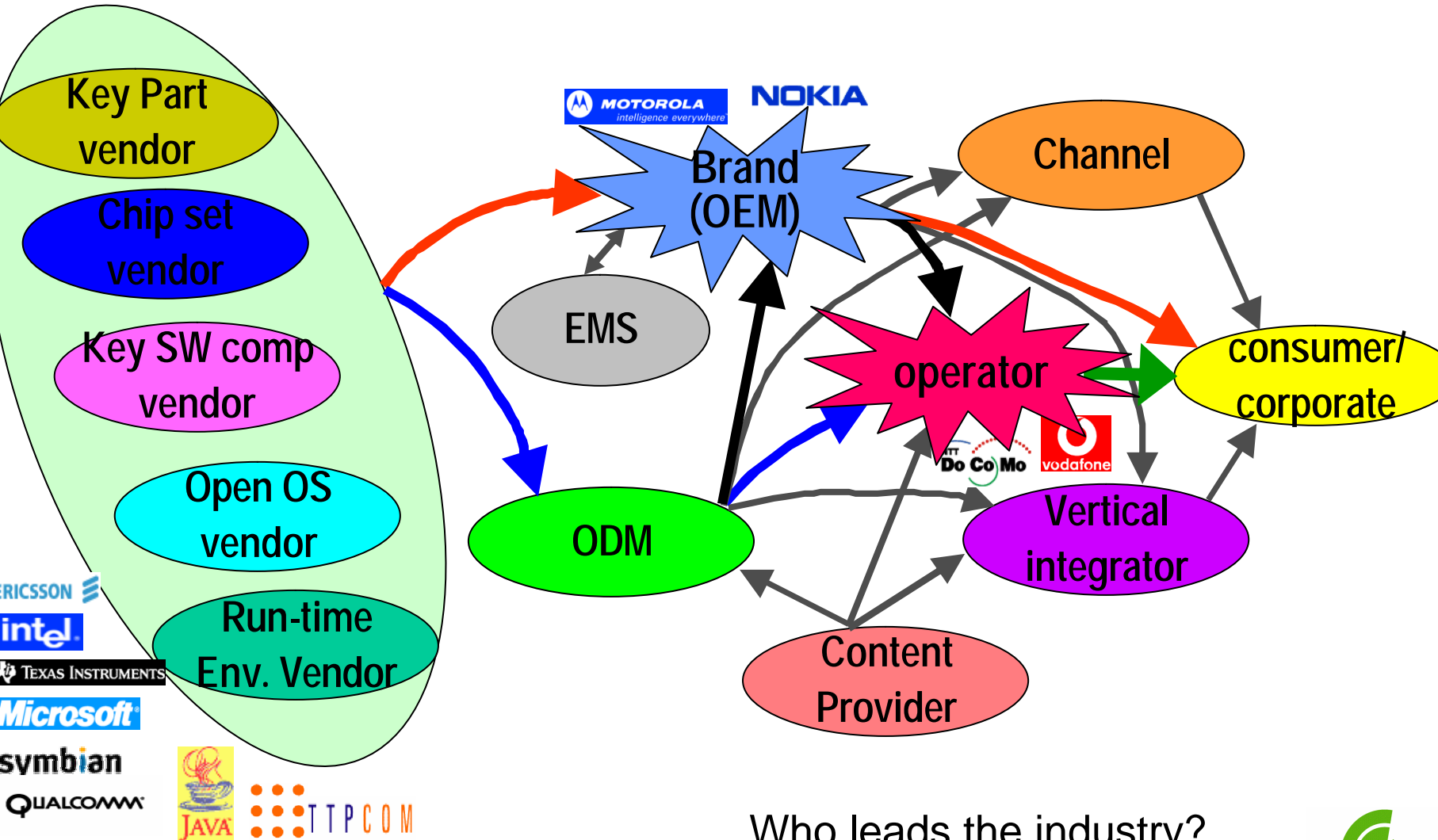
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Mobile Device Industry Value Chain

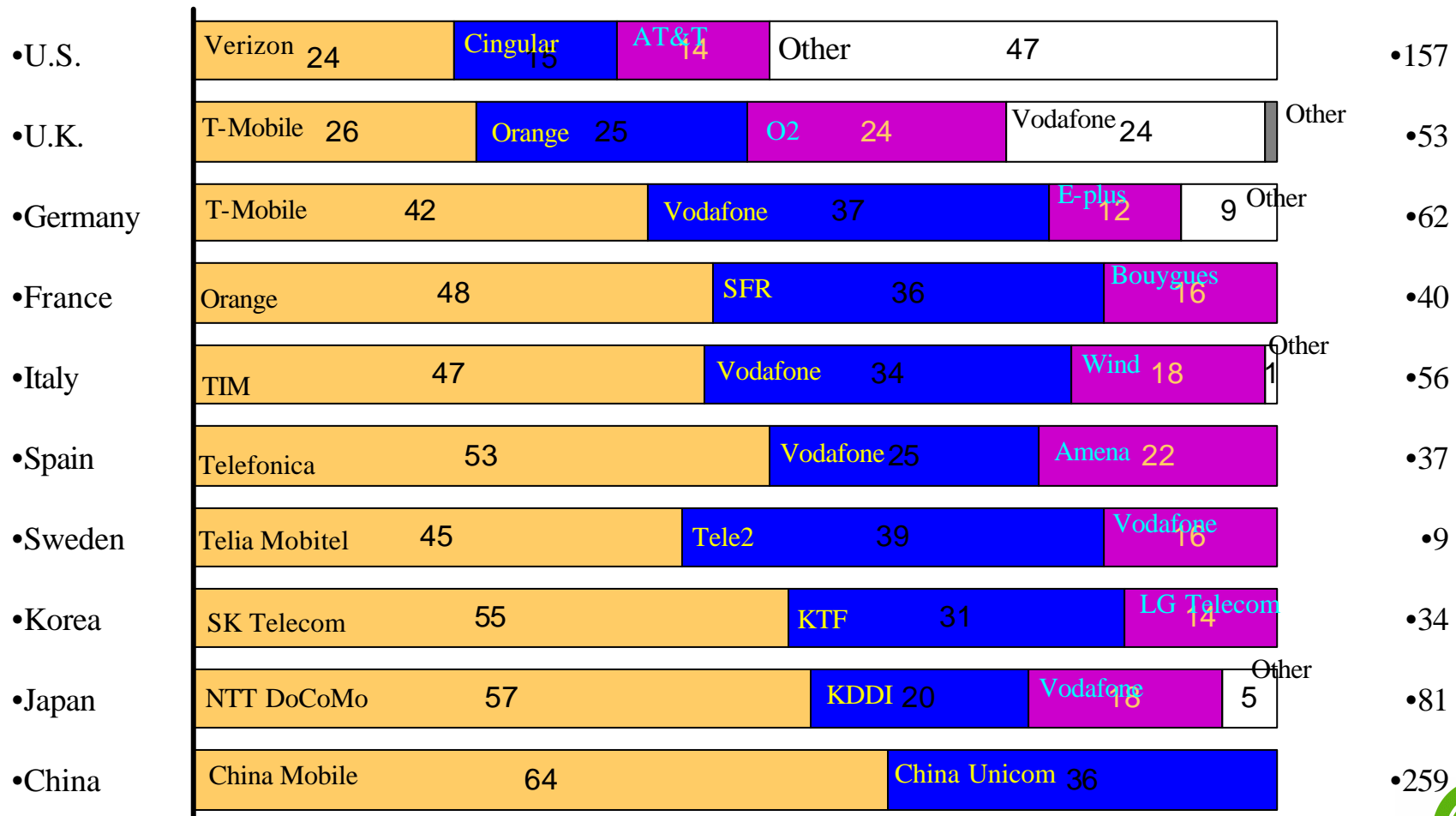


Who leads the industry?

SUBSCRIBER SHARE IS HIGHLY CONSOLIDATED IN MOST REGIONS

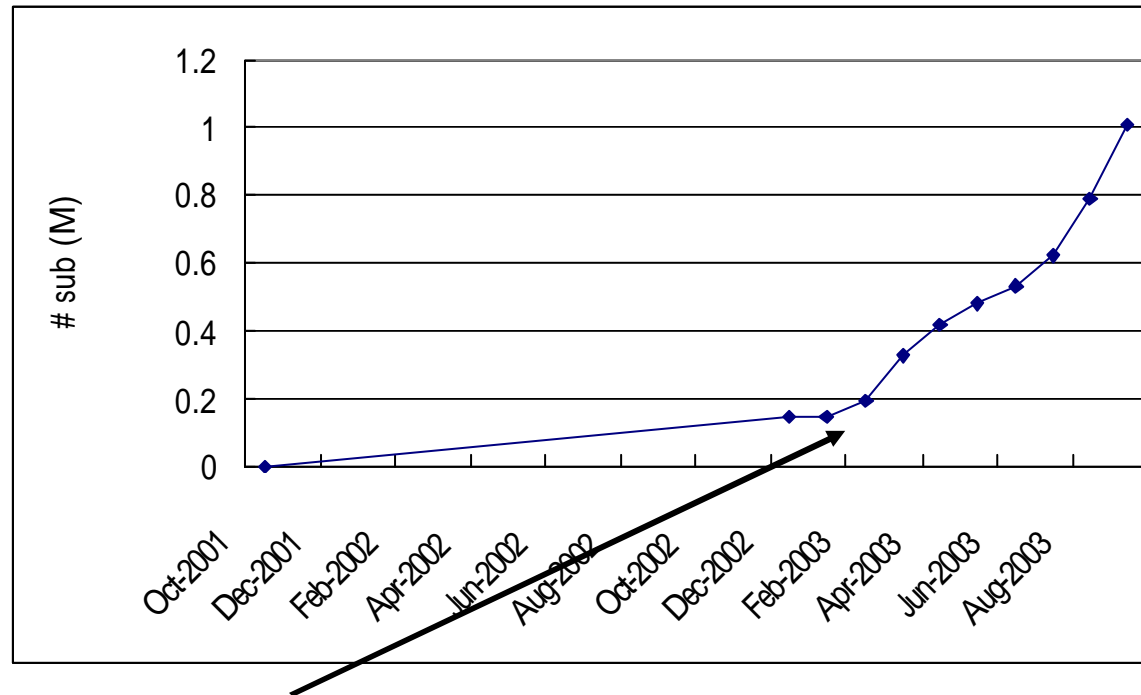
Percent of subscriber share by wireless operators

•Millions of
subscribers, 2003



Handset Supply as Key to Operator's Success

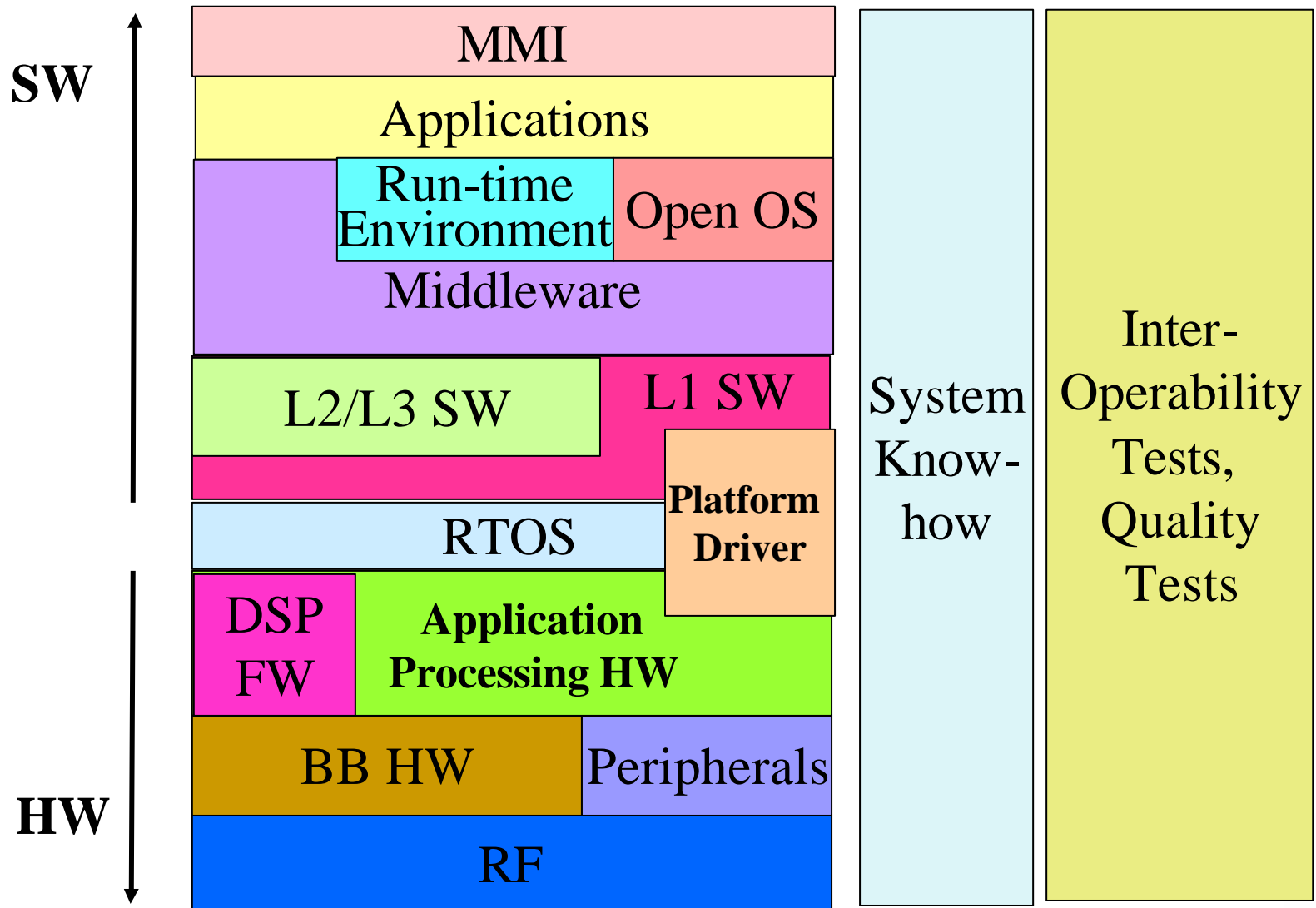
- DoCoMo launched FOMA (WCDMA) on Oct 1, 2001.
- FOMA is not flying until good handsets are available in March, 2003
- Subscriber number has crossed 1M in Oct, 2003.



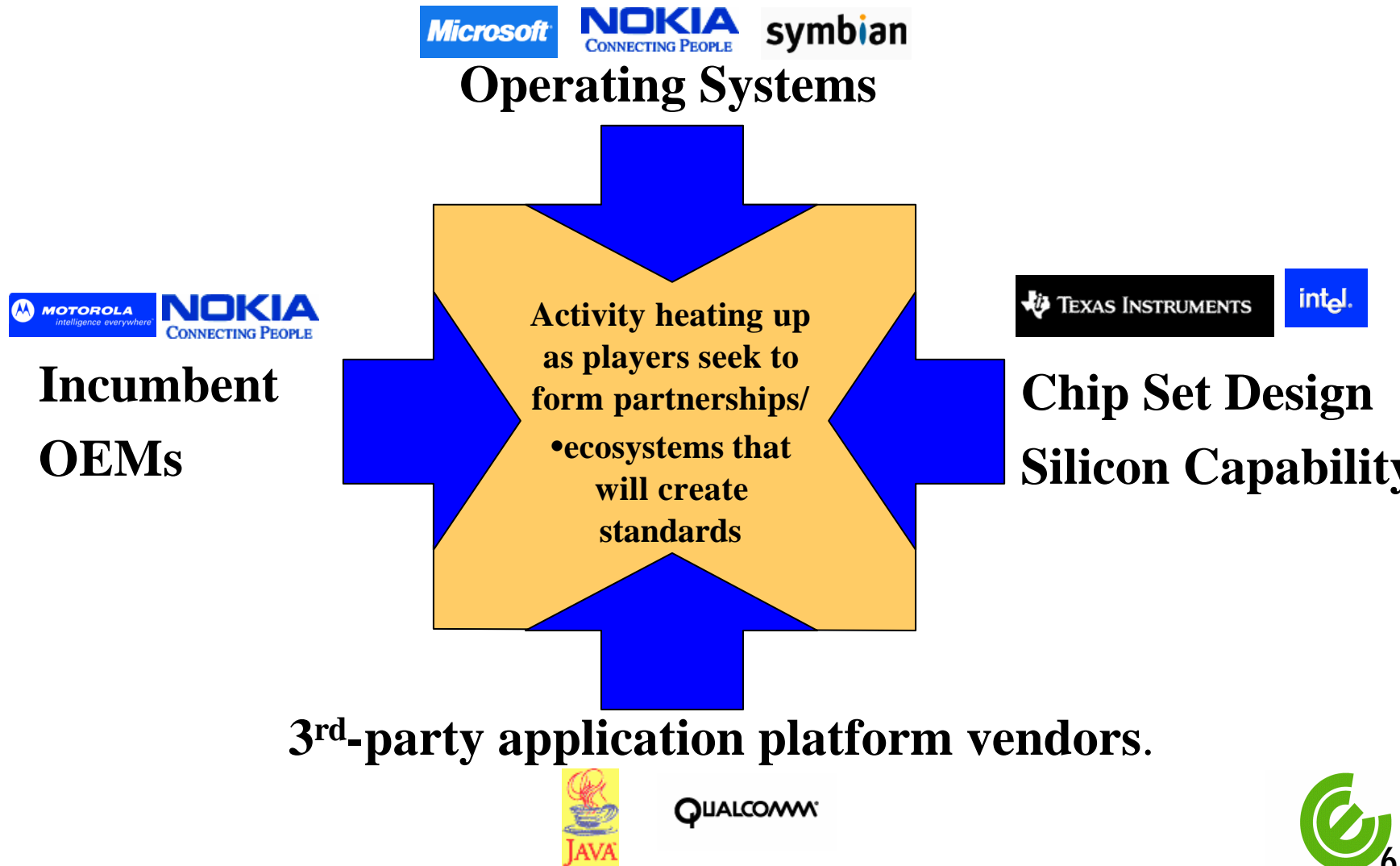
• **3 Italy shut off new sub sign-on in Oct-Dec, 03 due to shortage of handsets.**

- Key turning point is due to
 - good handsets & good coverage
- Expect to grow into 1.3M subs
- “Spring has come, look forward to the hot summer.” quoted from DoCoMo GM.





Layers & Functions of a Mobile Device



Ecosystem Fight – Mobile Device’s “Nervous System”



Mobile Device Categories

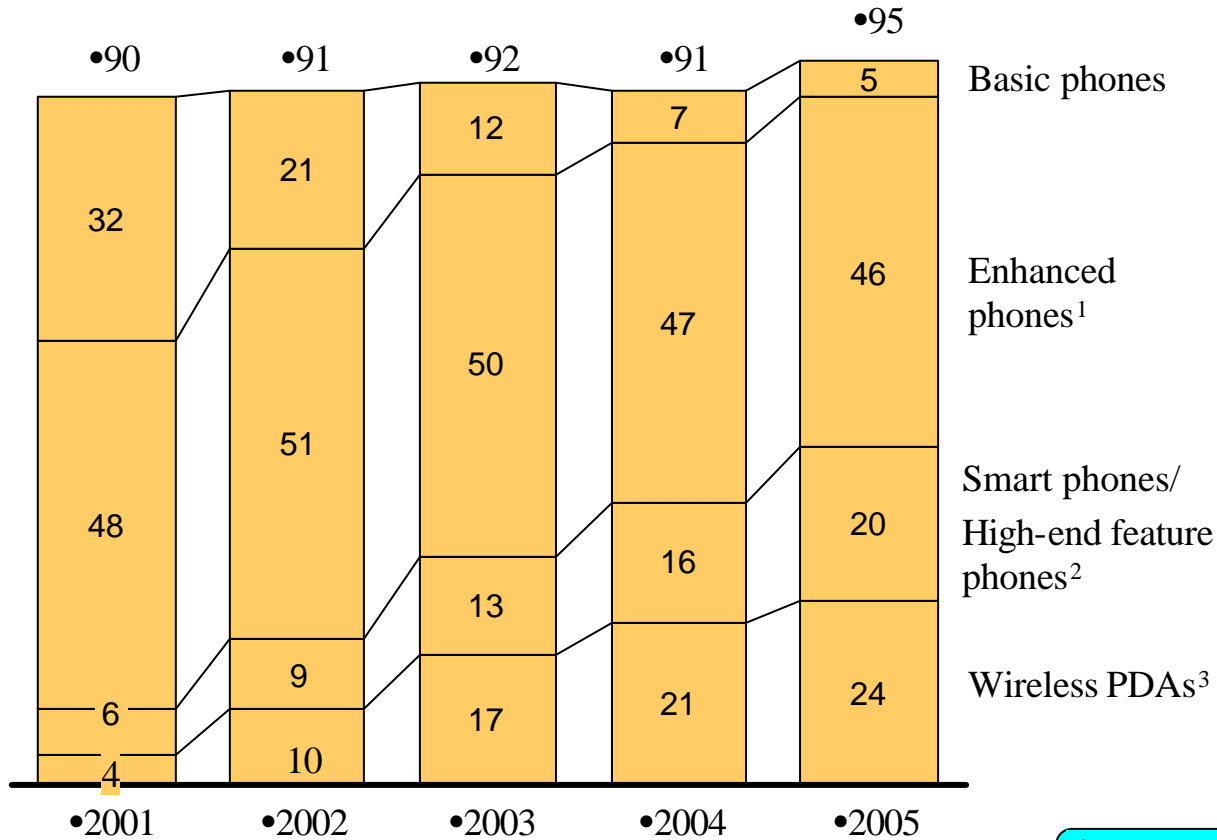
Wholesale Price	% of 2002 Shipments (E)	Characteristics	•Primary users	•Channels
   	<div> <div>\$400+</div> <div>\$250-500</div> <div>\$150-250</div> <div>\$150 and less</div> </div>	<div> <div>•10</div> <div>•30+</div> <div>•50+</div> </div>	<div> <div> Smart-phone <ul style="list-style-type: none"> – Near-PDA functionality – Large screen, variety of I/O – Open OS, office app. and huge memory – Ability to run 3rd-party app after sale </div> <div> High-End Feature Phones <ul style="list-style-type: none"> – Feature rich but without Open OS – Usually with attractive design/form factor – Address more on personal and entertainment aspects </div> <div> Mid-Range Feature Phones <ul style="list-style-type: none"> – Some multimedia applications – Limited software and processing capabilities (e.g., voice recognition) </div> <div> Low End Mobile Phone <ul style="list-style-type: none"> – Primarily for voice, some SMS capabilities – Very limited ability for applications – “Dumb” terminal for mass market penetration </div> </div> <div> <div> <ul style="list-style-type: none"> – Professionals – Affluent </div> <div> <ul style="list-style-type: none"> – Affluent </div> <div> <ul style="list-style-type: none"> – Young adults – Teens </div> <div> <ul style="list-style-type: none"> – Low-volume users (security conscious) – Teens </div> </div>	<div> <ul style="list-style-type: none"> – Direct Sales – VARs/SIs – Carrier Stores – Electronics Stores </div> <div> <ul style="list-style-type: none"> – Carrier Stores – Electronics Stores – Mobile Dealers </div> <div> <ul style="list-style-type: none"> – Dealers – General Retail – Carrier Stores </div> <div> <ul style="list-style-type: none"> – General Retail – Carrier Stores </div>

Source: Gartner; ARC; Giga; McKinsey

Category Evolution

•Worldwide mobile device sales to end users

•\$ Billions



– ASP erosion is canceling out overall shipment growth, resulting in overall flat market

– Smartphones and wireless PDAs growing to almost half of 2005 sales

•Shipments

•Millions of units

•2001 •2002 •2003 •2004 •2005

\$15-20 billion sold through enterprise channels in 2005

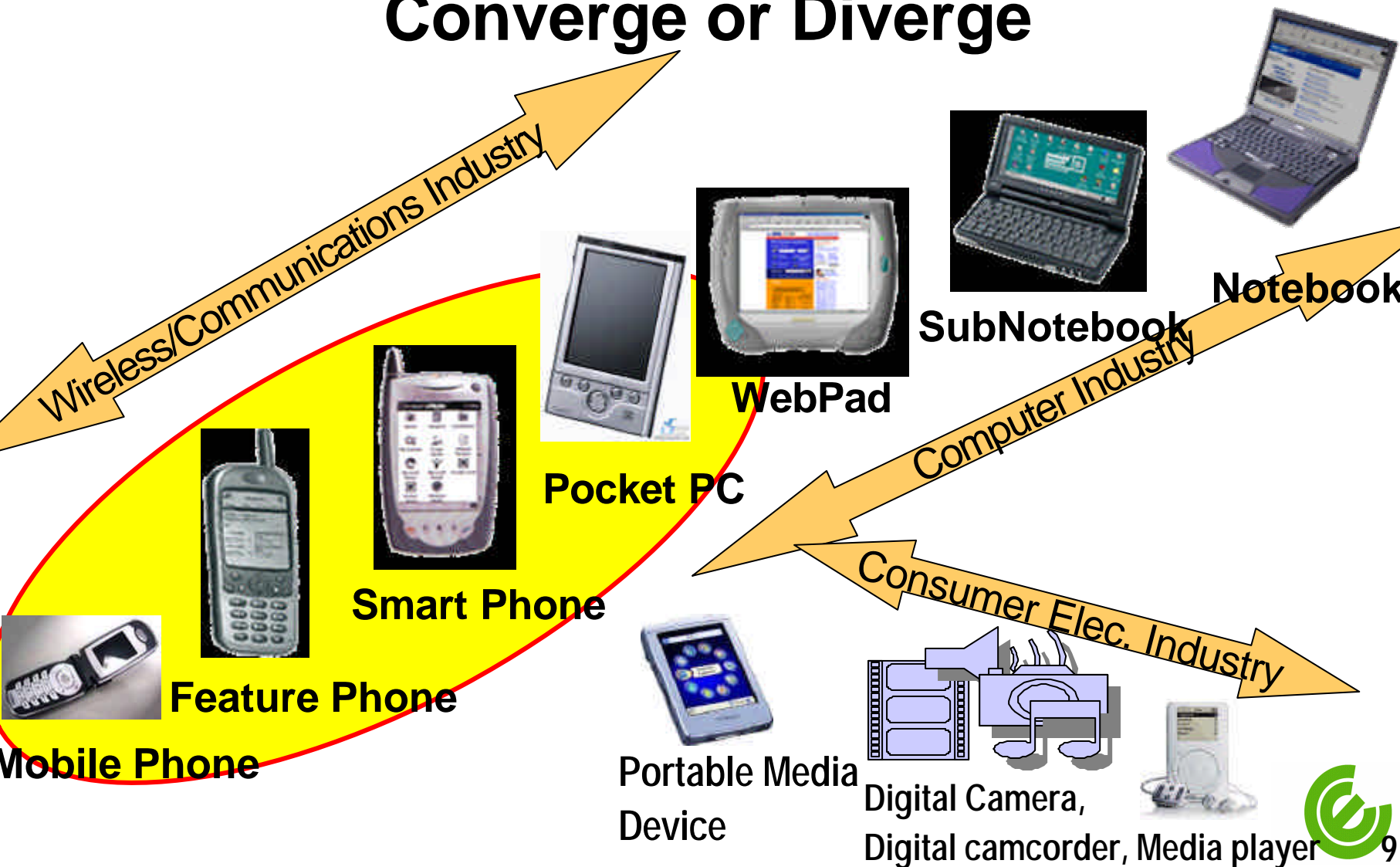
¹ Network-based content delivered to terminal with limited client software (e.g., WAP browser, basic PIM); example: Ericsson T68

² **Voice centric**, at least 1/8 VGA; examples: Ericsson R380, Symbian Pearl, Orange SPV

³ **Data centric**; typically keyboard/pen & ¼ VGA; examples: Nokia 9110, Symbian Quartz & Crystal, Microsoft Pocket PC Phone Edition

What devices could fit the market?

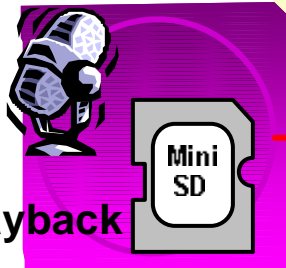
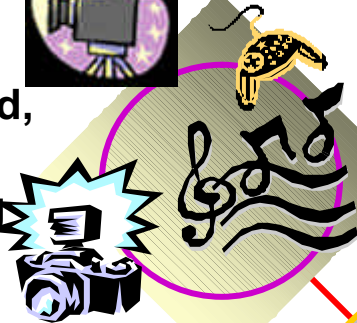
Converge or Diverge



Features to Come in Mobile Devices

Entertainment:

Music, Gaming,
Java applications,
Theme/skin download,
Ringtones, Photos,
Video clip, streaming
Picture mail



Data Storage:
Recording
Retrieving
Multimedia playback
DRM



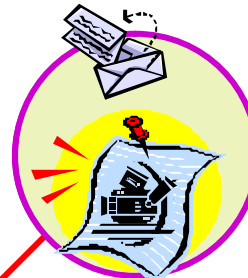
Data Access:
PIM, Phone/date book
Local synch
Remote synch
Corporate data base

• Browsing



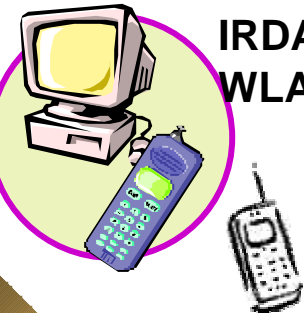
Phone call:

Video, Voice, Hand free, Push-to-Talk



Messaging:
SMS, MMS, E-mail
IMPS, Group-cast
LBS, infotainment

Local Comm:
IRDA, BT, USB
WLAN



Financial:
Micro-payment
Ad, E-coupon



Menu for Technology Combo

Consumer



User profile
Usage combo
Short Life Cycle
Value (Price to Performance)
Age/Gender/Group
Industry Design
Durability (ALT)
Safety
Fool Proof

Communication



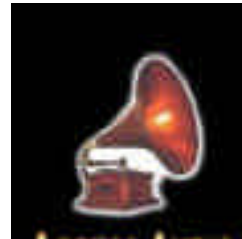
GSM/GPRS/UMTS
CDMA/ED-DO
Multi-band, -tech
RF Performance
Standby/Talk time
SMS/MMS/E-mail
Interoperability
User scenarios
IMPS / Push to Talk
LBS

Video



Multi-media Processing
Image Optimization
MPEG4, H.263, H264
Digital Rights
Storage
Power Management
3D Graphic
Video clips, streaming, msg

Audio



Melody
MP3
AAC
ATRAC 3
Stereo/ 3D Audio
HQ Speaker
Acoustic
Surround

Game



Content
Square off in
SONY/Microsoft/
Nintendo/Nokia
JAVA Game
Native Game
3D Graphic
Party-gaming
Local/remote
synch

Computing



Power Consumption
Intel / Microsoft
Office App.
Corporate database
Vertical integration
Storage
Input method
Display issue