HOW CHINESE COMPANIES BECOME LEADERS IN SEMICONDUCTORS

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INTERNATIONAL BUSINESS STRATEGIES BACKGROUND

- Has been in business for over 25 years
- Previous experience in managing 1.5K+ engineers at Rockwell International, which included avionics, communications, and semiconductors. Strong emphasis on communications
- Interface with most global leaders in electronics industry, with customers in U.S., Europe, South Korea, Japan, Taiwan, China, India, etc
- Interface and support for major global corporations such as Intel, Qualcomm, Broadcom, Microsoft, Nokia, Samsung, Sony, Toshiba, Apple, Cisco, Huawei, IBM, Fujitsu, NEC, Hitachi, Renesas, TSMC, STMicroelectronics, TI, ARM, Cadence, Synopsys, Mentor Graphics, and others
  - Participated with French Government on their advanced technology initiatives
- Interface and support for financial institutions such as Goldman Sachs, Carlyle, Blackstone, CitiGroup, Warburg Pincus, Walden, KKR, Morgan Stanley, Credit Suisse, BNP Paribas, Bain Capital, Bank of America, TPG, and others
- Involved with advanced technology concepts as well as price-sensitive platforms for smartphone and other high volume platforms. Also involved with high performance infrastructure companies on global basis
  - Forbes blog contributor, China Daily articles, Global Times editorials, etc
- Involved in number of due diligence projects on number of IPOs
- Support for strategic initiatives for number of global technology leaders

IBS HAS HIGH MARKET SHARE ON TECHNOLOGY AND STRATEGY BUSINESS
GLOBAL ELECTRONICS INDUSTRY PRODUCTION

CHINA IS STRENGTHENING RAPIDLY
SEMICONDUCTOR MARKET BY PRODUCT

- MPU
- MCU
- DSP
- Standard Cell ASIC
- FPGA
- Special-Purpose Logic
- General-Purpose Logic
- Display Driver
- Analog
- MOS Memory
- Other Semiconductor


Market Value:
- $450B
- $300B
- $150B
- $0B
TOP-LEVEL ISSUES IN SEMICONDUCTOR

- Market growth will be positive through 2020 but will likely have some volatility
- MPU market is dominated by Intel
  Windows 10 can strengthen competitive position of ARM 64-bit architecture
- MCU vendor base is fragmented
  Automotive has many growth areas
  NXP-Freescale will be largest vendor
- Modem market share leader is Qualcomm
  Increased competitive pressure from MediaTek
- Analog has many participants
  TI is global leader
- DRAM market share leader is Samsung
  Others are SK Hynix and Micron Technology
- NAND Flash market share leader is Samsung
  Others are Toshiba, SanDisk, Micron Technology, and SK Hynix

MOST MARKET SEGMENTS ARE DOMINATED BY FOREIGN COMPANIES

ISSUE IS HOW TO CHANGE THIS IN CHINA MARKET
SUPPLY SEGMENTATION IN CHINA’S SEMICONDUCTOR MARKET

FOREIGN SUPPLY DOMINATES CHINA MARKET

- Chinese Semiconductor Consumption
- Total Semiconductor Consumption in China
- Supply from Chinese Semiconductor Companies
- Supply from Foreign Semiconductor Companies

2020 Goal of Chinese Government for Supply from Chinese Semiconductor Companies

Goals for Supply from Chinese Semiconductor Companies:
- 2010: 4.5%
- 2011: 6.1%
- 2012: 7.2%
- 2013: 8.1%
- 2014: 8.6%
- 2015: 9.4%
- 2016: 10.2%
- 2017: 11.1%
- 2018: 12.1%
- 2019: 13.2%
- 2020: 14.1%

Chinese Semiconductor Consumption:
- 2010: $128B
- 2011: $132B
- 2012: $136B
- 2013: $147B
- 2014: $166B
- 2015: $181B
- 2016: $198B
- 2017: $216B
- 2018: $233B
- 2019: $254B
- 2020: $278B
SEMICONDUCTOR CONSUMPTION PATTERN IN CHINA

CHINESE EQUIPMENT COMPANIES ARE INCREASING CONSUMPTION OF SEMICONDUCTORS

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STRUCTURE OF CHINA’S ELECTRONICS INDUSTRY MARKET

- In 2010, 90.2% of semiconductors consumed in China was for support of foreign electronics equipment companies.

In 2020, 69.8% will be for support of Chinese electronics equipment companies.

- Historical driver was equipment designed by foreign companies such as Apple, Hewlett-Packard, Cisco Systems, Sony, and others.

Foreign companies were technology leaders.

Control of product features and architectures by foreign companies.

- New situation is where Chinese electronics equipment companies such as Huawei Technologies, Lenovo Group, Xiaomi, and others are competitive in global markets.

Semiconductors continue to be primarily supplied by foreign companies because of their design expertise and IP.

Exceptions are HiSilicon Technologies, Spreadtrum Communications, RDA Microelectronics, Allwinner Technology, Fuzhou Rockchip Electronics, and Montage Technology.

- New China is where full supply chain for electronics needs to be in China, including wafers, packaging and testing, IP creation, product design, and system design.

Will need to be systematically implemented because competition is strong.

MARKET FORCES AND TOP-LEVEL SUPPORT ARE NEEDED TO BUILD CHINA’S NEW SEMICONDUCTOR INDUSTRY RAPIDLY.
EXAMPLE OF SMARTPHONE MARKET

- 2B smartphones in 2020 with $100.00 in semiconductors per smartphone give $200B market
- Chinese smartphone vendors are becoming competitive in China and global markets
  It is significant that Micromax Informatics (Indian smartphone company) makes most of its smartphones in China
- There are opportunities for power amplifiers, transceivers, modems, application processors, PMUs, image sensors, ISP, Wi-Fi, Bluetooth, NFC, etc, in smartphones

**Important for Chinese semiconductor companies to select product area where there is ability to compete in global markets as well as China market**

- Tablet computers have similar characteristics to smartphones, with increased volume by Chinese companies
  Prices, however are very low
- Smart UHD televisions will have some similar building blocks as smartphones, including wireless connectivity
  DOCSIS 3.1 will become increasingly important in smart home environment
- Smart cards with NFC will also have some common IP with smartphones
  Security is high growth area

**IMPORTANT TO DEVELOP PRODUCTS WHERE THERE IS HIGH MARKET LEVERAGE**
SMARTPHONE AND TABLET COMPUTER MARKETS

SMARTPHONE MARKET

TABLET COMPUTER MARKET

CHINESE COMPANIES HAVE HIGH GROWTH, BUT STRONG PRICE PREMIUMS
CHINESE COMPANIES WILL HAVE 50% OF MARKET IN 2017
DATA TRAFFIC IN MOBILE PLATFORM

VIDEO IS KEY DRIVER

Video
File Sharing
Email
Gaming
M2M
Other
Voice

Data Traffic (EB)


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IOT IS ONE OF MARKETS THAT CAN GIVE HIGH GROWTH
IOT SEMICONDUCTOR AND SENSOR MARKETS

SEMICONDUCTOR AND SENSORS HAVE HIGH GROWTH

Semiconductor and Sensors Within Client IoT
Analog
Processor
Connectivity
Memory
Semiconductor hardware
Sensors
Semiconductor software

$0B
$25B
$50B
$75B

2012
2013
2014
2015
2016
2017
2018
2019
2020

$16.6B
$20.2B
$24.3B
$29.3B
$35.0B
$41.8B
$49.8B
$59.1B
$70.0B
IOT VALUE SEGMENTATION

MULTIPLE LEVELS OF VALUE AND VALUE LEVERAGE

- Sensors (2%)
- Devices (26%)
- Semiconductors (9%)
- Services (63% of Revenues)
HOW TO WIN

- If technology is developed in China, rate of progress will be too slow to compete in global markets
  
  Cannot close technology gap with leaders

- Important to be low cost, which will require low overhead cost as well as low product cost (small chip area is critical)
  
  Design capabilities are very important

- Best approach in gaining access to competitive products is through strategic partnerships
  
  Successful strategic relationships need to be based on two partners having common long-term goals…cannot be short term

  Important to have business structures that give equitable financial returns

- Foreign companies must understand that better financial returns can be obtained through partnership with Chinese company rather than through establishment of sales team in China

CONCEPTS OF HOW TO WIN APPLY TO FOREIGN AND CHINESE COMPANIES
IP MARKET BY PRODUCT

PROCESSOR IS LARGEST CATEGORY AND IS DOMINATED BY ARM
WHAT NOT TO DO

- Have many companies in the same market, and all have low market share
  Critical to be one of the top two or three vendors

- Be focused only on low cost
  Important to have some form of technology advantage
  Important to have access to financial resources required to develop next-generation products

- Sell to customers that have low market share
  Many of these companies will not survive in the long term
  Financial stability will be low

- Have IP that is not clean
  Will be a major problem for products that will end up outside of China

CHINA IS MOVING TO ADVANCED TECHNOLOGY STAGE
WINNING STRATEGIES: EIGHT GOLDEN RULES

1. **Have exit strategy for company**
   Company that cannot be bought or cannot have IPO will have low value

2. **Build strong management team**
   Having strong CEO is critical
   Many companies fail because their management team is weak

3. **Ensure access to adequate funding or funding roadmap**
   Need to develop products for multiple generations
   New products must also be better than competitors
   Cash management will be critical to long-term success

4. **Have good visibility into customer targets**
   Critical to focus on getting design wins from growing customers

5. **Have very strong product development organization**
   Need fast time-to-market for new products and ability to modify products rapidly
6. *Participate in high growth markets where competitive advantage can be built*

Many market segments in China are growing

However, need to ensure that high market share can be built

Most profitable companies are those that are market share leaders

7. *Have global perspective on competitors and customers*

China market has good growth potential

However, need to ensure that foreign competitors do not take away market

8. *Winning philosophy must be in place*

Competition is brutal

Need team that is committed to win

Important to be sensitive to competitive threats as well as new opportunities

**EXCELLENT GROWTH OPPORTUNITIES IN CHINA MARKET**

**MANY COMPANIES CAN BE SUCCESSFUL WITH APPROPRIATE STRATEGIES**