China’s IC industry, the status quo and future

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Content

I  The status quo

II  The future trend
From nineteen sixties to year 2000, almost 40 years, China’s IC industry experienced a very twisted road.

Since 2000, China’s IC Industry enter a high speech growing period.
Status Quo and Future, China’s IC Industry

I Status quo
Four characteristics

- IC industry
- IC market
- R&D
- Investment system
IC Industry situation

• 2000 ~ 2004, both output and sales revenue exceed 30% annual growth rate, highest in worldwide at the same period.

• In 2004, the output amounted to 21.15 billion pieces, the sales revenue amounted to 6.73 billion USD, increase by 55.2% than last year.

• China’s IC scale expands three times, the share in global IC industry also reach 3.7% from 1.2% in 2000. one of the fastest growing region in global IC industry.
### Table 2000-2004 China IC output and sale in 100 million

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sales (RMB)</strong></td>
<td>186.2</td>
<td>188.3</td>
<td>268.4</td>
<td>351.4</td>
<td>545.3</td>
</tr>
<tr>
<td><strong>Growth rate (%)</strong></td>
<td>133.9</td>
<td>1.1</td>
<td>42.5</td>
<td>30.9</td>
<td>55.2</td>
</tr>
<tr>
<td><strong>Output (pieces)</strong></td>
<td>58.8</td>
<td>63.8</td>
<td>96.3</td>
<td>124.1</td>
<td>211.5</td>
</tr>
<tr>
<td><strong>Growth rate (%)</strong></td>
<td>93.4</td>
<td>8.5</td>
<td>50.9</td>
<td>28.9</td>
<td>70.4</td>
</tr>
</tbody>
</table>
• 2000-2004 China IC sale revenue in 100 million RMB
• 2000-2004 China IC output
In 100 million
IC design sector, IC manufacture sector and assembly sector develop together

- pioneered with IC design and embodied by IC manufacture
- By the end of 2004, IC companies totaled 670, among which,
  --IC design 476, chip manufacturer 50 and package and assembly more than 110.
  --Workforce in industry exceeds 130 thousand, among them, over 40 thousand engineers.
IC design sector

• since 2000, the number of IC companies four times, and the annual growth rate reaches 61.3%.
• employee totals 18 thousand.
• The sales revenue: 1 billion USD, growing 81.5% than 2003.
• improvements in technology level.
The number of IC companies

![Graph showing the number of IC companies from 1991 to 2004. The number of companies grew from 17 in 1991 to 476 in 2004.]}
IC Manufacture sector

• sales revenue: 2.24 billion USD, 1.9 times than 2003.

• By the end of 2004, the production lines are as followed: 39 lines above 4 inch in all but one 12 inch line—SMIC; nine 8 inch lines —— SMIC（Shanghai, Tianjin）、Huahong NEC、ASMC、Grace、Hejian、TSMC（Shanghai）。 Twenty nine 4—6 inch lines.
# China’s Chip production line

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Company Name</th>
<th>IDM</th>
<th>Foundry</th>
<th>Both</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>12() inch</td>
<td>SMIC Beijing</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Beijing</td>
</tr>
<tr>
<td>8() inch</td>
<td>SMIC Shanghai</td>
<td>✓ ✓ ✓</td>
<td></td>
<td></td>
<td>Shanghai</td>
</tr>
<tr>
<td></td>
<td>SMIC Tianjin</td>
<td>✓</td>
<td></td>
<td></td>
<td>Tianjin</td>
</tr>
<tr>
<td></td>
<td>NEC Huahong NEC</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>Shanghai</td>
</tr>
<tr>
<td></td>
<td>Grace Semiconductor</td>
<td>✓</td>
<td></td>
<td></td>
<td>Shanghai</td>
</tr>
<tr>
<td></td>
<td>QMNI VISION</td>
<td>✓</td>
<td></td>
<td></td>
<td>Shaoxing</td>
</tr>
<tr>
<td></td>
<td>Advanced Semiconductor</td>
<td>✓</td>
<td></td>
<td></td>
<td>Shanghai</td>
</tr>
<tr>
<td></td>
<td>TSMC Shanghai</td>
<td>✓</td>
<td></td>
<td></td>
<td>Shanghai</td>
</tr>
<tr>
<td></td>
<td>Shougang NEC</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>Beijing</td>
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<tr>
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<td></td>
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<td>Shanghai</td>
</tr>
<tr>
<td>6() inch</td>
<td>CSMC</td>
<td>✓</td>
<td></td>
<td></td>
<td>Wuxi</td>
</tr>
<tr>
<td></td>
<td>SIMBCD</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td>Shanghai</td>
</tr>
<tr>
<td></td>
<td>Nanker</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td>Zhumai</td>
</tr>
<tr>
<td></td>
<td>Zhongwei</td>
<td>✓</td>
<td></td>
<td></td>
<td>Ningbo</td>
</tr>
<tr>
<td></td>
<td>CSWC</td>
<td>✓</td>
<td></td>
<td></td>
<td>Wuxi</td>
</tr>
<tr>
<td>5() inch</td>
<td>Advanced Semiconductor</td>
<td>✓</td>
<td></td>
<td></td>
<td>Shanghai</td>
</tr>
<tr>
<td></td>
<td>CS</td>
<td>✓</td>
<td></td>
<td></td>
<td>Wuxi</td>
</tr>
<tr>
<td></td>
<td>58 Institute</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td>Wuxi</td>
</tr>
<tr>
<td></td>
<td>Huayue</td>
<td>✓</td>
<td></td>
<td></td>
<td>Shaoxing</td>
</tr>
<tr>
<td></td>
<td>Tsinghua</td>
<td>✓</td>
<td></td>
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<td>Beijing</td>
</tr>
<tr>
<td></td>
<td>QMNI VISION</td>
<td>✓</td>
<td></td>
<td></td>
<td>Jilin</td>
</tr>
<tr>
<td></td>
<td>Silan</td>
<td>✓</td>
<td></td>
<td></td>
<td>Hangzhou</td>
</tr>
<tr>
<td>Total</td>
<td>3</td>
<td>15</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
• IC design and manufacture, In 2004, their total proportion has reached half of the whole sector, IC design close to 15% and chip manufacture over 30%.
• package and assembly: maintained a fast and flat increase momentum these years. In 2004, sales revenue: 3.49 billion USD, 15.8% increase.
### Table 2004 China IC different sectors in 100 million

<table>
<thead>
<tr>
<th></th>
<th>IC Design</th>
<th>IC manufacture</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales (RMB)</td>
<td>81.50</td>
<td>181.24</td>
<td>282.56</td>
</tr>
<tr>
<td>Growth rate(%)</td>
<td>81.5</td>
<td>190.0</td>
<td>15.8</td>
</tr>
<tr>
<td>Proportions (%)</td>
<td>14.9</td>
<td>33.2</td>
<td>51.9</td>
</tr>
</tbody>
</table>
• 2004 China IC different sectors
• 2004 China IC different sectors

- Design业: 14.9%
- Chip Manufacturing: 33.2%
- Packaging and Testing: 51.9%

2004年，设计业所占比例接近15%，芯片制造业所占比例超过30%。
IC industry shows a centralization trend

<table>
<thead>
<tr>
<th>Region</th>
<th>Characteristic</th>
<th>Scale in 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yangtze river delta</td>
<td>55% of IC manufacturer, 80% of package and assembly companies and nearly 50% of IC design companies.</td>
<td>Sales revenue 4.51 billion USD, 61.9% up</td>
</tr>
<tr>
<td>Beijing, Tianjina and Bohai Bay Around</td>
<td>an important R&amp;D, design and manufacture base in China</td>
<td>1.91 billion USD, 44.2% up</td>
</tr>
<tr>
<td>Zhujiang river delta</td>
<td>electronics and application products production base and IC and semiconductor discrete device market.</td>
<td>180 million USD, 48.9% up</td>
</tr>
<tr>
<td>West China</td>
<td>potential developing region</td>
<td></td>
</tr>
</tbody>
</table>
IC industry by region

- 2003年销售收入
- 2004年销售收入
- 同比增长
• China’s IC industry has entered a rapid growth period.
• While if we look at the industry: total sales or production is quite small and technology level in general is relatively behind the advanced one, and a large space needed to be enhanced.
Three factors are the main engine to China’s IC industry rapid development.

1. Domestic market continuous increase provides a potential space for IC industry’s development.

2. Investment system has made a substantial change.

3. Industry transfer to China mainland when global market is in recession.
When foreign investment and technology find the contact point with China domestic resources, it stimulates China’s IC industry development rapidly.
China’s Market situation

1. Market scale: the first place in world.
2. growth speed: first place in world
3. foreign trade adverse balance: first place in world
• In 2004, the output of computer, color TV amounted respectively to 43 million sets, 74 million sets, first place in world
• number of cell phone users totaled 334 million, first place in world.
• output of cell phone: 230 million, 40% of the global market.
• CSIA’s statistics, in 2004, China’s IC market scale: 40 billion USD, 40.8% up, the share in global market : 22%.
• China has become second largest IC market in the world.
• different agency’s forecast: by 2010, the market scale will amount to 77.8 –111 billion USD.
• Since 2000, maintains a high growing momentum.
• from 2000-2004, market scale expands 3.4 times, the annual average compound growth rate reach 36%.
• The growth rate of 2004 was twelve percent higher than global level, the fastest growing region in the whole world.
• 2000–2004 China’s IC market sales and growth in 100 million

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales (RMB)</td>
<td>975</td>
<td>1260</td>
<td>1841</td>
<td>2373</td>
<td>3342</td>
</tr>
<tr>
<td>growth %</td>
<td>77.9</td>
<td>29.2</td>
<td>46.1</td>
<td>28.9</td>
<td>40.8</td>
</tr>
</tbody>
</table>
• 2000-2004 China’s IC market sales and growth in 100 million
• statistics from China Custom, in 2004, the import IC value 54.62 billion USD, 52.6% up. 9.7% of China’s total import value, 30.7% of worldwide’s market demand total
• 1.3 times of oil and the like, and 1.6 times of steel, iron ore and the like.
• the largest adverse balance in China, the margin reach 49.6 billion USD, in the top of high-tech products list
China’s IC import
in 100 million

![Graph showing China’s IC import from 2001 to 2004.](image)

- 2001: 261.8 million
- 2002: 344.3 million
- 2003: 436.0 million
- 2004: 583.7 million
The proportion of IC to other industry

<table>
<thead>
<tr>
<th>Industry</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil and refined oil</td>
<td>7.5</td>
</tr>
<tr>
<td>Steel and iron ore</td>
<td>6.8</td>
</tr>
<tr>
<td>Computers and mobile phones</td>
<td>9.7</td>
</tr>
</tbody>
</table>
• Made some improvements on R&D of CPU chip, second generation ID IC card, audio decode chip, 3G cell phone base band chip and MP3 chip.
• However, self-dependence ability is still very weak. All the micro components and memories are imported. Most of companies much rely on foreign enterprises.
• The investment system change, one of important reason for China’s IC rapid development.
• Government will not directly invest and operate IC programs any more. A new investment phase with multi-channel has come into being.
• State owned, private owned and foreign direct investment are three main ownership.
• Venture capital in 2004: 424 million USD, more than 30 IC design companies got VC, and the total value is 353 million USD.
II The future trend
A general picture in next five years

- annual average growth rate: over 30%,
- by the end of 2010, the sales revenue approach 300 billion RMB, accounting for 8% of worldwide market. China will be one of important IC manufacture base in the world.
- Chip manufacturing mass production technology reach 12 inch, 90—65 nm.
- In assembly and package sector, types of BGA, SiP, CSP, MCM can be in volume production.
Accomplishment will be based on following four aspects:

1 big potential market
2 investment
3 human resources
4 Policy
big potential market

- According to CCID, 2006~2009, China’s IC market scale annual average growth rate: about 23.5%.
- By the end of 2009, Market scale will reach 94.75 billion USD, hoped to have about 30% domestic market share.
# Forecast on 2005–2009 China’s IC market in 100 million

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale (RMB)</td>
<td>3409.2</td>
<td>4268.3</td>
<td>5761.8</td>
<td>7565.7</td>
<td>9475.0</td>
</tr>
<tr>
<td>Growth rate</td>
<td>17.2%</td>
<td>25.2%</td>
<td>35.0%</td>
<td>31.3%</td>
<td>25.2%</td>
</tr>
</tbody>
</table>
Forecast on 2005-2009 China’s IC market in 100 million
Investment

• In next five years, it is estimated that the total investment at least 30 billion USD is needed.

• Investment source:
  1. Central and local government
  2. bank loans
  3. private investment agencies
  4. Venture capital.
  5. Foreign direct investment (FDI)
3. Human resources

• China has big potential human resources.
• In 2003, “National IC talent cultivation base” plan began implementation.
• through 6-8 years, cultivate 40 thousand IC designers and 10 thousand IC processing technologists
• some agency is considering to establish more cultivation bases during 11th five-year development plan.
4 Policy

- Government will continue the role of creating fine industry environment.
- Hope more policy, necessary for current industry development needs and consistent with WTO rules.
“Independent innovation” is very important in “11th five year development plan”.

“Independent innovation” will promote IP protection in China and also enable us to join in the global R&D team, make contribution to the global IC industry development.
Future five years’ development will leave a big cooperation space to foreign partners. China welcomes the mutual benefit cooperation with American industry and academic circles, in manufacture line expansion or in the innovation work of R&D.
About CSIA

- China Semiconductor Industry Association is a nationwide non-profit social organization.
- About 460 member companies.
- Five branches: IC design branch, IC manufacture branch, package and assembly branch, discrete device branch and semiconductor supporting sector.
CSIA’s Objectives

◆ Serve for semiconductor enterprises and promote China’s semiconductor industry development in information service, technology consultation, technology cooperation and business service.

◆ acting as a bridge to link up semiconductor enterprises with authorities concerned.

◆ Conduct exchange work with foreign organizations and enterprises,
Major activity

- CSIA holds several seminars and one exhibition every year. IC CHINA will be held in early September every year.
- CSIA’s IP working group, holding several training and education class to CSIA’s member companies, providing IP consultation service, doing research about IP issues and promoting IP standard.
Promote exchange and mutual benefit cooperation between China and American semiconductor and High-tech circles!
Status Quo and Future, China’s IC Industry

Thanks