New Technology Transforms Skilled Work

2007. 11. 16.

Ji Oh Song
Executive Vice President
Samsung Electronics
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5. Conclusions - Skills for the Future
1. Samsung Electronics

Overview

<table>
<thead>
<tr>
<th>Brand</th>
<th>Revenue (Billion USD)</th>
<th>Net Profit (Billion USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samsung Electronics</td>
<td>63.4</td>
<td>8.5</td>
</tr>
<tr>
<td>SONY</td>
<td>63.9</td>
<td>1.1</td>
</tr>
<tr>
<td>General Motors</td>
<td>207</td>
<td>-2.0</td>
</tr>
<tr>
<td>Phillips</td>
<td>36.4</td>
<td>7.3</td>
</tr>
</tbody>
</table>

- **Memory Chips**: 32% of World M/S (1st) Increasing Overseas Manufacturing
- **Cell Phone**: 14% of World M/S Overseas Manufacturing: 50%
- **Digital TV**: 11% of World M/S Overseas Manufacturing: 96%

(Branch Value, Billion USD)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Brand</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Coca-Cola</td>
<td>65.3</td>
</tr>
<tr>
<td>2</td>
<td>Microsoft</td>
<td>58.7</td>
</tr>
<tr>
<td>3</td>
<td>IBM</td>
<td>57.0</td>
</tr>
<tr>
<td>4</td>
<td>GE</td>
<td>51.5</td>
</tr>
<tr>
<td>5</td>
<td>Nokia</td>
<td>33.6</td>
</tr>
<tr>
<td>21</td>
<td>Samsung Electronics</td>
<td>16.8</td>
</tr>
<tr>
<td>22</td>
<td>Marriott Lynch</td>
<td>14.3</td>
</tr>
<tr>
<td>25</td>
<td>Sony</td>
<td>12.9</td>
</tr>
<tr>
<td>42</td>
<td>Phillips</td>
<td>7.7</td>
</tr>
</tbody>
</table>

* Source: *BusinessWeek* / Interbrand (Jul. 2007)
1. Samsung Electronics

Global Manufacturing

- **Headquarters**: Seoul, South Korea
- **Production Bases**: 27 Locations in 13 Countries
- **Number of Employees**: 152,000 Worldwide (66,000 Abroad)
  - **Manufacturing Related Employees**: 75,000 Worldwide (35,000 Abroad)
  
  (As of Q1 2007)

<table>
<thead>
<tr>
<th>Region</th>
<th>Locations</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Americas</td>
<td>USA (Texas), Mexico, Brazil</td>
<td>- Semiconductor, TV, Monitor, Home appliance</td>
</tr>
<tr>
<td>SE/SW Asia</td>
<td>Thailand, Malaysia, India...</td>
<td>- Home appliance, AV equipment, ODD, TV, Monitor, Cell phone</td>
</tr>
<tr>
<td>Europe</td>
<td>Slovakia, Hungary</td>
<td>- TV, Monitor</td>
</tr>
<tr>
<td>China</td>
<td>Suzhou, Tianjin...</td>
<td>- Home appliance, Semiconductor, LCD, Cell phone, Laptop PC, Printer</td>
</tr>
</tbody>
</table>
1. Samsung Electronics

**Electronics Industries**
- Samsung Electronics Co., Ltd
- Samsung SDI Co., Ltd
- Samsung Electro-Mechanics Co., Ltd
- Samsung Corning Co., Ltd
- Samsung Corning Precision Glass Inc
- Samsung SDS Co., Ltd
- Samsung Techwin Co., Ltd
- Samsung Networks Inc

**Machinery & Chemical**
- Samsung Heavy Industries Co., Ltd
- Samsung Techwin
- Samsung Total Petrochemicals
- Samsung Petrochemical Co., Ltd
- Samsung Fine Chemicals Co., Ltd
- Samsung BP Chemicals Co., Ltd

**Trade & Services**
- Samsung Corporation
- Cheil Industries Inc
- Samsung Everland Inc
- The Shilla Hotels and Resorts Co., Ltd
- Cheil Communications Inc
- S1 Company
- Samsung Engineering

**Financial Services**
- Samsung Life Insurance Co., Ltd
- Samsung Fire & Marine Insurance
- Samsung Card Co., Ltd
- Samsung Securities Co., Ltd
- Samsung Investment Trust Management Co., Ltd
- Samsung Venture Investment Corp.

**Samsung Group**
- Revenue 158.9 Billion USD
- Net Profit 12.9 Billion USD
- Employees 261,000
  (As of 2006)

**Social Responsibility**
- Samsung Community Relations
- Samsung Legal Aid Service
- Samsung Foundation of Culture
- Samsung Welfare Foundation
- Samsung Scholarship
- Hoam Foundation
Our Philosophy

Contribute to a Better Global Society

Create Superior Products and Services

Human Resources + Technology

Corporate Mission

Key Management Resources
To achieve sustainable growth, new skilled work should be developed throughout the whole value chain.
Advent of new manufacturing technologies reduced need for traditional skilled workers

Lessen Need for Skilled Workers and the Number of Skilled Workers

Do they really eliminate skilled workers?
3. Tech Innovations and Manufacturing

**Innovative products need creative skilled workers**

<table>
<thead>
<tr>
<th>Traditional Products</th>
<th>Innovative Products</th>
<th>Creative Skilled Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily Objectives</td>
<td>1)</td>
<td></td>
</tr>
<tr>
<td>Speed &amp; Quantity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal Performance</td>
<td>2)</td>
<td></td>
</tr>
<tr>
<td>Diligence &amp; Concentration</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Innovative products are opening a huge market**

→ **Skill is becoming crucial for innovation**

1) Samsung Electronics Flash Memory Chips, 2) Toyota ‘i-REAL’ - 40th Tokyo Motor Show (Oct. 2007)
3. Tech Innovations and Manufacturing

Global Companies with Human Centered Management

Matsushita

“We make a human, and we also make electronic products.”
- Lifetime Employment
- Employees as the Basis of Management

Encourage Creativity by Educating Employees

Creativity

Toyota

“Implicit knowledge into explicit standardized knowledge”
- Toyota Production System
- Quantify and Systemize Best Practices and Spread them

Drive Kaizen by Systemizing Employees’ Knowledge and Experience

Human System

IBM

“The most important value of IBM is the way we think.”
- Knowledge Management System
- Recycle Exiting Knowledge and Capitalize It
- Successfully Transfer to a Knowledge Based Company

Capitalize Ideas Using Knowledge Management System

Knowledge Management
4. SEC- A Manufacturing Company

**Semiconductor & LCD Manufacturing**
- Huge Capital Investment: 3~5 Billion USD per a 300mm Wafer FAB
- Key Success Factors: Equipment Efficiency, Yield, Cost Reduction

**Hardware Oriented Manufacturing**
- Limited Roles to Technicians: Less Chance to Learn Useful Technology
- Harsh Working Environment: Physically Demanding, Repetitive

Automated Operation Helps to Concentrate on Quality and Productivity Issues

- **Daily Equipment Operation**
- **Fully Automated FAB**
- **Workers Discuss on How to Improve yield of a wafer**

**Shop Floor Control → MES**
**Wafer Transfer → OHT**
**Monitoring → FDC**

MES: Manufacturing Execution System
OHT: Overhead Hoist Transportation
FDC: Fault Detection & Classification
4. SEC - A Manufacturing Company

- Quality Analysis, Process Analysis, Equipment Optimization
  : Use of In-house Developed Computer S/W Tool for FAB Technicians

Robots

MCC tool helps to visualize whole manufacturing process

Technicians gain insight into complex semiconductor manufacturing process

MCC : Machine Cycle Chart
4. SEC - A Manufacturing Company

Hazardous and Health Breaching Environment
- Working in a Clean Class 100~10000 Environment
  (Heavy Payload and Repetitive Work, Exhaustion)
- LCD Inspection by Naked Eye Requires High Level of Training → Eye Sight Problems

Automated Machine Inspection

- Inspection Equipment Detects Flaws and Defects: Missing TRs, Shorts, Bad Pixels
- Skilled Workers Analyze the Source of Defect: Process, Equipment, Material (Knowledge Based)

- Inspection such as Mura Detection is a Technically Challenging Topic
  : Human Knowledge + Experience → Machine Intelligence
4. SEC- A Manufacturing Company

**Home Appliances and Cell Phone Manufacturing**
- Assembly Industry: Requires Economic Workforce, Low Capital Investment
- Productivity and Cost Efficiency: Low Level of Automation, Low Margin Business

**Fast Changing Market**
- Lower Batch Manufacturing System
- Flexible Manufacturing Line, Low Cost Automation
- Global Manufacturing (96% of Production)

**Introduction of Cell Manufacturing System (Self-completion, 2-men, 3-men …)**

- Better Productivity (90→130 Laptops/Person/Day), Better Job Satisfaction, Better Salary for Best Workers
- **Multi-capability Training Essential**
4. SEC- A Manufacturing Company

Quality and Productivity
- Personal Level of Skills: Fluctuation after a Shift / Turnover
- Equipment Reliability and Maintenance: Experience/Skill, Dedication

SMT (Surface Mount Technology) Machine – A Fundamental Quality Issue

Experience and Know-how of SMT is Embedded in a Knowledge Based System
- Monitoring and Diagnosis: Preventive or Fast Recovery from Fault
- Intuitive System: Easy to Learn (Fast Training of Newly Recruits)
- Engineers can concentrate on more fundamental quality issues
4. SEC - A Manufacturing Company

Traditional skills evolve for creative products

**Bordeaux TV**

**Design Skills** + **Mold Skills**

High-Glossy Mold Skill
Weldless Steam Mold Skill

Superior Quality Chassis For LCD/PDP TVs

**Cell Phone**

**Systemization and Integration of Design and Mold Skills**

New Material Mold, Runnerless Mold Process Automation, RFID tech

**Speedy Mold & Die System**
New Mold Delivered in Less than 7 days
4. SEC- A Manufacturing Company

**Skills Education/Training System**
- Training Video for Shop Floor Workers (In-House, Movie Clip 1)
- Year Round Education System (a la carte) : From Low-level to High-level Skills

**Skills Competition**
- Holding **Global Mfg. Technology Olympics** and **Global Ace Cell Competition** within the Company (Movie Clip 2)
- Supporting **WorldSkills Korea** and **WorldSkills International**
  - Encouraging Employees / Hiring 32 Winners and 9 National Representatives
5. Conclusions – Skills for the Future

WSI and Future

Samsung Electronics selected new growth engines for the future including **Bio/Health, Energy** and **Robot**.

- **Motivation**
  - Education
  - Environment
  - Tools

- **Creative Skilled Worker**
  - Multi-skilled
  - Knowledge-based
  - Teamwork-oriented

**Global Issue**

Excavate and Share

Standards of the World Class Competency of **Creative Skilled Workers**

All Over the World
5. Conclusions – Skills for the Future

- Young technicians should be trained now for the future.
  - Foresee at Least 10 Years: Skills now will be obsolete soon
  - Transform Common Technicians into Multifunctional Workforce
  - Share Long-term Vision with Them: Stimulate Their Creative Power

- Develop Consistent and Integrated Education Programs
  - Use State-of-the-art Technology for Training and Education
  - Provide Good Tools for Innovation

- Re-create Human Resources together with WSI
  - Share Global Experience: Culture, Language
  - Cross-industrial Experience: Best Practice, New Ideas
  - Better International Cooperation and Relations
Thank you!