Singapore’s Productivity Movement and Lessons Learned

October 7, 2010
Sheraton Addis

Daniel Kitaw (Dr.-Ing.)
Asso. Prof. of Industrial Engineering
Addis Ababa University

Special thanks and appreciation goes to Mr. Lo Hock Meng, Executive Director of the Singapore Productivity Association and to the kind and open Singaporean officials. Many thanks are also due to Prof. Kenichi and Izumi Ohno and their team, GRIPS and JICA.
Outline

1. Introduction and Basic Facts
2. Quality and Productivity concept
3. Productivity movement
   • Early years
   • Awareness, Action, Ownership
3. Innovation-Driven Phase
4. Lessons Learned
Singapore’s mission
(Aug 28 – Sept 05/2010)

- Productivity Movement
- Current Industrial Policy Measures and Organizations
- SME Development
- FDI Attraction
- Nanyang Polytechnic
- Singapore’s International Cooperation in the Industrial Sector and others.

- Land Area: 685 sq km (710)
- Population: 4.1 million (4.99)
- Literacy Rate: 94% (96%)
- Labor Force: 2.1 million
- GDP Growth: 2.2%
- Productivity Growth: 4.2%
- % GDP contribution:
  - Manufacturing: 26%
  - Non-manufacturing: 74%
Impact of Productivity Movement (1981-2001)


<table>
<thead>
<tr>
<th></th>
<th>1981</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per Capita Income($)</td>
<td>11000</td>
<td>37,100</td>
</tr>
<tr>
<td>Average Monthly Earnings($)</td>
<td>736</td>
<td>2,800</td>
</tr>
<tr>
<td>Home Ownership</td>
<td>63%</td>
<td>92%</td>
</tr>
<tr>
<td>Life Expectancy(male)</td>
<td>73yrs</td>
<td>78yrs</td>
</tr>
</tbody>
</table>
# Global Competitiveness Index (2010 – 2011) Ranking

<table>
<thead>
<tr>
<th>Country</th>
<th>GCI Rank (2010 -11)</th>
<th>Score</th>
<th>GCI Rank (2009 – 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switzerland</td>
<td>1</td>
<td>5.63</td>
<td>1</td>
</tr>
<tr>
<td>Sweden</td>
<td>2</td>
<td>5.56</td>
<td>4</td>
</tr>
<tr>
<td>Singapore</td>
<td>3</td>
<td>5.48</td>
<td>3</td>
</tr>
<tr>
<td>United States</td>
<td>4</td>
<td>5.43</td>
<td>2</td>
</tr>
<tr>
<td>Germany</td>
<td>5</td>
<td>5.39</td>
<td>7</td>
</tr>
<tr>
<td>Japan</td>
<td>6</td>
<td>5.37</td>
<td>8</td>
</tr>
<tr>
<td>China</td>
<td>27</td>
<td>4.84</td>
<td>29</td>
</tr>
<tr>
<td>Tunisia</td>
<td>32</td>
<td>4.65</td>
<td>40</td>
</tr>
<tr>
<td>South Africa</td>
<td>54</td>
<td>4.32</td>
<td>45</td>
</tr>
<tr>
<td>Kenya</td>
<td>106</td>
<td>3.65</td>
<td>98</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>119</td>
<td>3.51</td>
<td>118</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>136</td>
<td>3.03</td>
<td>132</td>
</tr>
<tr>
<td>Chad</td>
<td>139</td>
<td>2.73</td>
<td>131</td>
</tr>
</tbody>
</table>
Singapore's Industrial Development Phases

- Labor Intensive
- Skills Intensive
- Technology Intensive
- Innovation Intensive
- Knowledge Intensive
Evolution of the Productivity Movement in Singapore

- Stages of Economic Development

- Labour-Driven  Capital-Driven  Innovation-Driven
Why quality and productivity?

1. **Customer**
   ✓ Today is the customer economy.
   ✓ Customer has upper hand.

2. **Competition**
   ✓ Competition is agenda for survival.
   ✓ Lowest price, highest quality and best services is the standard of the day.

3. **Change**
   ✓ The nature of change becomes fast, flexible
   ✓ Nothing is constant or predictable
Quality is

- Fitness for purpose - Juran
- Conformance to requirements - Crosby

But what does that mean?

EXCEEDING CUSTOMERS EXPECTATIONS!!
Quality, (KAIZEN) if it is introduced and managed correctly, will:

- Eliminate waste;
- Cut inventories;
- Improve customer satisfaction; and
- Enhance profitability.
At the heart of Total Quality (KAIZEN) are two simple aims, they are:

1. Make things right the first time and every time.

2. Work for continual improvement.
Productivity concept

“Productivity is a state of mind... an attitude that seeks the continuous improvement of what exists. It is a conviction that one can do better today than yesterday and that tomorrow will be better than today.”

European Productivity Agency (1959)
Productivity concept

“Productivity is an attitude of mind that strives for and achieves the habit for improvements, as well as the systems and the set of practices that translate the attitude into action...”

National Productivity Board, Singapore
Productivity concept

Productivity = \frac{\text{Value of Output}}{\text{Value of Input}}

Firm-level Productivity = \frac{\text{Output}}{\text{Worker}}

National-level Productivity = \frac{\text{Gross Domestic Product}}{\text{Work force}}
Productivity concept

Productivity Growth = Total Factor Productivity Growth (TFP) + Capital Intensity (CI) Growth

TFP = A measure of how well resources are used
CI = Capital per Worker
Productivity concept

Higher Quality → Higher productivity → Higher competitiveness

- Global
- International multinational
- Export
Productivity concept

Standard of living

Economic Growth

Productivity Growth + Employment Growth

TFP Growth + Capital Intensity Growth
Productivity concept

Factor Contributing to Higher TFP

- **Skill level** of the workforce
- Technical progress as indicated by
  - **Innovation**, advances in knowledge, better management systems, positive work attitudes and teamwork
- **Industrial Restructuring**
  - **Shifting of resources** to more productive sector
Productivity improvement techniques

- Material Based Techniques
- Technology Based Techniques
- Investment Based Techniques
- Employee Based Techniques
- Task Based Techniques
- Management Based Techniques
- Product Based Techniques

- Reducing administrative cost
- Increasing value added
- Increasing contribution
- Increasing profit
- Increasing contribution
- Increasing value added
- Increasing contribution
- Increasing profit

- Maintenance planning and control
- Layout
- Group technology
- CAD, CAM, CAPP
- Computer applications
- Inventory control
- MRP
- Quality control
- Material handling improvement
- Material reuse and recycling

- Work study
- Job evaluation
- Job safety
- Ergonomics
- Scheduling
- Computer Aided data processing
- R & D
- Product design
- Product standardization
- Product improvement
- Product reliability
- Value improvement
- Value engineering

- Work condition improvement
- Communication improvement
- Job rotation
- Work condition improvement
- Communication improvement
- Job rotation

- Financial Incentives
- Training and education
- Quality circles
- Brainstorming
- Training and education
- Quality circles
- Brainstorming

- Marketing Mgt.
- Production Mgt.
- Cost Mgt.
- Maintenance Mgt.
- Material Mgt.
- Resource Mgt.
- Financial Incentives
- Training and education
- Quality circles
- Brainstorming

- Resource Mgt.
- Product Mgt.
- Marketing Mgt.
- Production Mgt.
- Cost Mgt.
- Maintenance Mgt.

- Cost Mgt.
- Resource Mgt.
- Product Mgt.
- Marketing Mgt.
- Production Mgt.
- Maintenance Mgt.

- Product design
- Product standardization
- Product improvement
- Value improvement
- Value engineering
- Brainstorming
- Training and education
- Quality circles
- Brainstorming
- Training and education
- Quality circles
- Brainstorming

- Work condition improvement
- Communication improvement
- Job rotation
- Work condition improvement
- Communication improvement
- Job rotation

- Financial Incentives
- Training and education
- Quality circles
- Brainstorming
- Training and education
- Quality circles
- Brainstorming
Prod’vity Movement - Early Years

Charter for industrial progress (1965)

• Joint declaration by employer groups and unions to work together to increase productivity under a Productivity Code of Practice.

• Establishment of the Singapore Productivity Center to Promote productivity in Singapore.
Prod’vity Movement - Early Years

• National Productivity Center (1967-1972)
  ➢ Training and management consultancy
  ➢ Industrial Relations

• National Productivity Board (1972-1981)
  ➢ Training and Management Consultancy
  ➢ Productivity Council
  ➢ Low Cost Automation
National Prod’vity Board(1981-1995)

• Training and Management Consultancy
• Work Excellence Committee
• Quality Circles
• Productivity Promotion
• Skills Development Fund Administration
Productivity and Standards Board (PSB)

• Formation of PSB in 1996 to promote innovation and raise TFP.

- Merger of National Productivity Board and the Singapore Institute of Standards and Industrial Research.
• **Mission:** to raise productivity so as to enhance Singapore’s competitiveness and economic growth.

• **Six broad thrusts:**
  - Productivity promotion
  - Man power development
  - Technology application
  - Industry development
  - Standard & quality development
  - Incentives management
Standards, Productivity and Innovation Board (SPRING Singapore) (2002)

- Innovation and Entrepreneurship
- Small and Medium sized Enterprises
- Domestic Cluster Development
- Service Excellence
- Standardization for Productivity
• **Mission:** To enhance the competitiveness of enterprises for a vibrant Singapore economy
  - **Nurture** a pro-business environment
  - **Facilitate** the growth of industries
  - **Enhance** productivity and innovation and capabilities of enterprises
  - **Increase access** to markets and business opportunities.
“... productivity will come the day we get it into everybody's head that he has a critical contribution ... it's got to do with self-respect, it's got to do with co-operation between workers, and between worker and manager on the same side.”

Prime Minister Lee Kuan Yew 1981
Stages of the Productivity Movement

- Awareness Stage (1981-85)
- Action Stage (1986-88)
- Ownership Stage (1989-90s)

100% Right
Awareness Stage

1. **Education of the public**
   - Launch of the Productivity Movement
   - Publication of Productivity Data
   - **Media Support**
   - **Changes in schools and Tertiary Institutions**
Awareness Stage

2. Information Dissemination and Training

- Courses with emphasis on Human Relations
- A Library of Local Case Studies on Good Management Practices
- A Registry of Courses on Productivity and Management
Awareness Stage

3. Strengthening Company Identification
   – Payment of variable bonus
   – Special awards for long service employees
   – House unions
   – Supports facilities: companies given preference during peak periods
Awareness Stage

4. Promotion of labour-manag’t joint consultation
   – Work excellence committees
   – Quality control circles

5. Promotion of productivity in the public sector
   – Productivity campaign in the public sector
   – Work improvement teams
   – Productivity working committee
6. **Formation of National Productivity Council** to review productivity efforts and outline future strategy on an annual basis. **High-level representation** from government, employer, groups, unions and academia.
**Action Stage**

**Objective:**
- To translate “awareness” into specific programs to improve productivity at the workplace

**Focus:**
- Skills upgrading of management and workers
- Upgrading of companies operational efficiency
Action Stage

- Management consultancy referral scheme
- Associate consultants scheme
- Model company project
- Industry based consultancy assistance scheme
Action Stage

- **Training** of the workforce
  - Skills development fund
- **Collaboration** on national training programs
  - **Singapore Airline:** SQ Center
  - **Philips Singapore:** Industrial Engineering Training Center
  - **Seiko Instruments:** On-The-Job Training Project
Ownership Stage

Objective:

• To Encourage Ownership of the Productivity Movement

Focus:

• Self-sustaining Productivity Movement

100% Right
Ownership Stage

“... to have a successful productivity movement, we must have a critical mass of organizations and individuals who know that they will benefit from it, are proud to be part of it, and are willing and ready to make it succeed.”

Mr Mah Bow Tan
Chairman, NPB 1989
Ownership Stage

• Launch of the productivity activities scheme
  - Develop a core of productivity “champions” in companies
• Private sector leading the annual productivity campaign
  - Employer groups chairing the campaign steering committee
Innovation Driven Phase

- Innovation-Driven Growth
- Abundance of Knowledge and Increasing Returns
- In perfecting searching the Unknown
Shorter life-cycles for innovative technologies

- Water power
- Textiles
- Iron
- Steam
- Rail
- Steel
- Electricity
- Chemicals
- Internal-combustion engine
- Petrochemicals
- Electronics
- Aviation
- Digital networks
- Software
- New media

1st Wave

1785

2nd Wave

1845

3rd Wave

1900

4th Wave

1950

5th Wave

1990

2020

60 yrs

55 yrs

50 yrs

40 yrs

30 yrs
Innovation Driven Phase

Yesterday  |  Today  |  Tomorrow

Quality Control  |  Quality Management  |  Innovation & Quality

Incremental Improvement  |  Continuous Improvement  |  Breakthrough Improvement

Cost Reduction  |  Cost management  |  Value Creation

Use of Data  |  Use of Information  |  Use of Knowledge
Innovation Driven Phase

Yesterday
A committed Workforce → A Quality Workforce → A Work-class workforce

Today
Training for Employment → Training for Development → Training for Employability

Tomorrow
Problem-solving Mindset → A Quality Mindset → An Innovation Mindset
Lessons Learned

1. Productivity is a question of **paradigm shift** and it is a movement not an event.

   “productivity is a mental attitude that leads to practical action, resulting in real improvement for everyone…”

   Japan Productivity Center
So what do we need?

New Mindset of

- Thinking big. The sky is the limit.
- Acceptance of complexity and its contradictions
- Diversity consciousness and sensitivity
- Seeking opportunity in surprises and uncertainties
- Do it right the first time and every time.
- Focus on continuous improvement
- Extended time perspective
- Systems thinking

Yes We can Make it !!!
Lessons Learned

2. Strong Commitment

• Higher government officials
• Enterprises leaders
• Individuals (Concerned citizens)
Lessons Learned

3. Strong Organizational Structure

- National Council of Productivity and Competitiveness
- Flat Structure
- Members - Dynamic, Visionary and action oriented
Lessons Learned

4. Be conscious of the three phases
   (Awareness, Action and Ownership)
   
   A. Awareness
   
   B. Action and Ownership (combined)
Awareness

Action and Ownership

Time (years)
Lessons Learned

5. Productivity Movement refers to the commitment and active involvement by government, private sector and universities in activities to increase productivity.
Lessons Learned - Triple helix fusion

Firms

Academia

Public Sector

Source: Economic Competitiveness Group
Lessons Learned  Productivity Promotion

1. Annual Productivity Campaign
   - Promotion Theme: Quality and Productivity
   - Launch of Campaign by High Level Ministers
   - Company Wide Programmes
   - Quality circles at the Workplace
Lessons Learned  Productivity Promotion

2. Education, Seminars and Publications

- Media Support and Involvement of Artists
- Teaching Quality and Productivity at all levels in the Ethiopian Education System.
- International Exposition of Quality Circles
- Quality Award Conference
- National Quality Circles Conventions
- Publications and Dissemination of Quality News
Lessons Learned: Productivity Promotion

3. National Awards

- Ethiopian Quality Award for Business Excellence
- National Productivity Award
- National Training Award
- Excellent Service Award
- National Quality Circles Award
Lessons Learned Productivity Promotion

4. Adopting Best Practices

- Japanese Productivity Movement
- Asian Productivity Organization
- Japan Productivity Center for Social-Economic Development.
- Study missions to study other countries productivity experience
Two Golden Rules

Rule Number 1: There is always a better way of doing things. (Continuous Improvement)

Rule Number 2: Don't forget Rule Number 1
Thank you