Seven Effective Lean Six-Sigma Principles For The Modern Enterprise

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World-class companies know what their customers want!

Voice of the customer (VOC)  
Critical to quality (CTQ)  
Just in time (JIT)  
How much, in what form, when
Which would you buy?

**Supplier A**
- Basic cost: $499
- Other costs: None
- Total costs: $499

**Supplier B**
- Basic cost: $449
- Better processes: $90
- Total costs: $539

WHAT DO CUSTOMERS WANT?

Not one, but all!

VALUES

QUALITY

RELIABILITY

PRICE

SERVICE
We always want the best value! And so does everyone! Provide features that will delight the customers! Support functions that provide value to customers!
World-class companies know that customers will not support inferior quality and inefficiency!
Quality is Free

❖ Incentives & rebates to customers attempt to hide inferior quality
❖ Patriotic slogans hide inefficiency!
❖ Selling inferior products is a dis-service to society!
❖ Customers will not support incompetence!

http://www.ar15.com/archive/topic.html?b=7&f=91&t=905267
http://www.notjohnchow.com/save-america-buy-american/
Rise of Toyota

❖ Eiji Toyoda: passed away at age 100
❖ Developed efficient, low-defect manufacturing processes
❖ Visited Ford plant in 1950 when Toyota was making 2,500 cars per year
Rise of Toyota

- Learned that Americans were buying European cars!
- Went back convinced that Americans will buy his “quality” cars!
Principle No. 3

❖ Your employees are your greatest asset
❖ All improvement starts with their self-improvement
❖ Help them create balanced lives
❖ Create high-performing teams
❖ Empower employees; 80% are coasting on the job!
High Performance Teams

What do high performance teams have that others don’t?

Skills

Dedication

Communication
In high performance teams, each team member is committed to make others the best they can be? And management encourages this to be so!
Educate Employees

http://www.files.chem.vt.edu/chem-dept/tissue/images/ethics180x120.png

http://deepgreenpermaculture.files.wordpress.com/2010/08/rightandwrongdecisions.jpg

http://2.bp.blogspot.com/-taPobSU3yk/TaLeTMQJcgl/AAAAAAAAJHs/xhXOAGJW2OA/s1600/Baldrige_Award_Logo.gif
Encourage Balanced Employees!

I'm afraid you'll have to stay late tonight, I want you to attend this talk on work-life balance.

http://4.bp.blogspot.com/-0ts09StEo70/ULY40-7ZLXJ/AAAAAAAABxc/6w70oa4fbIE/s1600/Work_Life_Balance+-+fam2220h.jpg

Customer satisfaction is directly proportional to employee satisfaction!
<table>
<thead>
<tr>
<th></th>
<th>Japanese</th>
<th>Japanese</th>
<th>American</th>
<th>European</th>
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<tr>
<td>Location</td>
<td>Japan</td>
<td>America</td>
<td>America</td>
<td>Europe</td>
</tr>
<tr>
<td>Hours/vehicle</td>
<td>16.8</td>
<td>21.2</td>
<td>25.1</td>
<td>36.2</td>
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<tr>
<td>Defects/100</td>
<td>60</td>
<td>65</td>
<td>82.3</td>
<td>97</td>
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<tr>
<td>Sq ft/vehicle</td>
<td>5.7</td>
<td>9.1</td>
<td>7.8</td>
<td>7.8</td>
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<tr>
<td>Repair to assembly area</td>
<td>4.10%</td>
<td>4.90%</td>
<td>12.90%</td>
<td>14.40%</td>
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<tr>
<td>Inventory (days for 8 parts)</td>
<td>0.2</td>
<td>1.6</td>
<td>2.9</td>
<td>2</td>
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<tr>
<td>% workforce in teams</td>
<td>69%</td>
<td>71%</td>
<td>17%</td>
<td>0.60%</td>
</tr>
<tr>
<td>Job rotations (0 to 4)</td>
<td>3</td>
<td>2.7</td>
<td>0.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Suggestions/employee</td>
<td>61.6</td>
<td>1.4</td>
<td>0.4</td>
<td>0.4</td>
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<tr>
<td>Job classes</td>
<td>11.9</td>
<td>8.7</td>
<td>67.1</td>
<td>14.8</td>
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<tr>
<td>New worker training hours</td>
<td>380</td>
<td>370</td>
<td>46</td>
<td>173</td>
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<tr>
<td>Absenteeism</td>
<td>5</td>
<td>4.8</td>
<td>11.7</td>
<td>12.1</td>
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<tr>
<td>Automation in welding</td>
<td>86%</td>
<td>85%</td>
<td>76%</td>
<td>76%</td>
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<td>Automation in painting</td>
<td>54%</td>
<td>41%</td>
<td>34%</td>
<td>38%</td>
</tr>
<tr>
<td>Automation in assembly</td>
<td>1.70%</td>
<td>1.10%</td>
<td>1.20%</td>
<td>3.10%</td>
</tr>
</tbody>
</table>

IMVP World Assembly Plant Survey (1989)
Train employees who come in direct contact with your customers well; they can make or break it!

Who touches your customers the most?

CEO, COO, CFO, president, vice-presidents, general managers, sales managers, marketing managers, department managers, supervisors, customer service reps, sales people
Use the 3 basic and best tools of Lean Six-Sigma extensively!

- Flow charts
- Standard work
- Check lists!
Document all processes

- No hidden work and information! Flow chart all processes!
- Create institutional knowledge base!
- If you can't describe what you are doing as a process, you don't know what you're doing."

W. Edwards Deming
Create Flow Charts for All Processes!

Clerk:
- Opn 1: 3 m
- Opn 2: 20 m
- Opn 3: 10 m
- Opn 6: 5 m

Loan Officer:
- Opn 4: 30 m
- Opn 5: 10 m
- Opn 8: 5 m
- Opn 9: 5 m
- Opn 10: 2 m

Manager:
- (240 m)
- Opn 5: 10 m
- Opn 8: 5 m
- (240 m)
- (120 m)

Underwriter:
- Opn 7: 15 m
- (240 m)

Operation Times:
- (60 m)
- (20 m)
- (10 m)
- (5 m)
- (30 m)
- (10 m)
- (5 m)
- (2 m)
- (15 m)
- (60 m)
- (480 m)
- (240 m)
- (240 m)
- (240 m)
- (240 m)
- (240 m)
- (240 m)

In-between Operation Times:
- (240 m)
Know %VAT for your Core Processes!

❖ VAT ratio = (sum of activity times) / (lead time)

❖ %VAT = \( \frac{30}{120} \times 100 = 25\% \)

❖ For all core & priority processes: %VAT = 100%

For most processes %VAT is below 5%! 
Process Value Mapping Case Study

- Industrial Engineer
- December 2006
- IIE Lean Solutions

Squeezing out extra value
Use Checklists Extensively

- First introduced in 1935 after the maiden B-17 test flight
- Major Ployer Hill, test pilot
- Died in maiden flight
- Forgot to release locking mechanism on elevator and rudder
- Too much plane for one person to fly?
Checklist for Avoiding Infections

1. Wash hands with soap
2. Clean patient’s skin with chlorhexidine
3. Put sterile drapes over entire patient
4. Wear mask, hat, sterile gown & gloves
5. Put sterile dressing over insertion site

- In 33% of cases, one step was skipped!
- After checklist, line infection rate went from 11% to zero!
- Prevented 43 infections, 8 deaths and saved $2 million!
Miracle on the Hudson

Sully
Standardize Processes

❖ All do it one way!
❖ All take the same time!
❖ All achieve the same quality!
❖ Easy to control, train and cross-train!
Standardized Work

- Combination of people, materials, methods, and machines in the process
- Change requires all process personnel to reconvene and accept new procedure before implementation
- Standardize the process and the activities
Create a culture of doing it right the first time!
Principle No. 7

- Track all you want to improve!
- What is not measured, is not important!
- What is measured only can be controlled!
How many of us will go to a game where no score is kept?

People like to know what the score is!
Closing Thoughts

❖ We are what we repeatedly do;
   ❖ Excellence, then, is not an act but a habit!

❖ Live as if today is your last day;
   ❖ Learn as if you are going to live forever!

❖ It is not necessary to change;
   ❖ Survival is not mandatory!

Aristotle

Mahatma Gandhi

Edwards Deming