Business Process Charting

Peter Peterka

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Objectives

- Define Business Process Charting
- How to Determine the Proper Metrics
- Statistical Thinking Basis of BPCharting
- Differences of Charting Business Data
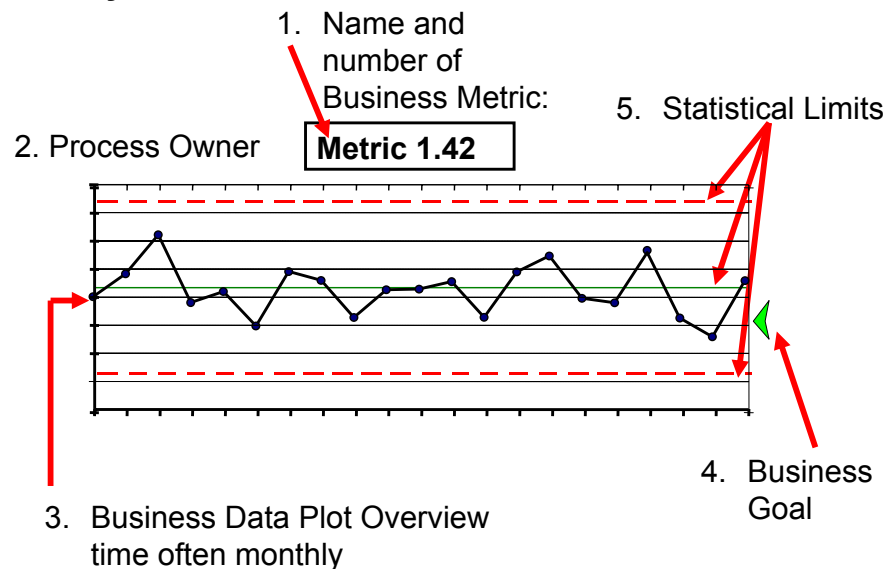- Road Map to Implement BPCharting

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Business Process Charting

- A graphical and numerical analysis method for any type of business process data used for insight into understanding and improvement of business results.

- Based upon Statistical Thinking Theory

- Directed toward identifying opportunities for improving business results

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Key Elements of Business Process Charts

1. Business Metric with an operational definition
2. Process Owner Labeled on Chart
3. Business Data Plotted over time often monthly
4. Business Goal Marker
5. Statistical Based Limits often based on Individual and Moving Range to start

Key Elements of Business Process Chart

1. Name and number of Business Metric:

Metric 1.42

2. Process Owner

5. Statistical Limits

4. Business Goal

3. Business Data Plot Overview time often monthly

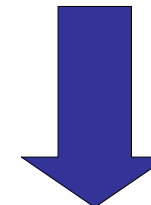## Determine the Operational Definition for the Metric

- Definitions that will be interpreted the same way by different people in different situations.
- Same method of calculation
- Same method of counting

How to: Determine the Proper Metrics

- Actual Process Map of Business Process
- Cause and Effect Matrix approach relating metrics to business goals
- Affinity Brainstorming of Metrics
- Have each business leader give their 10 "sweat" metrics
- Traditional Financial Measures
- Customer Measures
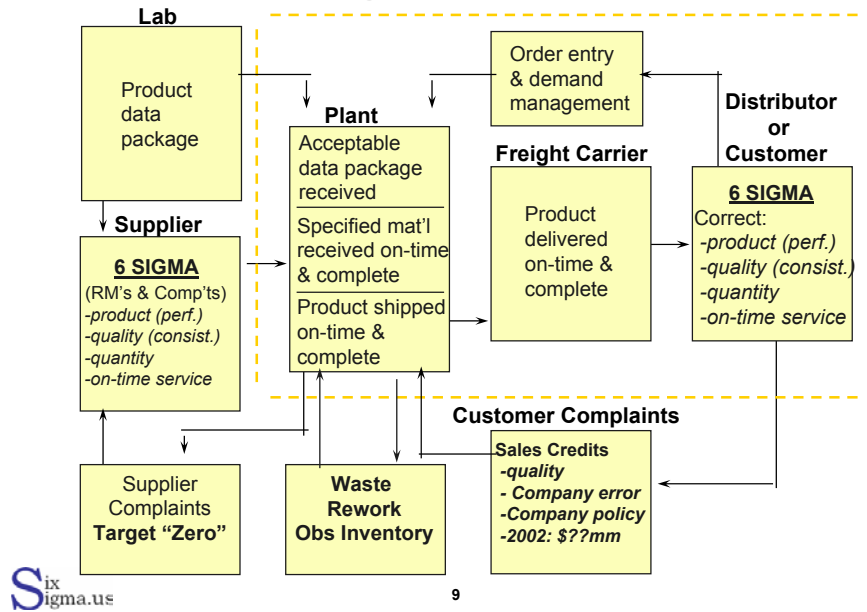- Indicators or Predictors of Performance (Xs)

High Level Outputs of Business System

Customers

Cash

Supply Chain Excellence

Lab

Product data package

Supplier

6 SIGMA
(RM's & Comp'ts)
-product (perf.)
-quality (consist.)
-quantity
-on-time service

Plant

Acceptable data package received

Specified mat'l received on-time & complete

Product shipped on-time & complete

Order entry & demand management

Freight Carrier

Product delivered on-time & complete

Distributor or Customer

6 SIGMA
Correct:
-product (perf.)
-quality (consist.)
-quantity
-on-time service

Supplier Complaints **Target "Zero"**

Waste Rework Obs Inventory

Customer Complaints

Sales Credits
-quality
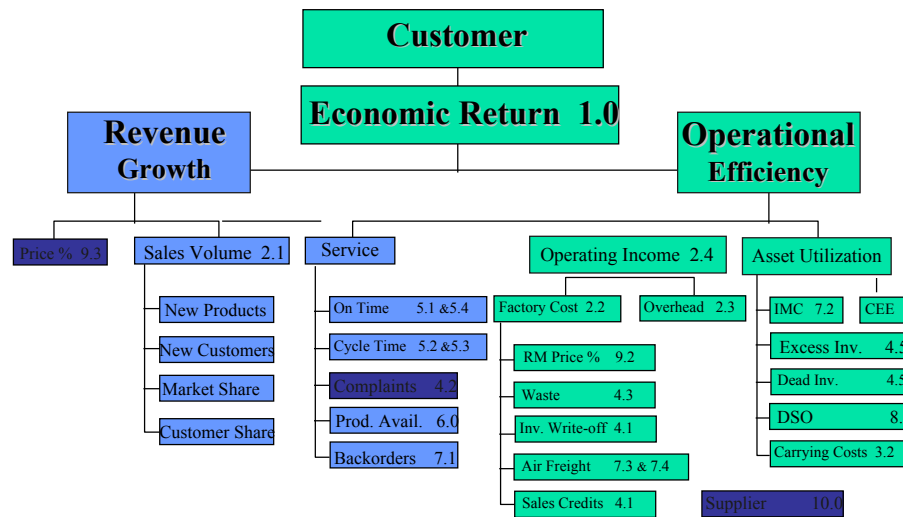- Company error
-Company policy
-2002: $??mm

Business Indices

1. Economic Return
2. Sales & Operating Income
3. Total Delivered Costs
4. Opportunity Costs
5. Order Fulfillment
6. Product Availability
7. Inventory/Service Indicators
8. Business Process Speed
9. Elements of Profitability
10. Supplier Performance
11. Improvement Assessment Matrix

"High Level' Division/Group Indices

Performance Metric Drill Down

Customer

Economic Return 1.0

Revenue Growth

Operational Efficiency

Price % 9.3

Sales Volume 2.1
- New Products
- New Customers
- Market Share
- Customer Share

Service
- On Time   5.1 &5.4
- Cycle Time 5.2 &5.3
- Complaints   4.2
- Prod. Avail. 6.0
- Backorders   7.1

Operating Income 2.4
- Factory Cost 2.2
- RM Price %   9.2
- Waste   4.3
- Inv. Write-off 4.1
- Air Freight   7.3 & 7.4
- Sales Credits 4.1

Overhead   2.3

Supplier   10.0

Asset Utilization
- IMC 7.2
- CEE
- Excess Inv.   4.5
- Dead Inv.   4.5
- DSO   8.3
- Carrying Costs 3.2

Mores Examples of Business Measures:

- Customer Complaints
- Economic Profit
- Order Fulfillment
- Product Availability
- Customer Credits
- Inventory Levels
- Delivery Costs
- Number of New Products/Sales $$
- Safety

- % Waste
- $$ Waste
- Raw Material Costs
- Cycle Time
- Inventory Turns
- Premium Freight
- IMC Index
- DSO
- Market Share

Metrics for Six Sigma Implementation

- Percent Projects Completed
- Savings from Projects
- Percent Projects in Company Database
- Percent Course Attendance
- Consultant work days
- Instructor Scores
- Percent Courses with Correct Material
- Six Sigma Billing Errors

Understanding Variation
The "Variability Onion" of Metrics:

Data can be segmented many ways
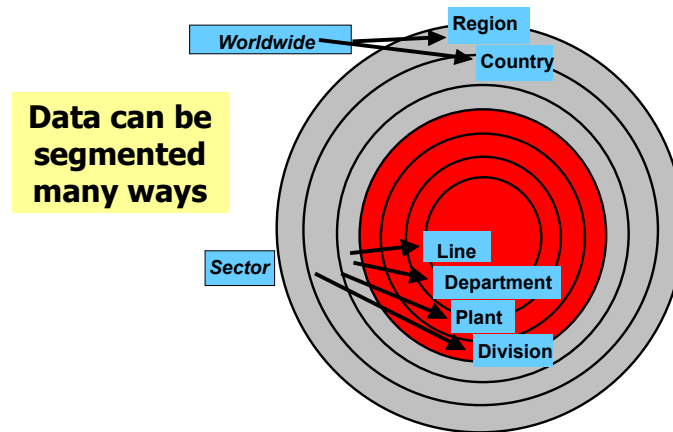
The Current Method of Business Analysis

- Summarize business results with a table of numbers.
- Compare to last period, same period last year or goal.
- React to big percent changes; ignore small percent changes.
- Focus attention on those portions that are getting worse.

Three Methods of Analysis

The Goal Approach
- Current values are judged to be either acceptable or not based on comparison with the goal, target, budget limit, etc.
- Alternate between "doing okay" and "in trouble"
  - When "doing okay" ignore it
  - When "in trouble" take action
  - On-again, off-again approach is the complete antithesis of continual improvement.
  - Goals are useful as a *means* to improvement, but when they become the *end*, to the degree of disrupting improvement, they are a problem!

Three Methods of Analysis

The Average Approach
- Compare actual results to average results
- Above vs. Below average is not a meaningful "break point" in performance
- Below average months are inevitable
- Creates internal comparisons that may not be either fair or helpful
- Other variations on this approach include:
  - Best/worst result (there will always be one!)
  - Best/worst result in X months

Three Methods of Analysis

The Business Process Chart Approach
- Results are judged first on whether they represent a real change in the underlying process (special cause) or not (common cause)
- The capability of the business process is compared to any goals, targets, etc.

"To Measure or Not to Measure"

- ✓ Raw Monthly Number: $, Total, %
- ✓ Aggregate Numbers
- ✓ Percent to Sales or Similar Business Ratio
- 🚫 Mix of Monthly and Year to Date
- 🚫 Percent Change
- 🚫 % Change vs. Same Month Last Year
- 🚫 Year to Date Percent Increase
- 🚫 Take Care with Accounting Accruals/Adjustments

Benefits of Business Process Charting

- Improve Business Results
- Make better predictions, improve credibility
- Detecting real trends not "phantom"
- Learn more about processes
- Ask more helpful questions
- Identify chronic opportunities for improvement
- Engage Business Leaders and Champions

Statistical Thinking is ....

- A philosophy of learning and action based on the following fundamental principles:
  - All work occurs in a system of interconnected processes,
  - Variation exists in all processes, and
  - Understanding and reducing variation are keys to success.
- A Way of Thinking

Benefits of Statistical Thinking

- Strengthens the connection between improving the <u>business</u> and improving the business process
- Improve predictability and credibility
- Defines the appropriate direction for action
- Focuses scarce resources on the right issues
- Learn faster about processes
- **Engaging Business Leaders and Champions**

What Action is Appropriate?
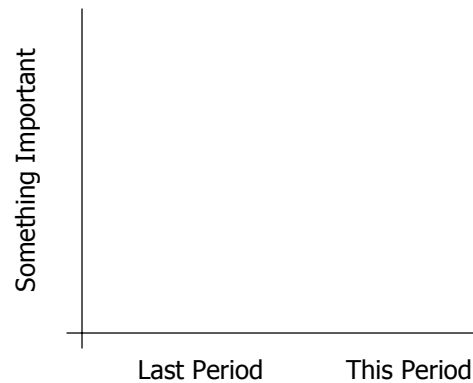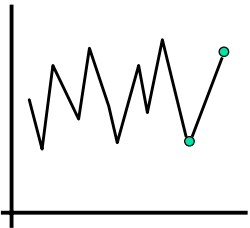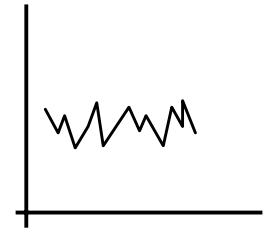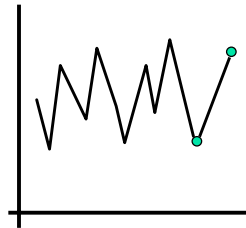
What Action is Appropriate?

It Depends!

25

It Depends!

26

It Depends!
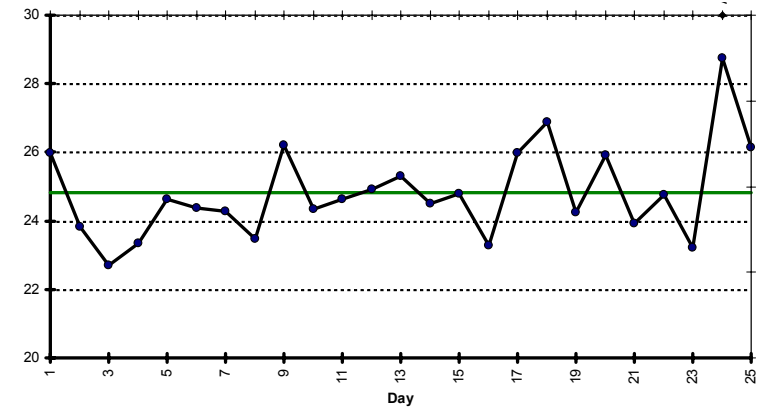
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It Depends!

28
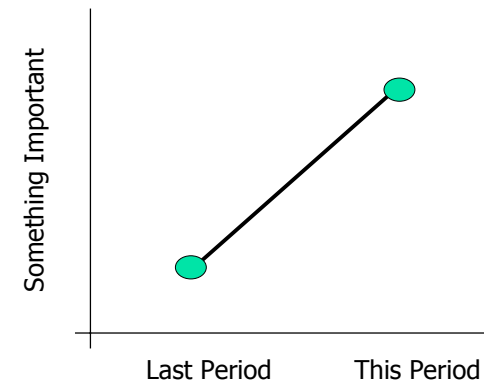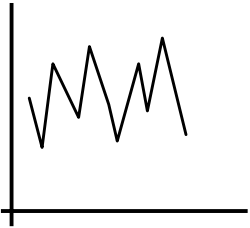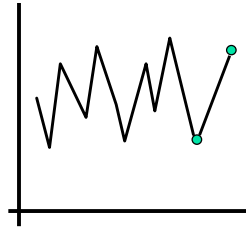
It Depends!

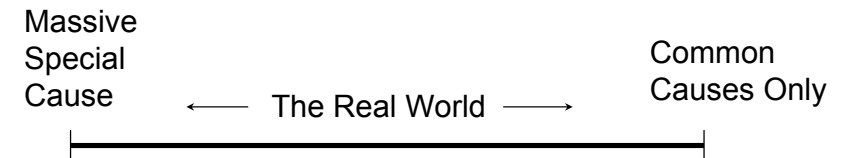## How Long does it take me to get to work?

Why 23 one day and the next 26 minutes?

Common-Cause and Special-Cause Variation

- From Common Causes
  - Systemic, Chronic, Built-in Variation
- From Special Causes
  - Sporadic, Exceptional, Atypical Variation

The Special and Common Cause Spectrum

Massive
Special
Cause   ←—— The Real World ——→   Common
                                                   Causes Only

It is important to know, at any point in time, which type of variation is <u>dominant</u>.

Appropriate Questions

- If special causes dominant
  - What <u>happened</u> (in that period)?
  - Is it likely to <u>continue or re-occur</u>?
- If common causes dominant
  - What is <u>happening</u> (throughout the whole time span)?
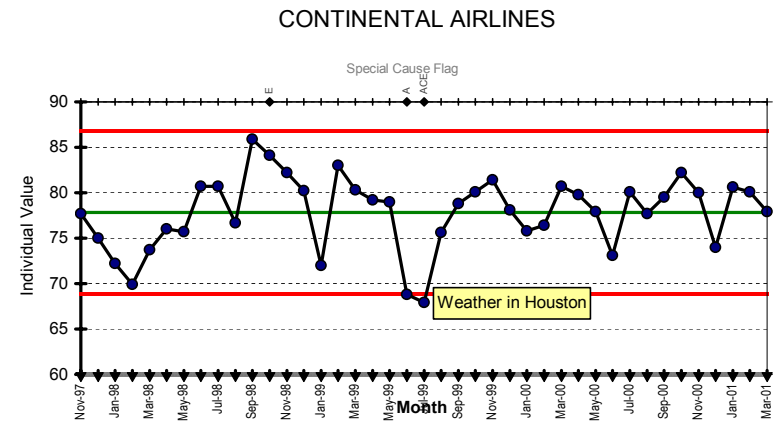
Appropriate Type of Action

- If special causes dominant
  - <u>Isolate and address</u> the special cause(s)
  - Don't <u>over-fix</u>
- If common causes dominant
  - Make a <u>permanent change</u> to the system
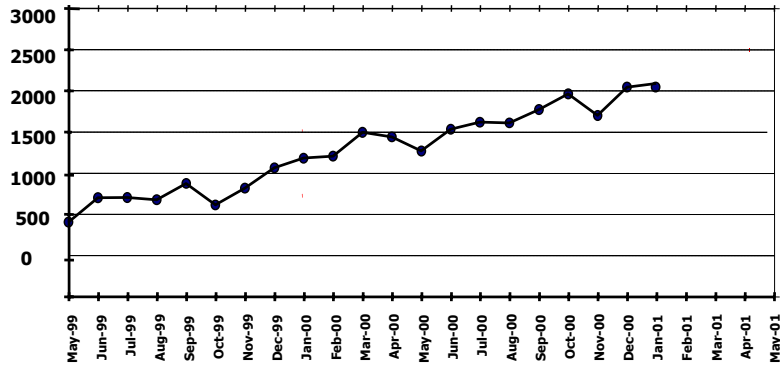 - Don't <u>tamper</u> after at each data point

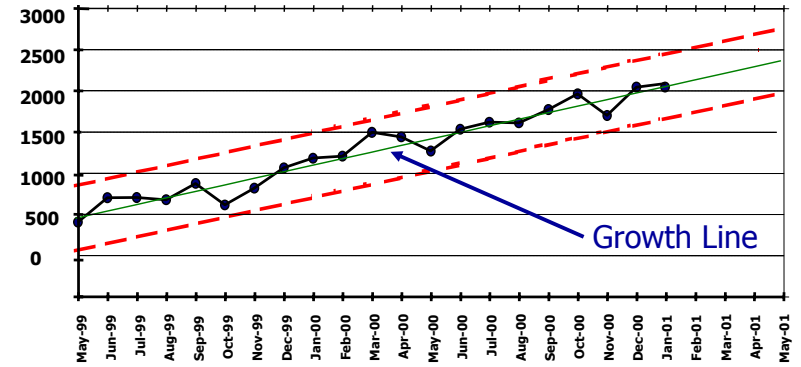## Business Process Chart for Improvement
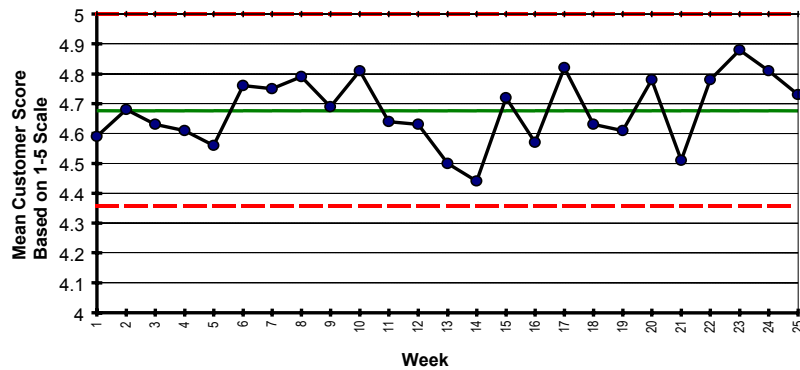
Business Metric with Special Cause

CONTINENTAL AIRLINES

New Product Growth

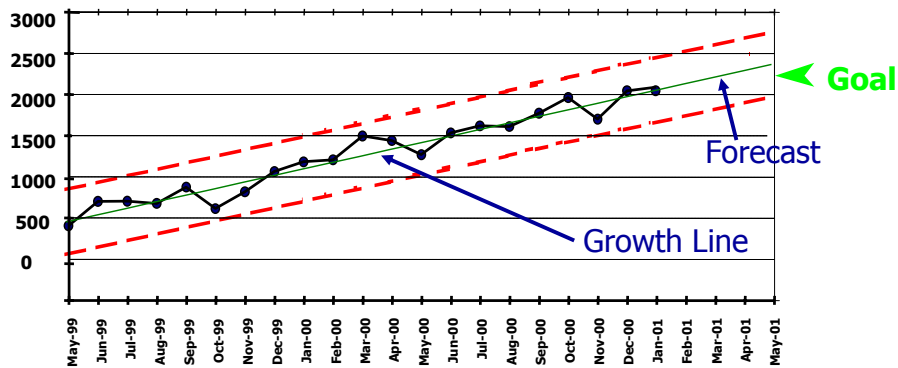# New Product Growth

Growth Line

New Product Growth

Goal

Forecast

Growth Line

Chart created in MTES www.mtes.com

3 Up
Run Chart

AMERICAN

CONTINENTAL

SOUTHWEST

Slide 41
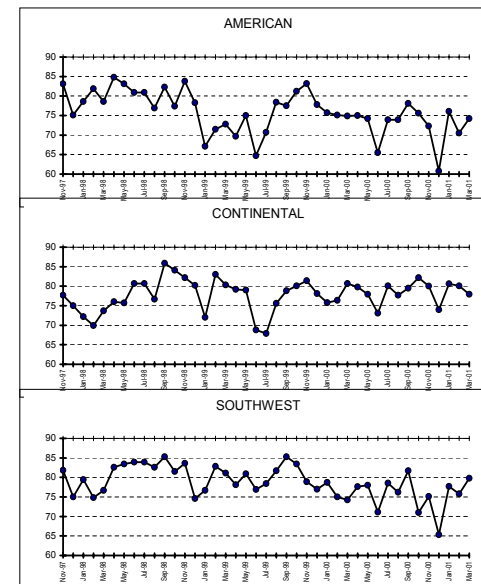
3 Up BPChart

Step Change

Slide 42

9 Up BPChart

Slide 43
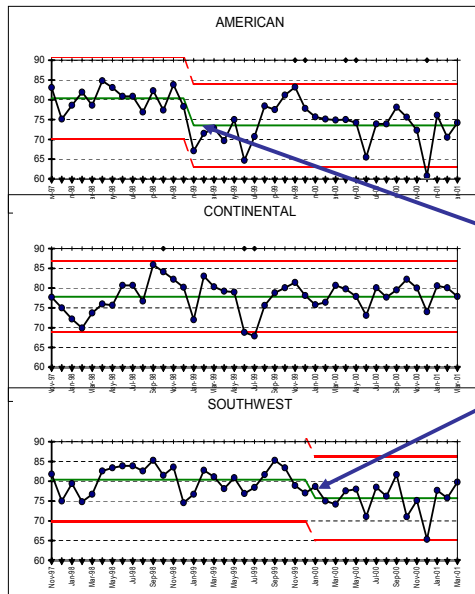
Business Data versus Manufacturing Data

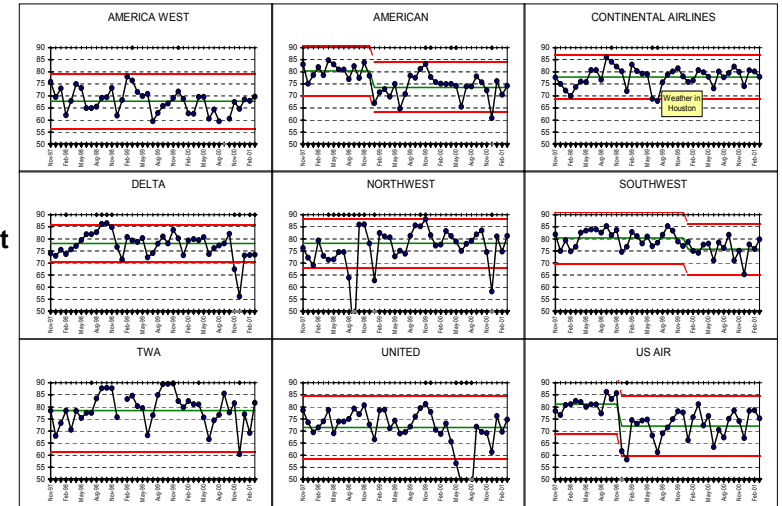| Business		Manufacturing
Collected Infrequently	⬌	Frequent
Often monthly	⬌	By the hour or shift
Trends often desired	⬌	No trends desired
Often individual values	⬌	Individual and subgroups
Lack operational definitions	⬌	Often clearly defined
Difficult to quantify error	⬌	Easy to obtain measurement error
More difficult to experiment	⬌	Easy to experiment
Often time correlated data	⬌	Data can be corrected correlation

Slide 44

Types of Control Charts

- There are many types of control charts
  - X-Bar & R, Individuals, p, c, u, cusum, etc.
  - Most control chart limits are mean +/- 3 Std Deviations
- X-Bar charts will work for some Mfg Processes
- Individuals chart will work in most instances for Business Process Charts
  - Individuals charts are not perfect in all cases
  - Other charts will be technically more correct in some cases
  - But the simplicity of Individuals charts makes them a good general tool for business process charts.

Becoming an "Statistical Thinker"

- Be able to explain to others the meaning of performance <u>within the process limits</u>
- Use data to understand the future rather than explain the past
- Get results by improving the process
- Use thinking always with data
- Learn how to apply in the absence of data in situations that call for judgment
- Control Chart your data
- Avoid two point comparisons
- Require and teach others to employ

Roadmap to Implement Business Process Charts

```
Determine     →  Determine      →  Refine         →  Obtain 24
Business         Key Business      Operational       Month History
Goals            Metrics           Definitions
```

```
Leadership    →  During          →  Process Owners with
2 Day Statistical  Workshop          Improvement
Thinking Workshop  Refine Metrics    Specialists support
                   and Drill Downs   establish initial limits
```

```
Business Leaders Meet         →  Continue to Monitor
Quarterly to Select Improvement   Business Metrics in Chart
Projects Identified on "Chronic"  Form – Make Sure to
Common Cause Opportunities        Identify Special Causes
```

Closing Thoughts

"Being committed to the truth is far more powerful than any technique"
          Peter Senge

"The most important figures that one needs in management are unknown or unknowable, but successful management must nevertheless take account of them".
   Dr. W. Edwards Deming

"If we know how to manage with data, then we can learn how better to manage without data"
          Heero Hacquebord

Contact Information and References

- Peter Peterka - peter@sixsigma.us
- Phone (512) 233-2721
- Peter's sites www.mtes.com or www.sixsigma.us
- Books/Info www.asqstatdiv.org/aqc-thinking-title.html
- Books/Info www.spcpress.com

Improving Performance Through Statistical Thinking
ASQ Statistics Division
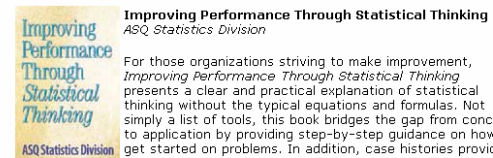
For those organizations striving to make improvement, *Improving Performance Through Statistical Thinking* presents a clear and practical explanation of statistical thinking without the typical equations and formulas. Not simply a list of tools, this book bridges the gap from concept to application by providing step-by-step guidance on how to get started on problems. In addition, case histories provide real-world examples for readers to extend to their own processes, while they learn how to implement statistical thinking in their organization. Concepts are clearly illustrated for readers to follow and extend to their own processes.

UNDERSTANDING VARIATION THE KEY TO MANAGING CHAOS

DONALD J. WHEELER SECOND EDITION