Translating Customer Expectations with Quality Function Deployment (QFD)
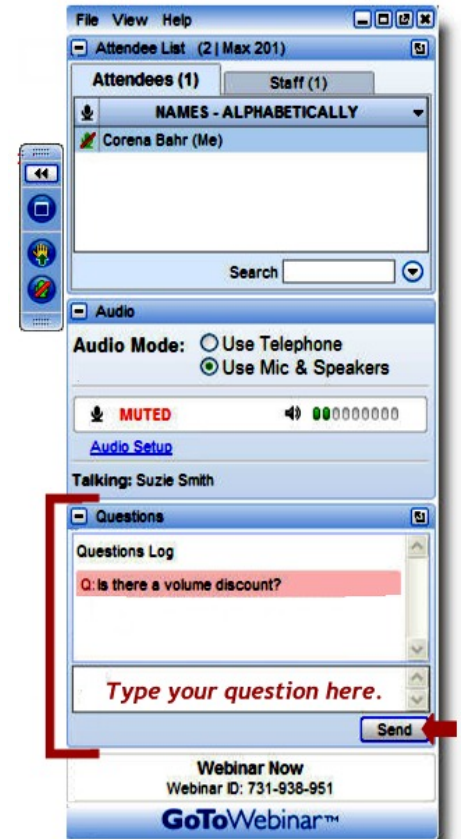
Sheryl Vogt
Vogt Consulting, Inc.
April 24, 2013

Agenda

- Welcome

- Introduction of MBB Webcast Series
  - Larry Goldman, MoreSteam.com

- Today's Session
  - Sheryl Vogt, Vogt Consulting

- Open Discussion and Questions

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- Founded in 2000

- Trained 400,000 Lean Six Sigma professionals

- Served over 2,000 corporate customers (including 50+% of the F500)

- First firm to offer the complete Black Belt curriculum online

- Courses reviewed and approved by ASQ and PMI

- Academic Partnerships with Ohio State University, Cal Poly and George Washington University

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Today's Presenter

Sheryl Vogt

President, Vogt Consulting, Inc.

- *Develops and delivers LSS programs and training for manufacturing, service, healthcare, and government organizations.*

- *Mentored hundreds of Black and Green Belts on their projects.*

- *Previously worked as a Black Belt and Master Black Belt for GE.*

- *B.S. in Mechanical Engineering and M.S. in Industrial Engineering – Purdue University*

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Today's Topic – Simple QFD

- Quality Function Deployment (QFD) is a complex but powerful tool that is used for product development

- Today we will focus on a simplified version that can be used for process design

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# *QFD Simplified for Process*

- History and purpose of Quality Function Deployment (QFD)

- Simplified version that can be used for process design

- Some examples

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History of QFD

- Developed in the 1960's by two professors in Japan

- Purpose was to design customer satisfaction into products

- Refined in 1970s

- Caught on in the US in the 1980's and 90's for product design

House of Quality
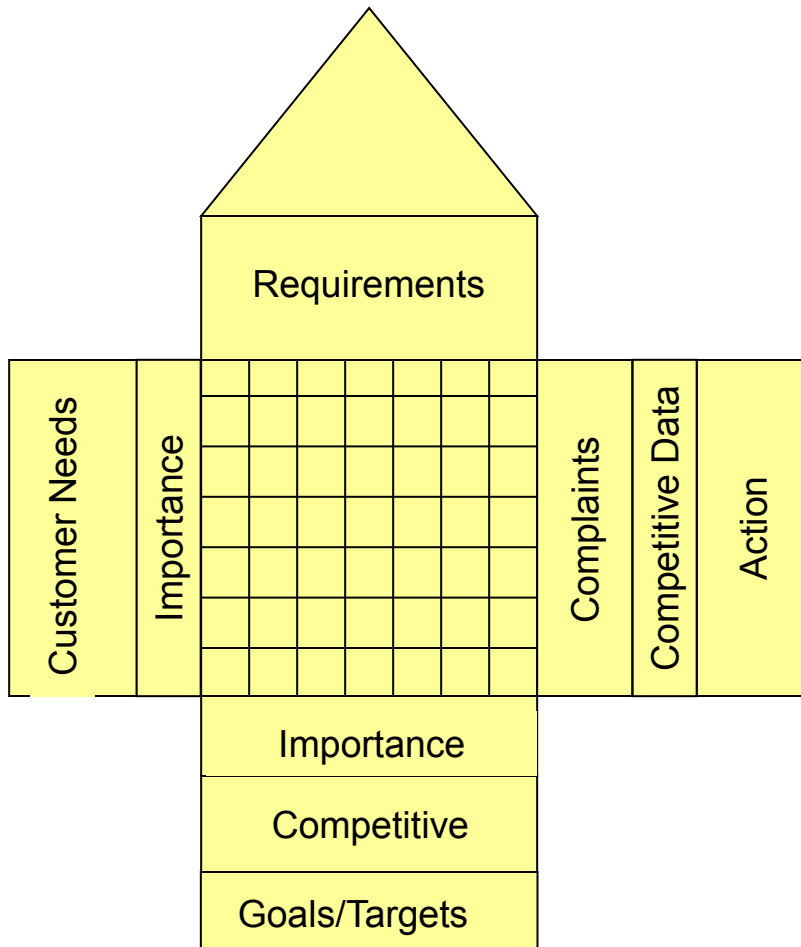
The "House of Quality"

- **Quality Function Deployment (QFD)** is recognized for the matrix which translates customer requirements (the voice of the customer) into technical requirements

- The matrix is often referred to as the **"house of quality".**

Why is QFD Good?

It's a Translation Tool

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Translating Customer Requirements

Customer Needs

Customer Requirements

Functional Requirements

Design Specs

Process Specs

Produce

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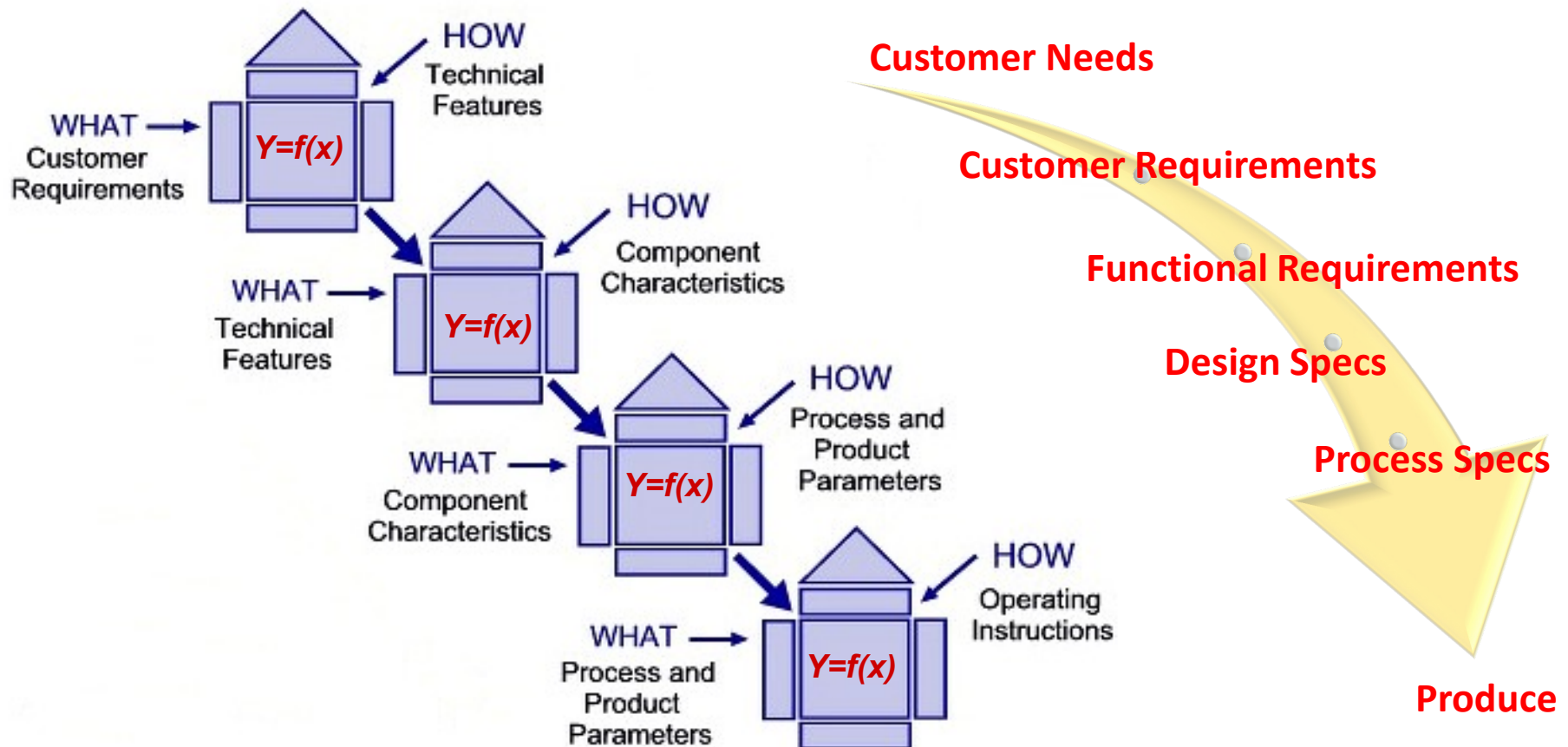
Customers are Hard to Understand
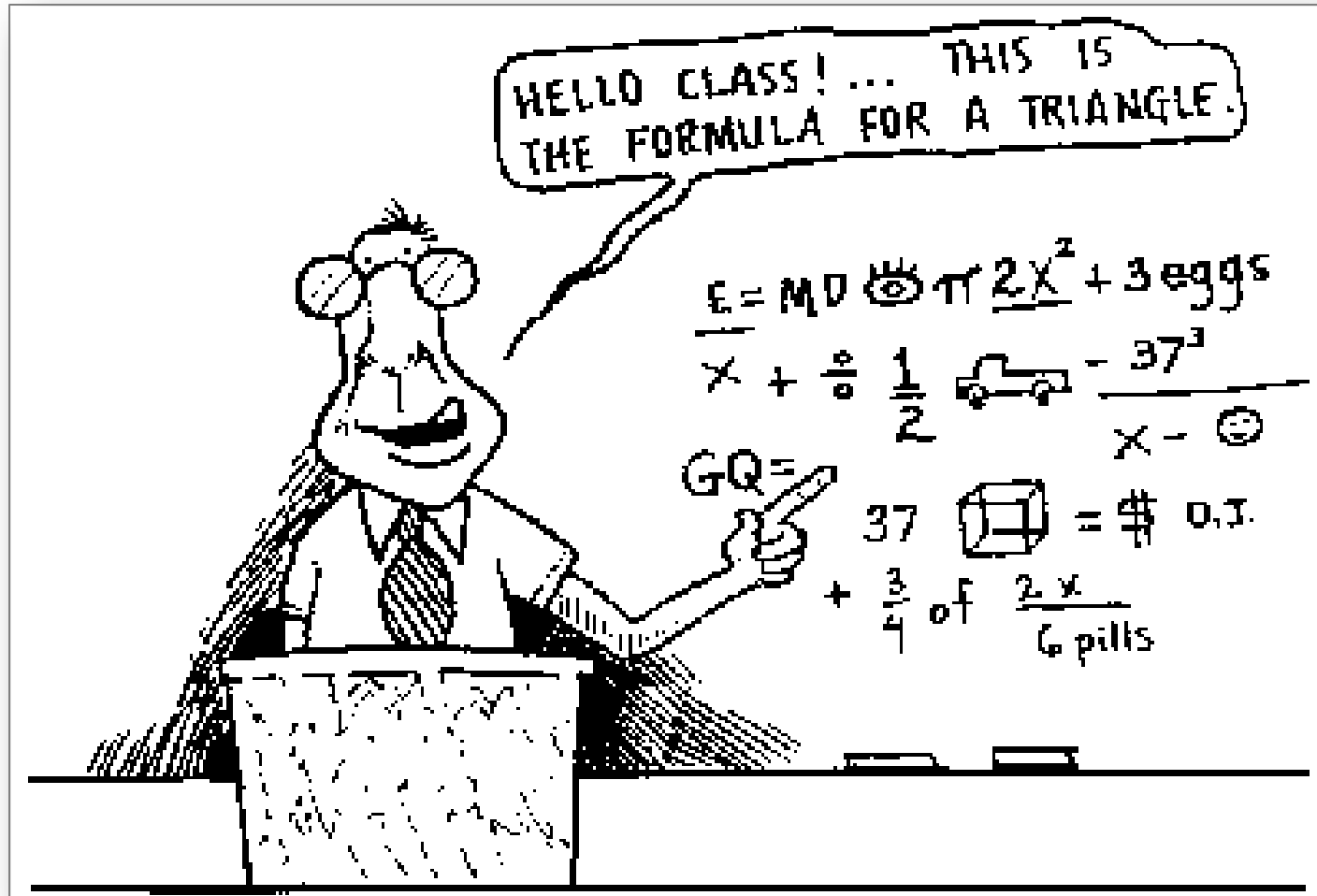
Great Tool but……

- Very long and tedious method

- Correct application requires rigor and time

- Hard to translate from product to process

Typical Team Reaction

Had this experience?

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Adapting Tools to our Needs

- QFD is a great tool for product development or even complex process development

- Most of us spend more time on small pieces of internal processes

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Simplified Approach

- What if we could apply the idea in a much simpler way?

- Translate customer requirements without confusing out teams

- Let's make the tool work for us, not us working for the tool

A Translation Tool

CUSTOMER NEEDS

CUSTOMER REQUIREMENTS

FUNCTIONAL REQUIREMENTS

DESIGN SPECIFICATIONS

PROCESS SPECS

Produce

CUSTOMER NEEDS / CUSTOMER REQUIREMENTS — $Y=f(x)$ — IMPORTANT DIFFICULT NEW — HIGH RISK

CUSTOMER REQUIREMENT / TECHNICAL REQUIREMENTS — $Y=f(x)$ — IMPORTANT DIFFICULT NEW — HIGH RISK

TEHCNICAL REQUIREMENTS / DESIGN SPECIFICATIONS — $Y=f(x)$ — IMPORTANT DIFFICULT NEW — HIGH RISK

DESIGN SPECIFICATIONS / PROCESS SPECIFICATIONS — $Y=f(x)$ — IMPORTANT DIFFICULT NEW — HIGH RISK

! QFD is actually more than one matrix. It is a whole *process* of translating customer requirements into specifications.

A Translation Tool

CUSTOMER NEEDS

CUSTOMER REQUIREMENTS

FUNCTIONAL REQUIREMENTS

DESIGN SPECIFICATIONS

PROCESS SPECS

Produce

Matrix 1:
CUSTOMER REQUIREMENTS / CUSTOMER NEEDS

$Y=f(x)$

IMPORTANT
DIFFICULT
NEW

HIGH RISK

Matrix 2:
TECHNICAL REQUIREMENTS / CUSTOMER REQUIREMENT

$Y=f(x)$

IMPORTANT
DIFFICULT
NEW

HIGH RISK

Matrix 3:
DESIGN SPECIFICATIONS / TEHCNICAL REQUIREMENTS

$Y=f(x)$

IMPORTANT
DIFFICULT
NEW

HIGH RISK

Matrix 4:
PROCESS SPECIFICATIONS / DESIGN SPECIFICATIONS

$Y=f(x)$

IMPORTANT
DIFFICULT
NEW

HIGH RISK

! QFD is actually more than one matrix. It is a whole *process* of translating customer requirements into specifications.
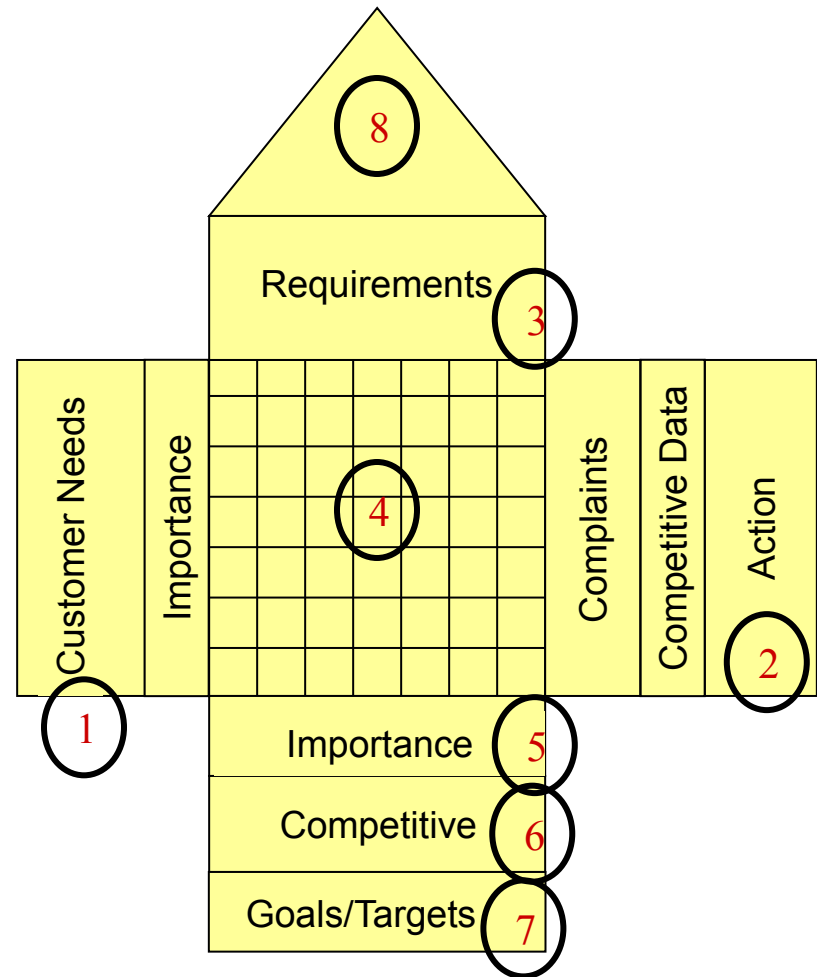
Components of the House of Quality

1. Identify Customer Needs
2. Competitive Comparison of Customer Ratings
3. Measurable Customer Requirements
4. Correlations
5. Calculated Importance
6. Competitive Benchmarks
7. Target Limits
8. Measurement Conflicts

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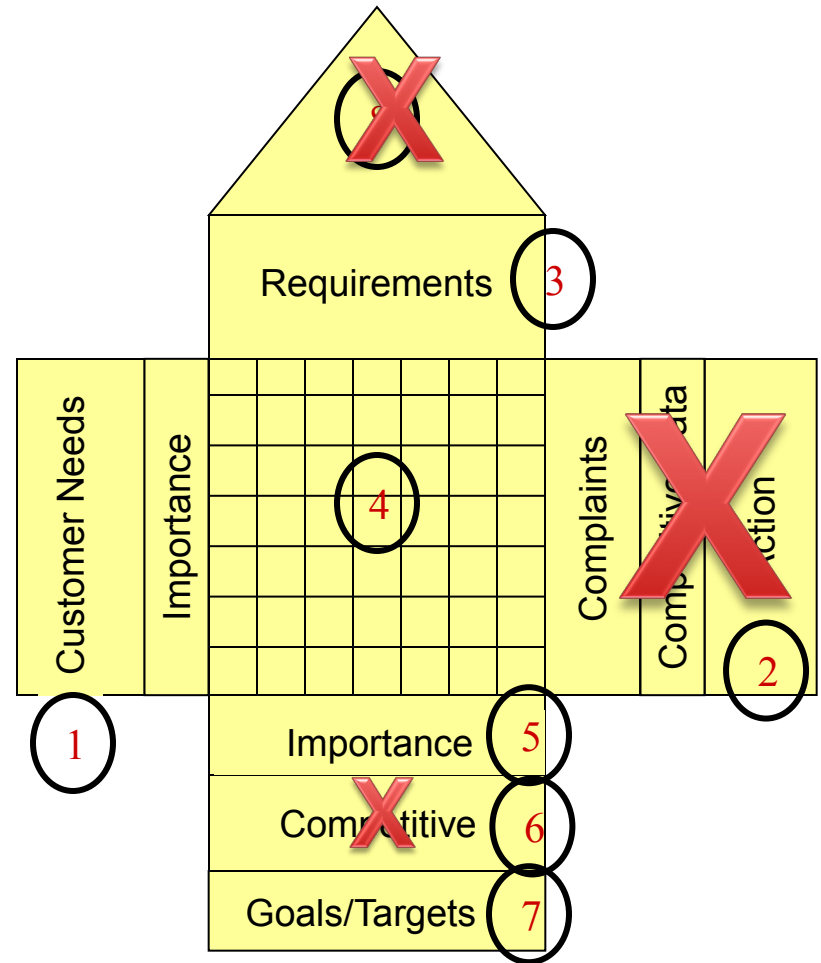# *Simplified House of Quality*

1. Identify Customer Needs
2. Competitive Comparison of Customer Ratings
3. Measurable Customer Requirements
4. Correlations
5. Calculated Importance
6. Competitive Benchmarks
7. Target Limits
8. Measurement Conflicts

Similar to C&E but Not Quite

WHATs - Customer Needs	HOWs - Product Features																			Importance: 5 High, 1 Low
Feature Raw Score	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feature Rank	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Target																				

Critical Elements

	HOWs - Product Features																					Importance: 5 High, 1 Low
WHATs - Customer Needs																						
Feature Raw Score		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Feature Rank		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Target																						

Needs, Requirements, and Specifications

Focus Today

<u>Needs</u> – Something a Customer would say they wanted – you could hear this coming from a customer's mouth

<u>Requirements</u> – Something measurable – you can tell how you are doing in comparison – but generic – doesn't imply a solution

<u>Specifications</u> – Something measurable from a specific design or process– design parameters and process parameters

Examples

RESPONSIVENESS

MINUTES ON HOLD

**Service is
a Call Center**

EASY TO ERASE

AUTOMATIC ROLL-OVER

PRESSURE TO ERASE

ROLLOVER IN 2 MIN

ERASER

**Product is
a Pencil**

ERASER (SOFTNESS)
ERASER HOLDER (TENSION)

Customer Needs

WHATs - Customer Needs	HOWs - Product Features																				Importance: 5 High, 1 Low

Feature Raw Score	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
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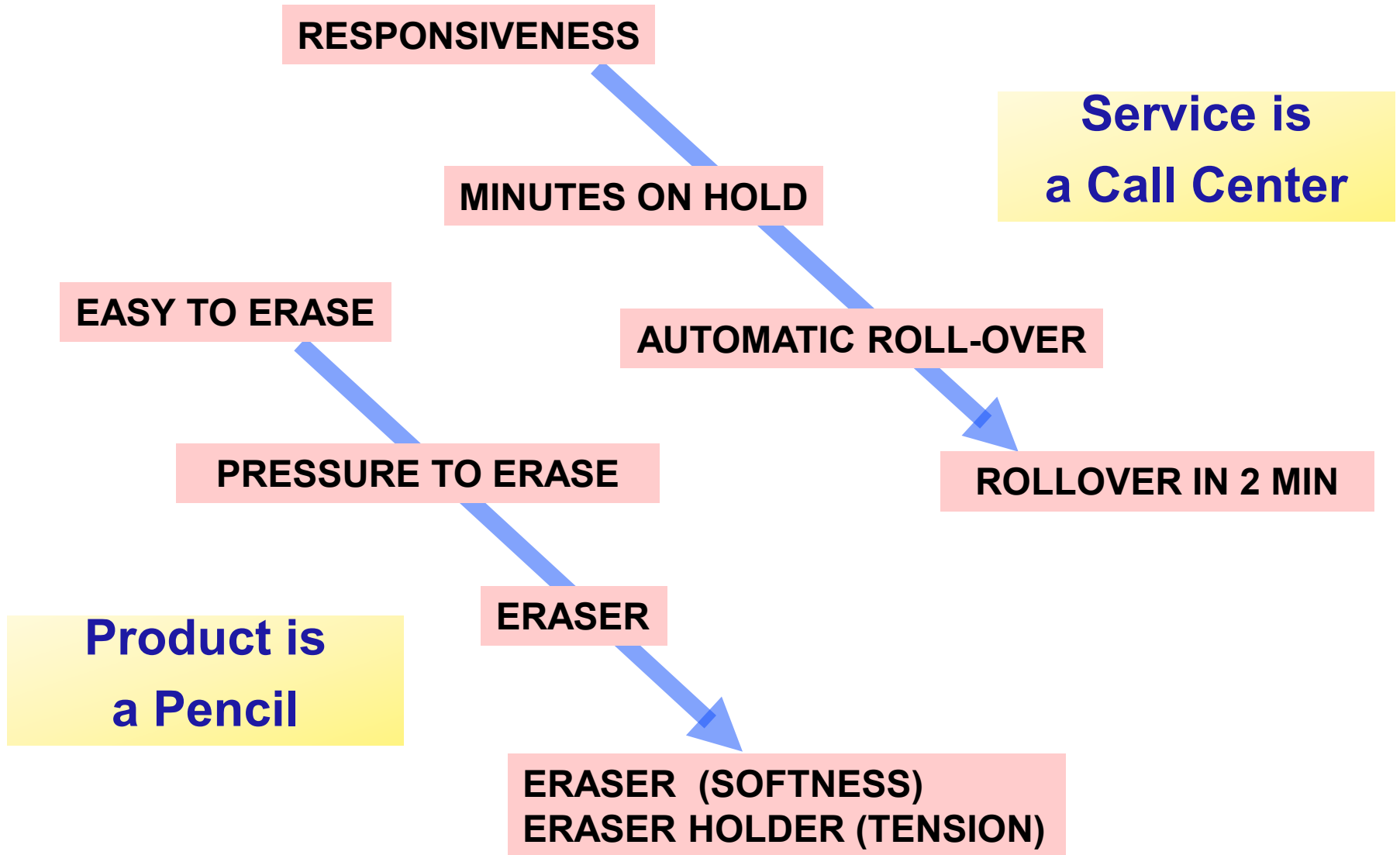
What are Customer Needs

- A complete set of customer wants and needs

- Expressed in their own language

- Organized into a hierarchy

- Prioritized by importance and current performance or satisfaction

* *Voice of the Customer is both qualitative and quantitative*

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Capturing Customer Needs

- Look for existing information
  - Historical data
  - Complaints
  - Standards and Regulation
  - System specifications

- Conduct Surveys

- Conduct Team Meetings and Focus Groups

- Conduct individual interviews

? *Do you know what data you already have?*

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Mixed messages

Laptop wish-lists: Customer Needs, Functional Requirements or Design Specifications?

- Light
- Fits onto Airplane table, with space for my diet Pepsi
- Easy to carry
- At least 2 GHz
- Enough space for all of my software
- No cheap plastic housings
- 8X DVD+/-R/RW drive
- No sweat or tears operation
- Intel Core i3

- Bright Screen
- At least 1366 x768 resolution
- Fast
- 6 cell Lithium-Ion battery
- An easy to use mouse
- Minimum 500 Gigabytes Hard disk space
- Free game software
- As small as possible
- Doesn't run out of juice

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Mixed messages

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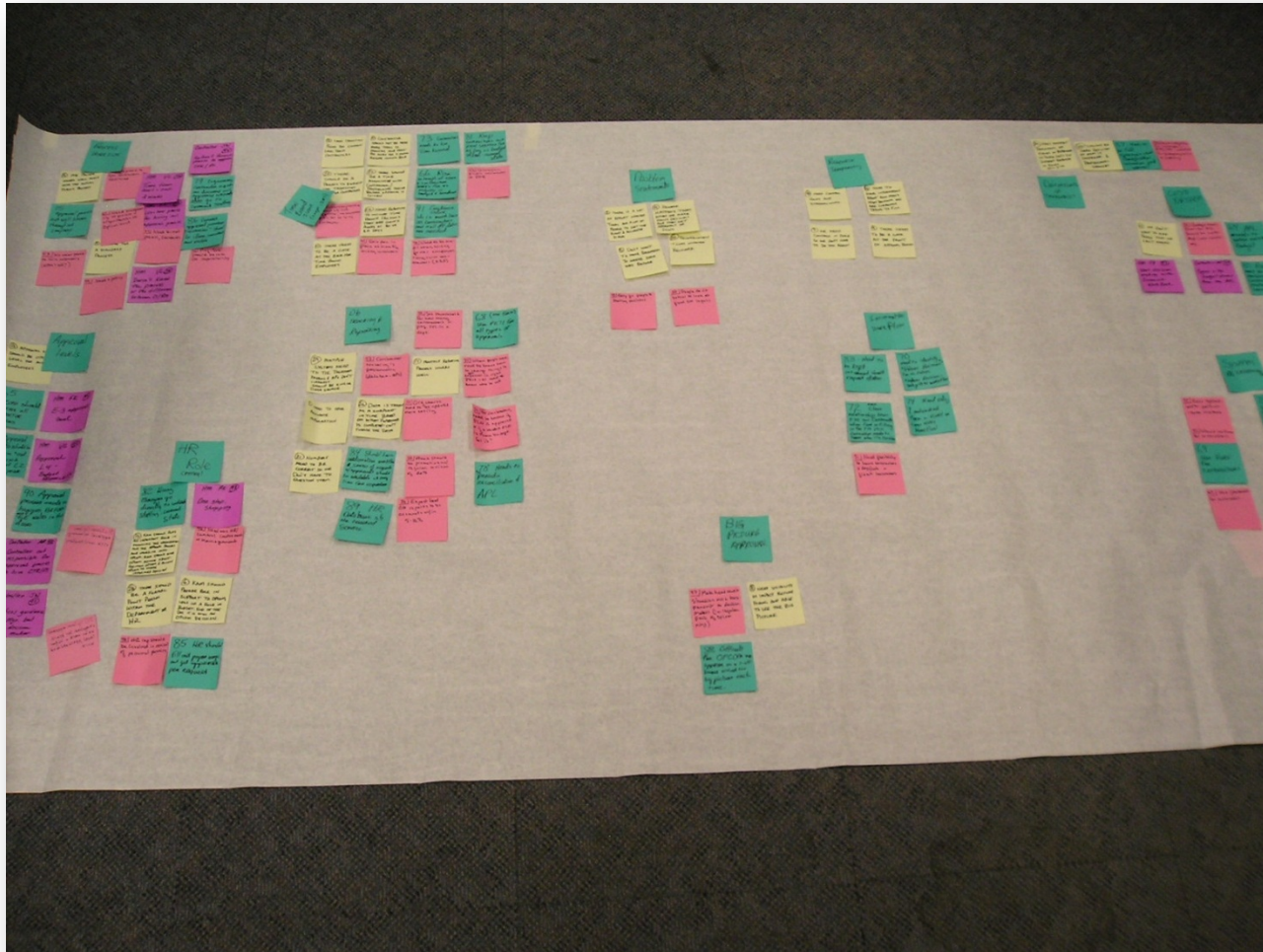
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Needs or Requirements

- It's our job to sort that out

- Affinity Diagrams or CTQC trees are helpful tools

VOC Affinity Diagram

33

Entering Customer Needs

WHATs - Customer Needs

HOWs - Product Features

Importance: 5 High, 1 Low

<u>Needs</u> – Something a Customer would say they wanted – you could hear this coming from a customer's mouth – but not measureable or specific

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Entering Customer Needs

Relative Importance of Needs – we usually use a scale of 1-5 or 1-10. (You may need to understand which customers matter most before you do this)

Requirements

WHATs - Customer Needs	HOWs - Product Features																				Importance: 5 High, 1 Low
Feature Raw Score	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Feature Rank	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Target																					

What is a Customer Requirement?

- Something that measures whether the customer need is met

- Not a solution, but may point the way to solutions

- Should not be design / implementation specific

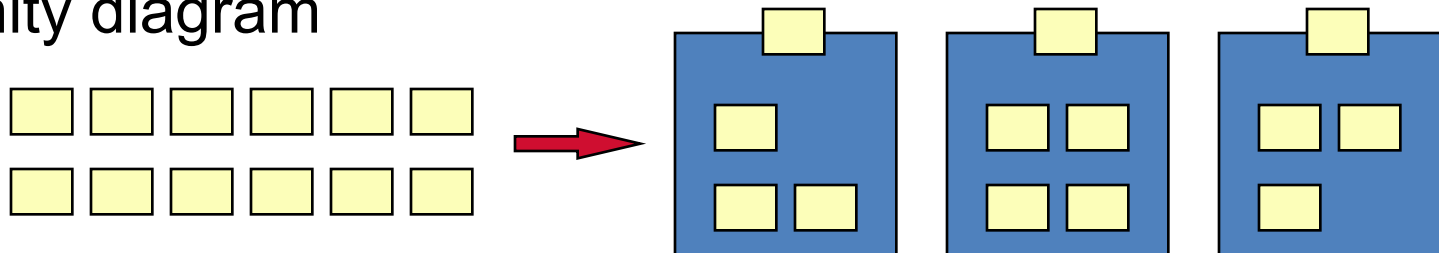- What measures might the customer use to determine whether the need is met?

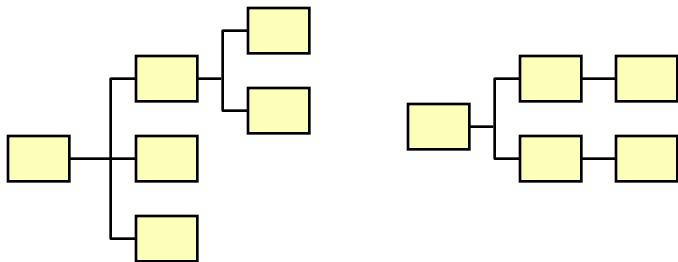***** *Sometimes we get many of these in our VOC*

Developing the List

Use tools to group like needs together & identify high level requirements

- Affinity diagram
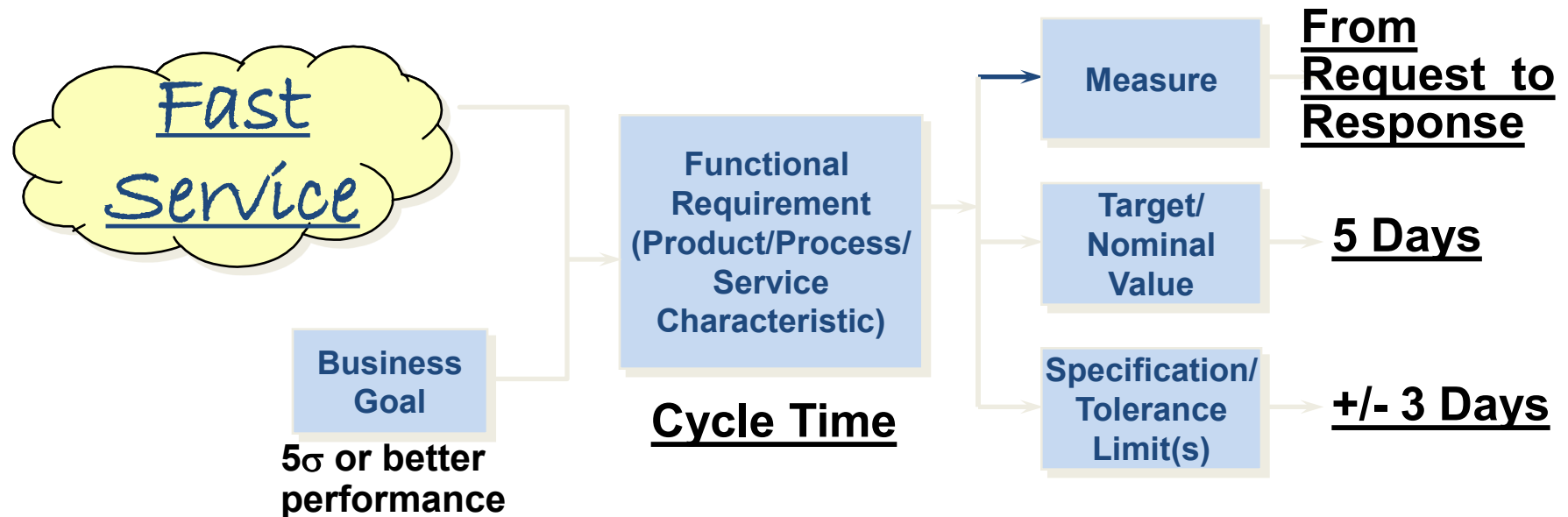

- Tree diagram

- Make sure requirements are clearly stated
- Try to keep requirements to five words or less

- Brainstorm (this is the creative part)

Need to a Customer Requirement

- "Customer requirements" means customer needs translated into quantified characteristics – CTQs or CTSs

Fast Service

Business Goal

5σ or better performance

Functional Requirement (Product/Process/ Service Characteristic)

Cycle Time

Measure → **From Request to Response**

Target/ Nominal Value → **5 Days**

Specification/ Tolerance Limit(s) → **+/- 3 Days**

Customer Need + Measure + Target

Entering Customer Requirements

<u>Requirements</u> – Something measurable – you can tell how you are doing in comparison – but generic – doesn't imply a solution

Similar to C&E but Not Quite

HOWs - Product Features

WHATs - Customer Needs

Importance: 5 High, 1 Low

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Target																			

Relationship Score

- ## Scoring is like the C&E Matrix
  - 1, 3 and 9

- ## The criteria for each score:
  - Blank = No relationship
  - 1 = The customer requirement only remotely affects the customer need
  - 3 = The customer requirement has a moderate effect on the customer need
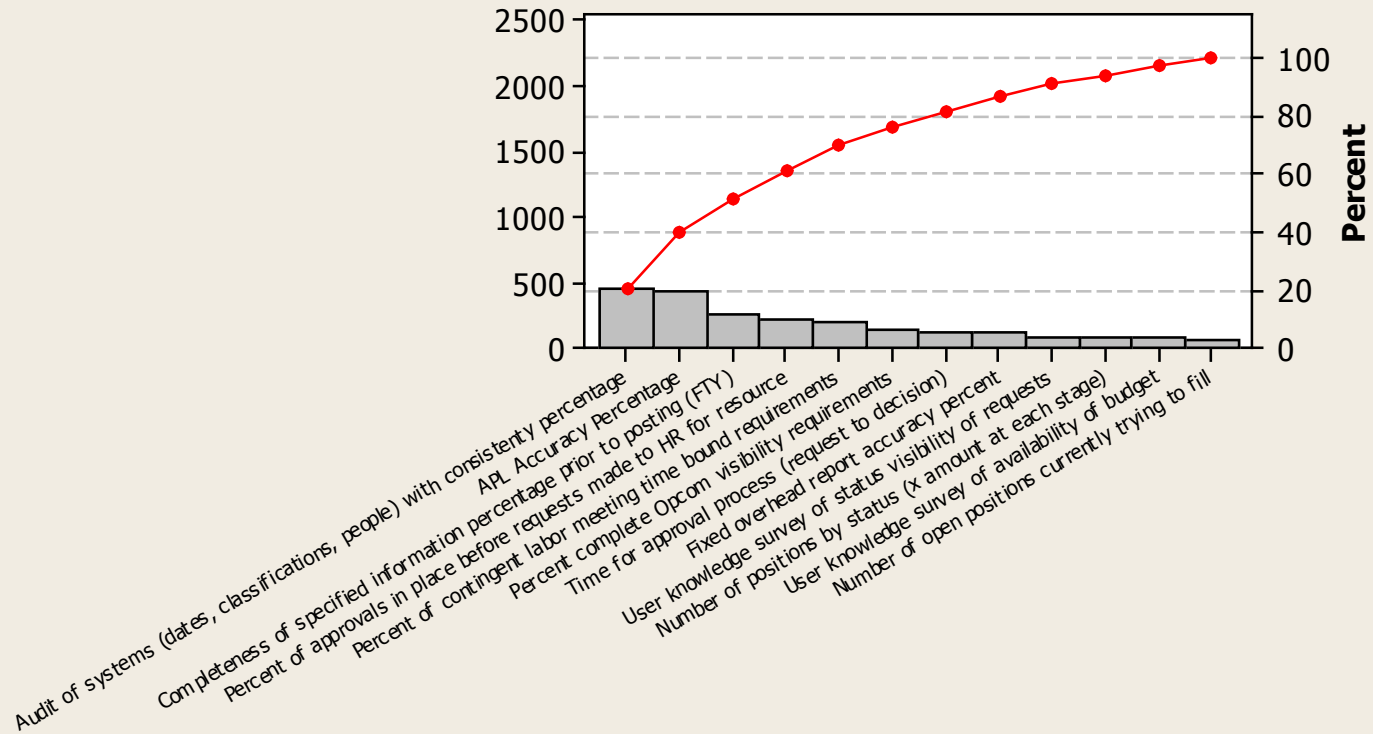 - 9 = The customer requirement has a direct and strong effect on the customer need

Requirements Rating

	Customer Need	Priority Rating	Timely Communication	Communication to all affected parties	Complete Information Communicated	Management Support	Employee Involvement
1	Open Communication	8	3	9	9	9	3
2	Buy-in	6	9	9	9	9	9
3							
4	Valid Selection Process	10	1	9	9	3	3
5	Sustainable Results	4	1	9	9	9	9
Total			92	252	252	192	144

Rate the customer requirements by multiplying the customer need rating with the relationship score and summing by customer requirement.
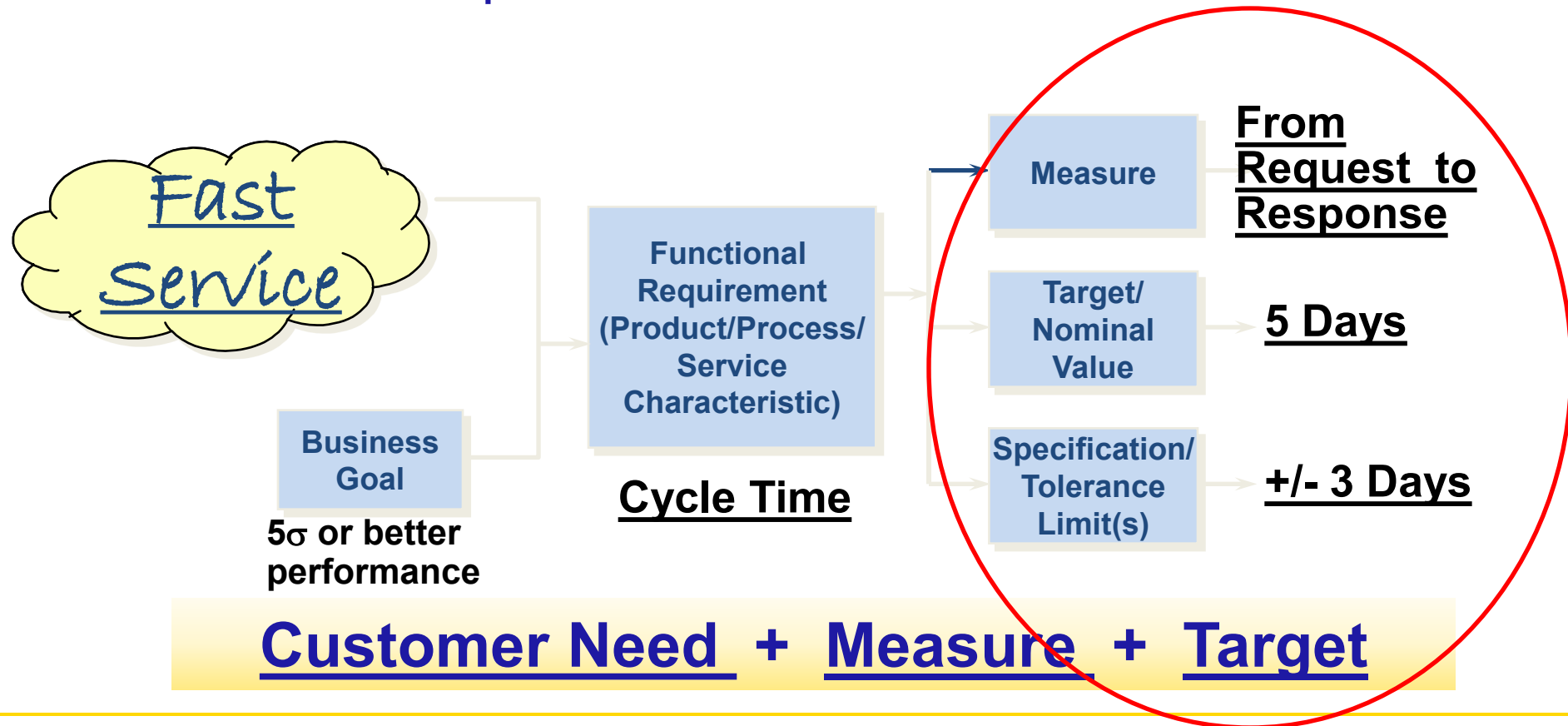
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QFD Results – Requirement Weights

Pareto Chart showing Importance of Measures

Score	443.8	431.5	254.8	221.9	193.2	134.2	123.3	119.2	86.3	75.3	74.0	61.6
Percent	20.0	19.4	11.5	10.0	8.7	6.0	5.6	5.4	3.9	3.4	3.3	2.8
Cum %	20.0	39.4	50.9	60.9	69.6	75.7	81.2	86.6	90.5	93.9	97.2	100.0

New Process Goals

One Last Step

- "Customer requirements" means customer needs translated into quantified characteristics – CTQs or CTSs

Fast Service

Business Goal

5σ or better performance

Functional Requirement (Product/Process/Service Characteristic)

Cycle Time

Measure

From Request to Response

Target/ Nominal Value

5 Days

Specification/ Tolerance Limit(s)

+/- 3 Days

Customer Need + Measure + Target

Simplified QFD Results

- Now we have translated our "Customer Voices" into something we can measure how well our new processes will meet the needs of our customers.

Examples

Quote Approval Process

1. Completeness of information

2. Accurate margin projections

3. Increase amount of value added time

| WHATs - Customer Needs	Cycle Time Request to Response	Value Added Time	Redundancy	Accurate Margin	Compliant to Internal and S	Complete Information	Appropriate Approval					Importance: 5 High, 1 Low
Quick Process Time	+++	+++	+++			+++	+++					4
Efficient	++	+++	+++		+	+++	+++					3
Best Margins	++			+++	++	+++						5
Meets Compliance		++	+	+++	+++	+++						4
Aligns with Business				+	+	++						1
Feature Raw Score	60	75	67	82	55	147	63	0	0	0	0	0
Feature Rank	6	3	4	2	7	1	5	8	8	8	8	8
Target												

HOWs - Product Features

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Best Practice Sharing

	Customer Need	Priority Ranking	1 Timely Communication	2 Communication to all affected parties	3 Complete Information Communicated	4 Management Support	5 Employee Involvement	6 Benefits easy to understand	7 Visability of benefits	8 Data Supported Selection	9 Involvement from PDC's on Selection	10 Data Supporting Improvement of Metrics	11 Feed Back on Practice Sharing
1	Open Communication	8	3	9	9	9	3	3	3	1	9	3	1
2	Buy-in	6	9	9	9	9	9	3	9	1	9	3	1
3													
4	Valid Selection Process	10	1	9	9	3	3	9	9	9	3	3	3
5	Sustainable Results	4	1	9	9	9	9	3	3	1	3	9	3
Total			92	252	252	192	144	144	180	108	168	108	56

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Summary

- QFD (Quality Function Deployment) is a very powerful tool to translate the customer voice into something measureable

- We can use a simplified version in smaller process design projects

- The result is a good translation of customer needs that teams can do easily and much more quickly

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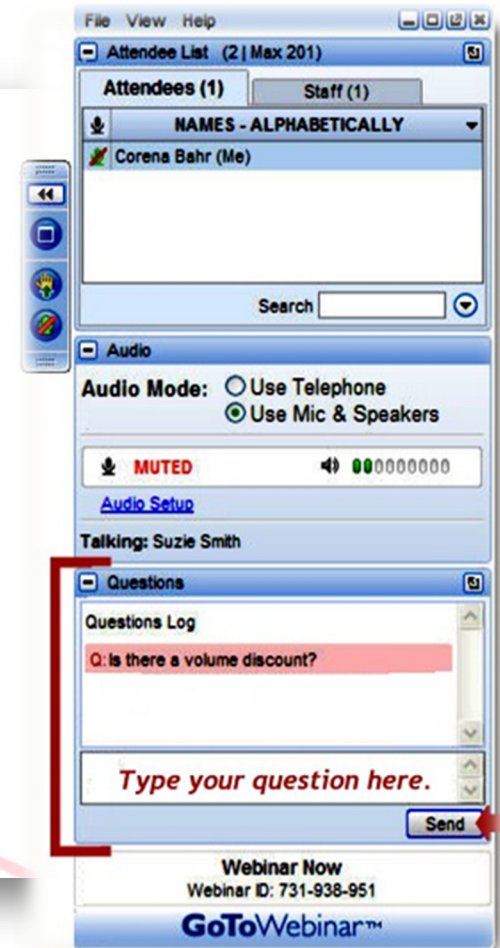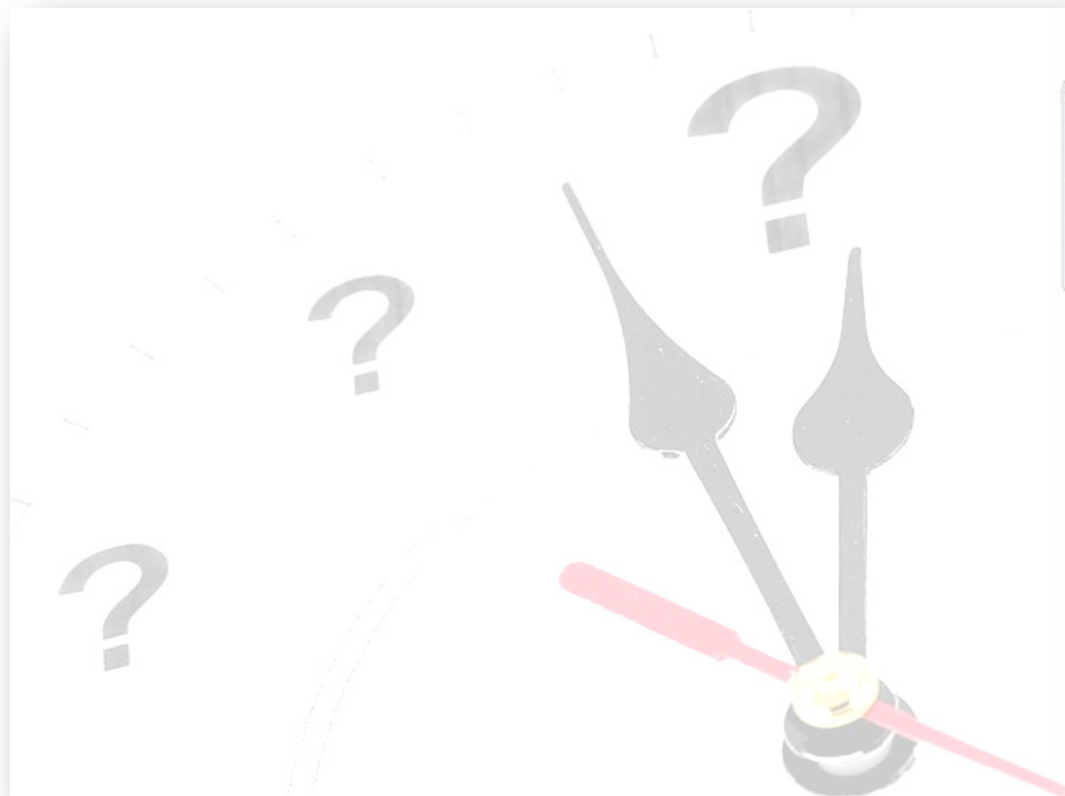
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Resource Links and Contacts

Questions? Comments? We'd love to hear from you.

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Larry Goldman, Vice President Marketing – MoreSteam.com
lgoldman@moresteam.com

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