Quality Principles, Processes and Techniques Applied to Information Quality Management

ABSTRACT

Quality Management is predicated on the theory of a common core set of Principles, Processes, with Techniques applied to improve Quality of manufactured products or delivered services. These Principles, Processes and Techniques apply to Information Quality Management with only slight variations.

World-class organizations apply the same quality principles, such as Deming's Fourteen Points, Kaizen, Quality Function Deployment (QFD), the Baldrige Criteria and Six Sigma for Business Performance Excellence to Information. This presentation addresses how these principles and techniques apply directly to information as a product and knowledge workers and information producers as "information consumers."

In this tutorial Mr. English describes the fundamental principles of Quality Management and how they apply to Total Information Quality Management. He describes how an organization can improve the quality and value of its information resources. He describes metrics for measuring information quality and the management principles for implementing an effective information quality environment. Mr. English describes how organizations have successfully implemented information quality processes to improve the effectiveness of their business and information system processes.

- Fundamental Principles of Quality Management Applied to Information Quality
- Applying Principles of Quality Management to Information Process Quality
- Culture Transformation: Creating a Sustainable Environment for Quality Information

BIOGRAPHY

Larry P. English
President
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Larry P. English, president and principal of INFORMATION IMPACT International, Inc., is an internationally recognized speaker, teacher, consultant, and author in information and knowledge management and information quality improvement. He has provided consulting and education in ~ 40 countries on five continents. Mr. English was featured as one of the "21 Voices for the 21st Century" in Quality Progress. DAMA awarded him the 1998 "Individual Achievement Award" for his contributions to the field of information resource management. He has chaired Information Quality Conferences in the US and Europe and is a co-founder of the International Association for Information and Data Quality (IAIDQ).

Mr. English's TIQM® Quality System for information quality improvement has been implemented in several organizations worldwide. Mr. English's widely acclaimed book, *Improving Data Warehouse and Business Information Quality*, has been translated into Japanese by the first information services organization to win the Deming Prize for Quality. His new book, *Information Quality Applied: Best Practices for Improving Business Information, Processes and Systems*, is available in mid 2009.

QUALITY PRINCIPLES, PROCESSES AND TECHNIQUES APPLIED TO INFORMATION QUALITY MANAGEMENT

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Mr. English is an internationally recognized speaker, educator, author and consultant in information and knowledge management and information quality improvement. He also provides consulting and education in information stewardship, strategic information visioning, information technology evaluation, information resource management and data administration, data modeling and facilitation, and value-centric application development methods. Mr. English has developed the Total Quality data Management (TIQM®) methodology applying Kaizen® quality principles to information quality management. He chairs Information Quality Conferences around the world and he is a co-founder of the International Association of Information and Data Quality (IAIDQ).

Prior to founding INFORMATION IMPACT International, Inc. (www.infoimpact.com), Brentwood, TN, over nineteen years ago, Mr. English was Vice President of an international IRM consulting firm. Before that, he was manager of systems development and then for information management with a large publishing firm. Before positions as Senior Instructor for a computer manufacturer and Information Systems Training Coordinator for a major insurance firm, Mr. English began his career with Sears, Roebuck, and Co., as a programmer and systems analyst.

He was featured as one of the "21 Voices for the 21st Century" in the January, 2000 issue of *Quality Progress*. DAMA awarded him the 1998 "Individual Achievement Award" for his contributions to the field of information resource management. Mr. English has served as an Adjunct Associate Professor in computer science. He is a member of the American Society for Quality and is a former advisor for DAMA. He has also been an active member of various ANSI (American National Standards Institute) standards committees, and he is an editorial advisor for *DM Review*.

A magna cum laude graduate of Hardin-Simmons University, Mr. English holds a Masters Degree from the Southern Baptist Theological Seminary where he was a Luther Rice Scholar and a Garrett Fellow. He is listed in Outstanding Young Men in America and Who's Who Worldwide. He has provided consulting and educational services in more than 30 countries on five continents to such organizations as Aera Energy, Air Canada, American Express, Belgacom, Boeing, British Telecom, Coca-Cola Foods, Dow Chemical, Eastman Kodak, Eli Lilly, the FDIC, Hewlett-Packard, The Hartford, IBM, L. L. Bean, NTT DATA, Optical Fibres, Sprint, Telenor, Toyota Motor Sales, UNUM Life Insurance Co., the U.S. Navy, Western Health Alliance and Weyerhaeuser.

A frequent keynote speaker, Mr. English writes the monthly "Plain English about Information Quality" column for *DM Review,* and is the author of the highly acclaimed *Improving Data Warehouse and Business Information Quality*, also available in Japanese, and numerous articles for publications in the US and Europe.

0604 QP>IQ 3

QUALITY MANAGEMENT PRINCIPLES, PROCESSES AND TECHNIQUES APPLIED TO IQ MANAGEMENT
Learning Objectives

- Understand How the proven Quality Management Principles of Deming, Juran, Crosby, Kaizen and other proven Quality Systems apply to *Information Quality Management*
- Understand Why and How Proven Quality Management Principles Must be applied to *Information as a Product* of Business and Information Processes

05285 [05244Gn, 05245DEM] U5/1/10 QP>IQ 4

SHORT LIST OF PROVEN QUALITY SYSTEMS

- Deming's System of Profound Knowledge and 14 Points of Mgt Transformation (*Out of the Crisis*)
- Juran's Trilogy: *Quality Planning, Quality Control, Quality Improvement*
- Walter Shewhart: *Quality Control Charts* and the *Plan-Do-Study-Act* cycle of Process Improvement
- Armand Fegeinbaum: *Total Quality Control*
- Genichi Taguchi: *Robust Engineering* and the Quality Loss Function
- Philip Crosby: *Quality Is Free, Quality Without Tears*
- Masaaki Imai: *Kaizen* and *Gemba Kaizen*
- *The Baldrige Criteria*
- *Six Sigma*

5696 U5/1/10 QP>IQ 5

P6

THREE CHOICES FOR THE FUTURE OF THE INFORMATION QUALITY DISCIPLINE

1. You can maintain the *Status Quo* of your current rate of defective information, incurring the high costs of process failure and Information Scrap and Rework, possibly leading to Enterprise Failure
2. You can embrace a conservative, reactive approach of "Playing at Information Quality" by following a failed "*Inspect and Correct*" model of "data profiling" and "data cleansing" [sic. "Information Scrap and Rework"]
3. You can embrace a proactive model of *Total Information Quality Management* by designing quality and error-proofing into the Information Processes. This requires transforming the Culture of the Enterprise through education, training and replacing detrimental performance measures of speed with measures of *Information Consumer Satisfaction and Continuous Information Process Improvement*

5709 U4/25/10 QP>IQ 6

P6

PHILIP CROSBY'S QUALITY "ABSOLUTES"

1. Quality has to be defined as *conformance to [customer] requirements*, not as goodness
2. The system for causing quality is *prevention*, not appraisal
3. The performance standard must be *zero defects*, not "that's close enough"
4. The measurement of quality is the *price of nonconformance*, not indexes [scorecards]

Crosby, *Quality Without Tears*

5444PC [4771MI, 4159MI, 4112Bal] 4/1/10 QP>IQ 7

P6

KAIZEN QUALITY AND INFORMATION QUALITY

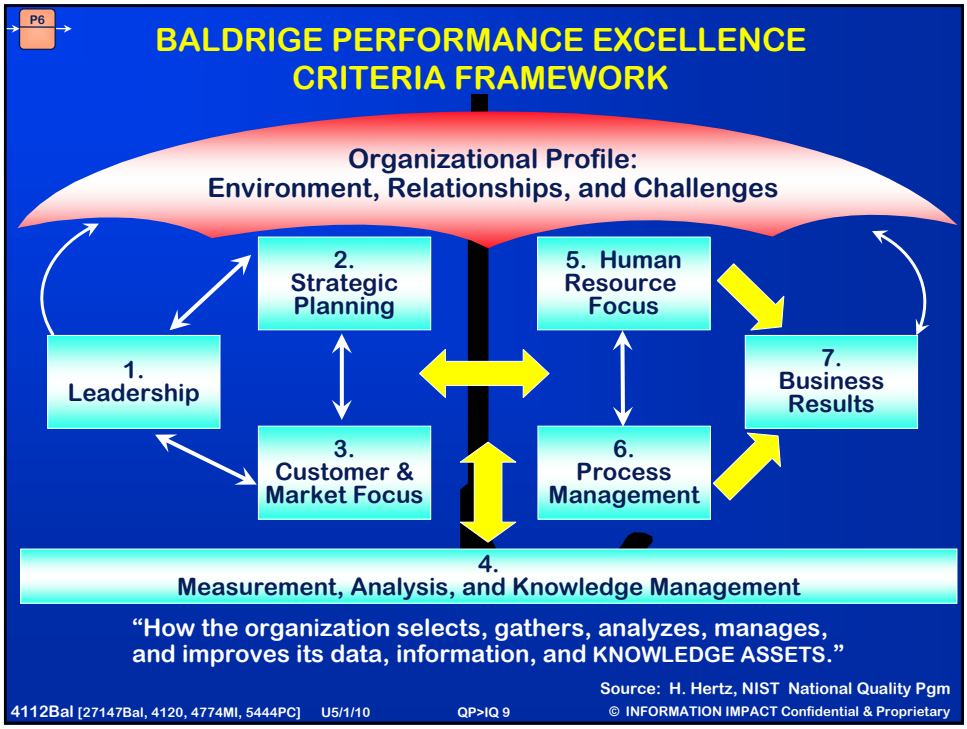
- *Kaizen* and Management:* Two major functions:
  - Maintaining management and quality standards
  - Elevating quality standards and innovation
- *The next process is the Customer*
- *Establish non-blame, non-judgmental environment*
- *Process versus Result*
- *Speak with Data* ["Manage by Fact"]
- *Follow the Plan-Do-Check/Study-Act and Standardize-Do-Check/Study-Act Cycles***
- *Put Quality FIRST*
- *Eliminate Muda* ("waste")
- Solve Information Quality problems at *Gemba* ("the real place")

* Kaizen: Japanese word for continuous process improvement involving everybody

**PDSA or PDCA & SDSA or SDCA

Adapted from: Masaaki Imai, *Gemba Kaizen*

4771MI [4159MI,4160,61MI, 5444PC, 4112Bal] U4/25/10 QP>IQ 8


P6
BALDRIGE PERFORMANCE EXCELLENCE
CRITERIA FRAMEWORK
Organizational Profile:
Environment, Relationships, and Challenges
1. Leadership
2. Strategic Planning
3. Customer & Market Focus
4. Measurement, Analysis, and Knowledge Management
5. Human Resource Focus
6. Process Management
7. Business Results
"How the organization selects, gathers, analyzes, manages, and improves its data, information, and KNOWLEDGE ASSETS."
Source: H. Hertz, NIST National Quality Pgm
4112Bal [27147Bal, 4120, 4774MI, 5444PC] U5/1/10
QP>IQ 9
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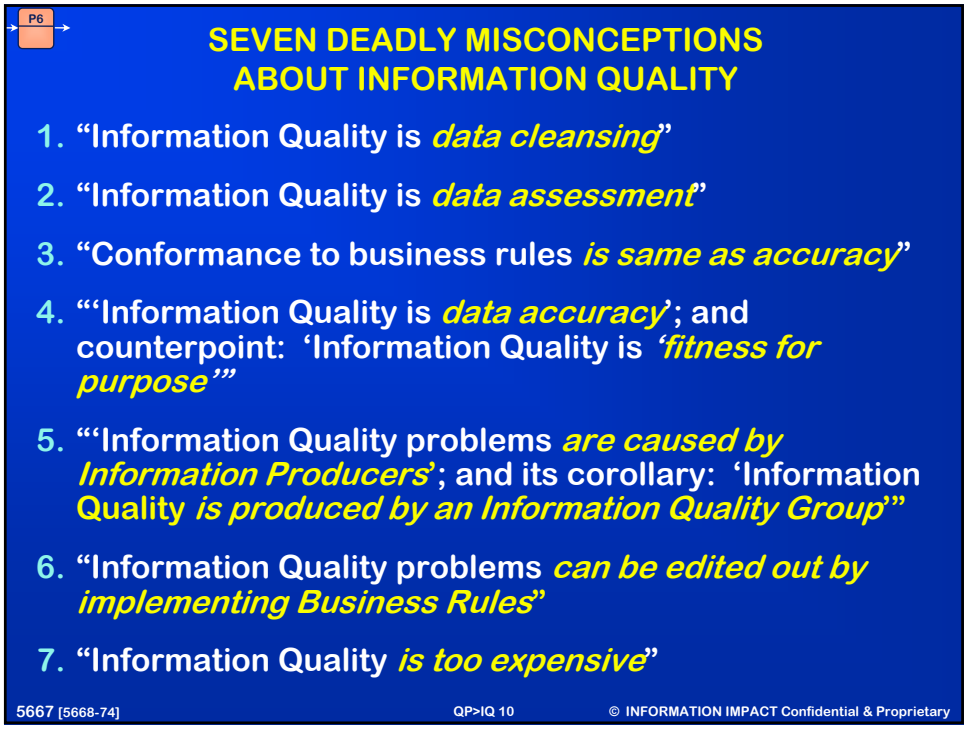
P6
SEVEN DEADLY MISCONCEPTIONS
ABOUT INFORMATION QUALITY
1. "Information Quality is data cleansing"
2. "Information Quality is data assessment"
3. "Conformance to business rules is same as accuracy"
4. "'Information Quality is data accuracy'; and counterpoint: 'Information Quality is 'fitness for purpose'"
5. "'Information Quality problems are caused by Information Producers'; and its corollary: 'Information Quality is produced by an Information Quality Group'"
6. "Information Quality problems can be edited out by implementing Business Rules"
7. "Information Quality is too expensive"
5667 [5668-74]
QP>IQ 10
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P6
THE FUNDAMENTAL QUALITY PRINCIPLES
Customer Focus
Customer satisfaction
Supplier / Customer Partnership
Information Quality
Supplier
Org
Customer
Continuous Process Improvement
Process definition
Product specification (customer-focused)
Process Improvement (CPI) and Business Process Reengineering (BPR)
CPI
BPR
CPI
Proven, scientific Methods
Statistical quality control
PDS/CA (Shewhart) cycle
SIPOC*
4 ACT 1 PLAN 3 STUDY 2 DO
Management Accountability
CPI = Continuous Process Improvement
BPR = Business Process Reengineering
SIPOC = Supplier-Input-Process-Output-Customer
0870 [0807, 0896, 8818]
QP>IQ 11
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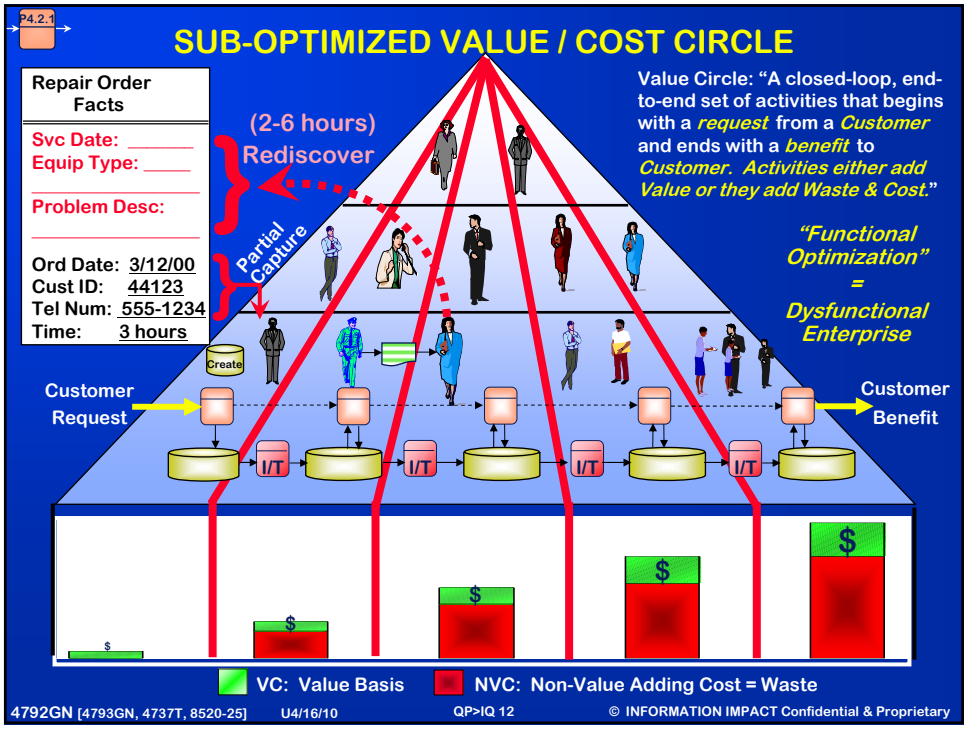
P4.2.1
SUB-OPTIMIZED VALUE / COST CIRCLE
Repair Order Facts
Svc Date: _____
Equip Type: _____
Problem Desc: _____
Ord Date: 3/12/00
Cust ID: 44123
Tel Num: 555-1234
Time: 3 hours
(2-6 hours) Rediscover
Partial Capture
Create
Value Circle: "A closed-loop, end-to-end set of activities that begins with a request from a Customer and ends with a benefit to Customer. Activities either add Value or they add Waste & Cost."
"Functional Optimization" = Dysfunctional Enterprise
Customer Request
Customer Benefit
I/T
I/T
I/T
I/T
$
$
$
$
$
VC: Value Basis
NVC: Non-Value Adding Cost = Waste
4792GN [4793GN, 4737T, 8520-25]
U4/16/10
QP>IQ 12
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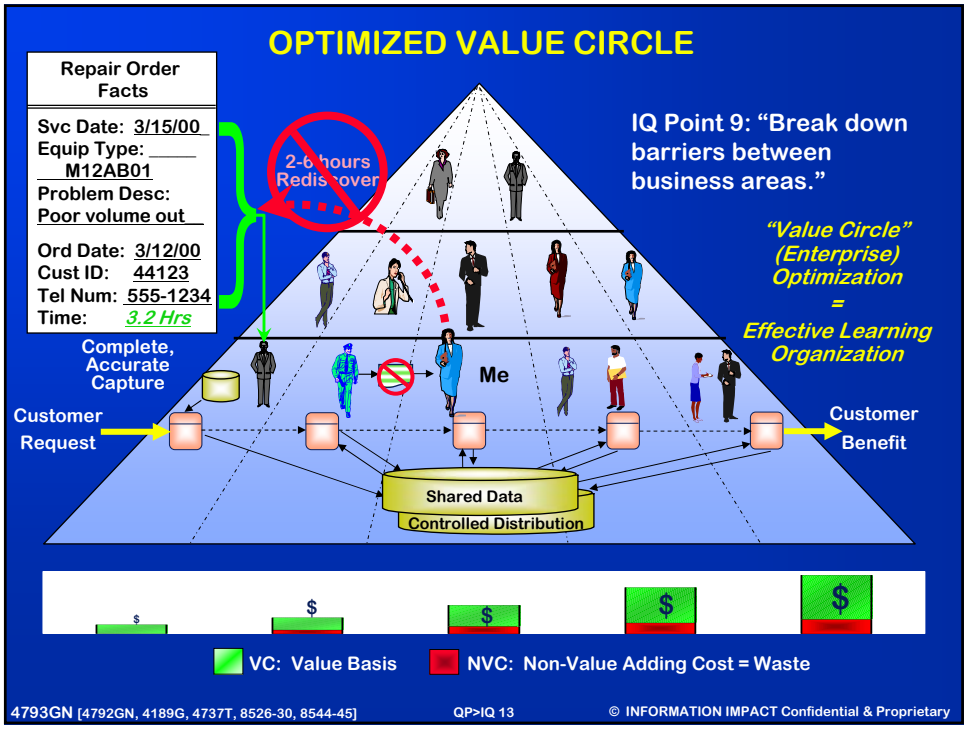
OPTIMIZED VALUE CIRCLE
Repair Order Facts
Svc Date: 3/15/00
Equip Type: M12AB01
Problem Desc: Poor volume out
Ord Date: 3/12/00
Cust ID: 44123
Tel Num: 555-1234
Time: 3.2 Hrs
2-6 hours Rediscover
IQ Point 9: "Break down barriers between business areas."
"Value Circle" (Enterprise) Optimization = Effective Learning Organization
Complete, Accurate Capture
Me
Customer Request
Customer Benefit
Shared Data
Controlled Distribution
VC: Value Basis
NVC: Non-Value Adding Cost = Waste
4793GN [4792GN, 4189G, 4737T, 8526-30, 8544-45]
QP>IQ 13
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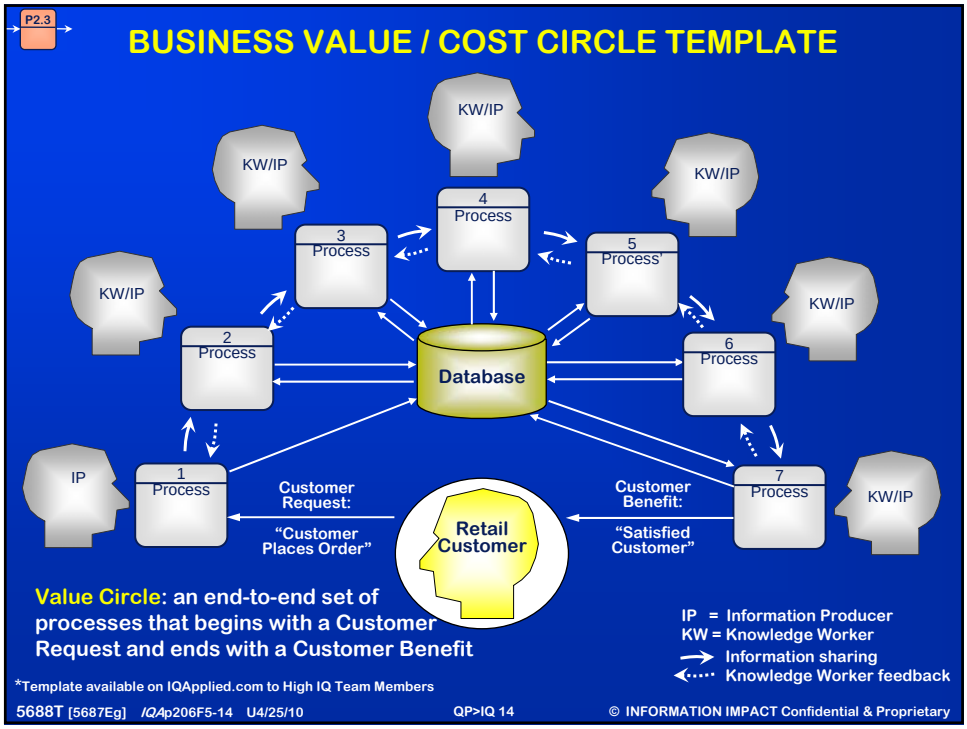
P2.3
BUSINESS VALUE / COST CIRCLE TEMPLATE
KW/IP
IP
1 Process
2 Process
3 Process
4 Process
5 Process
6 Process
7 Process
Database
Customer Request:
"Customer Places Order"
Retail Customer
Customer Benefit:
"Satisfied Customer"
Value Circle: an end-to-end set of processes that begins with a Customer Request and ends with a Customer Benefit
IP = Information Producer
KW = Knowledge Worker
Information sharing
Knowledge Worker feedback
*Template available on IQApplied.com to High IQ Team Members
5688T [5687Eg] IQAp206F5-14 U4/25/10
QP>IQ 14
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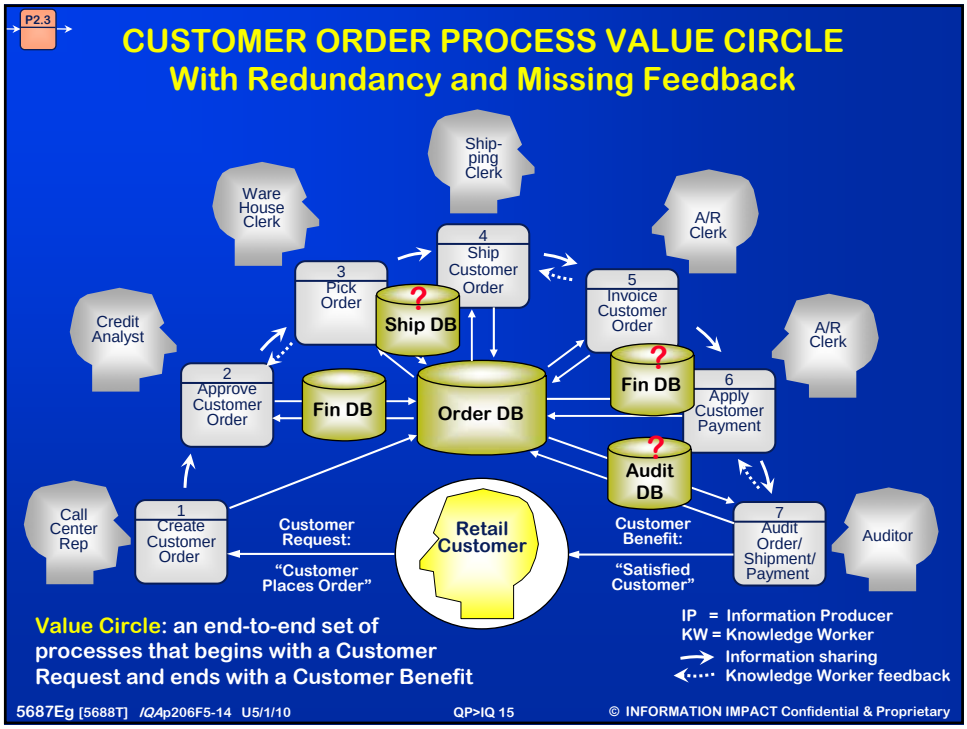
P2.3
CUSTOMER ORDER PROCESS VALUE CIRCLE
With Redundancy and Missing Feedback
Ship-ping Clerk
Ware House Clerk
A/R Clerk
Credit Analyst
A/R Clerk
Call Center Rep
Auditor
1 Create Customer Order
2 Approve Customer Order
3 Pick Order
4 Ship Customer Order
5 Invoice Customer Order
6 Apply Customer Payment
7 Audit Order/ Shipment/ Payment
Ship DB
Fin DB
Order DB
Fin DB
Audit DB
Retail Customer
Customer Request:
"Customer Places Order"
Customer Benefit:
"Satisfied Customer"
Value Circle: an end-to-end set of processes that begins with a Customer Request and ends with a Customer Benefit
IP = Information Producer
KW = Knowledge Worker
Information sharing
Knowledge Worker feedback
5687Eg [5688T] IQAp206F5-14 U5/1/10
QP>IQ 15
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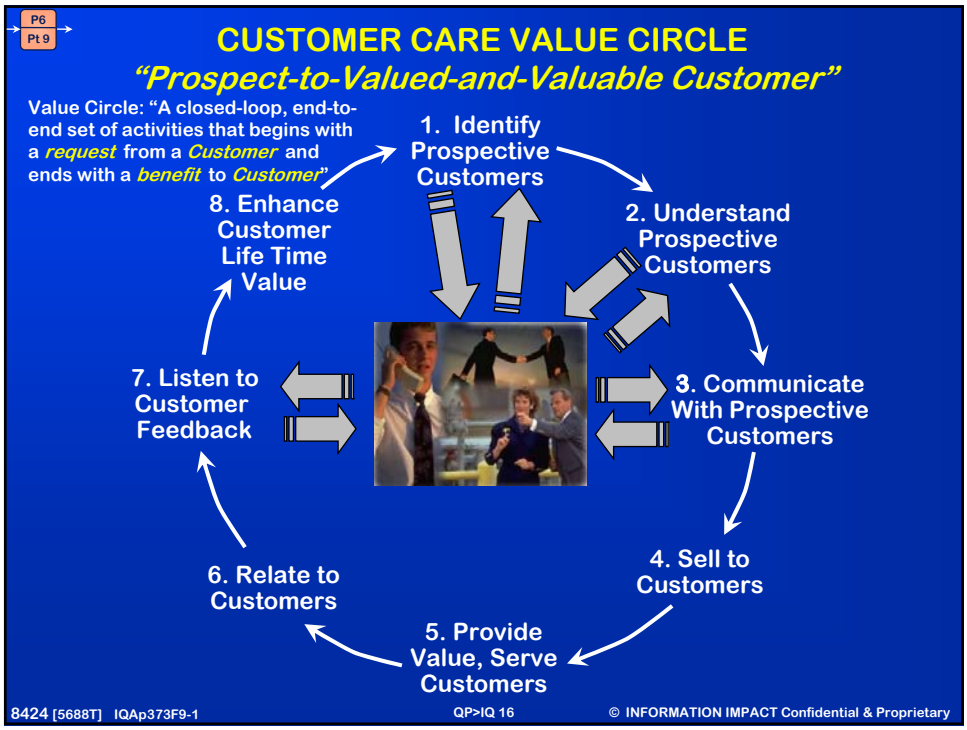
P6
Pt 9
CUSTOMER CARE VALUE CIRCLE
"Prospect-to-Valued-and-Valuable Customer"
Value Circle: "A closed-loop, end-to-end set of activities that begins with a request from a Customer and ends with a benefit to Customer"
1. Identify Prospective Customers
2. Understand Prospective Customers
3. Communicate With Prospective Customers
4. Sell to Customers
5. Provide Value, Serve Customers
6. Relate to Customers
7. Listen to Customer Feedback
8. Enhance Customer Life Time Value
8424 [5688T] IQAp373F9-1
QP>IQ 16
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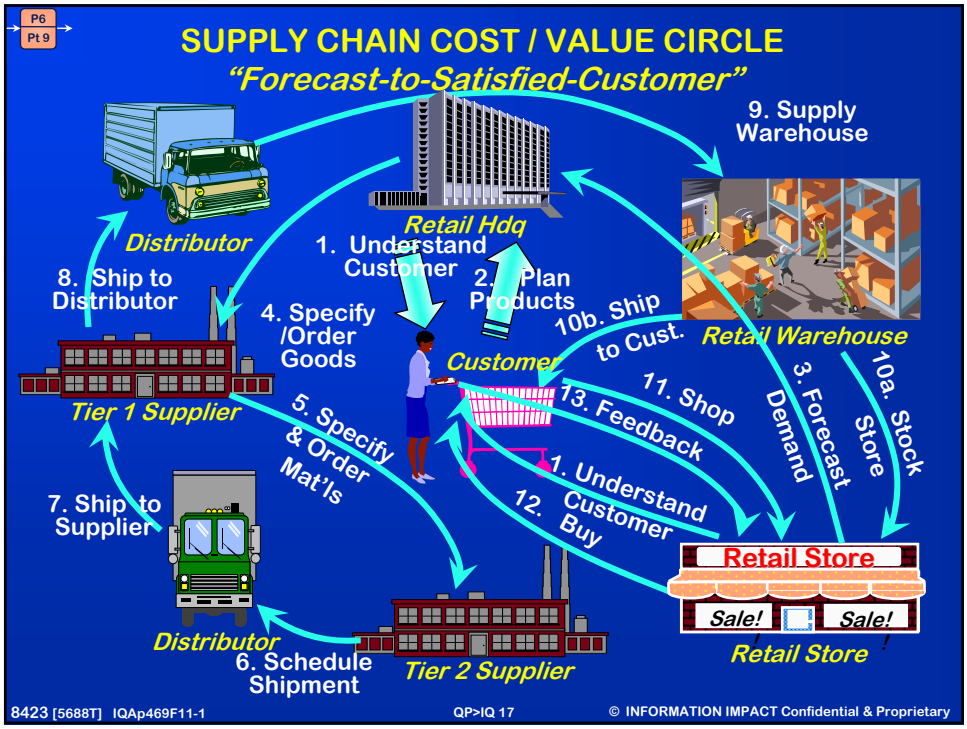
P6
Pt 9
SUPPLY CHAIN COST / VALUE CIRCLE
"Forecast-to-Satisfied-Customer"
9. Supply Warehouse
Retail Hdq
Distributor
1. Understand Customer
2. Plan Products
8. Ship to Distributor
4. Specify /Order Goods
10b. Ship to Cust.
Retail Warehouse
Customer
Tier 1 Supplier
11. Shop
13. Feedback
3. Forecast Demand
10a. Stock Store
5. Specify & Order Mat'ls
1. Understand Customer
12. Buy
7. Ship to Supplier
Retail Store
Sale!
Sale!
Distributor
6. Schedule Shipment
Tier 2 Supplier
Retail Store
8423 [5688T] IQAp469F11-1
QP>IQ 17
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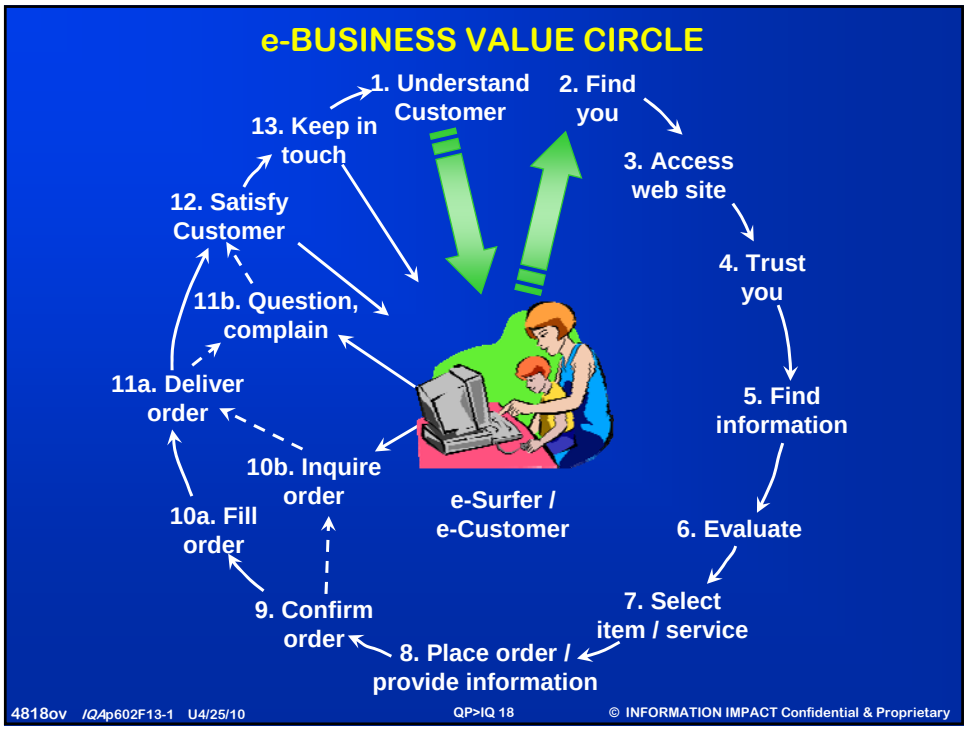
e-BUSINESS VALUE CIRCLE
1. Understand Customer
2. Find you
3. Access web site
4. Trust you
5. Find information
6. Evaluate
7. Select item / service
8. Place order / provide information
9. Confirm order
10a. Fill order
10b. Inquire order
11a. Deliver order
11b. Question, complain
12. Satisfy Customer
13. Keep in touch
e-Surfer / e-Customer
4818ov IQAp602F13-1 U4/25/10
QP>IQ 18
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P6

TOTAL INFORMATION QUALITY MANAGEMENT

- Information Quality is *NOT** about what is in databases
  (*well, it is, but that is not all)
- Information Quality (IQ) is *ABOUT business, service and manufacturing performance excellence* by improving information process quality for mission accomplishment

TIQM addresses:

- Quality of Information *Definition, Models, DB Designs*
- Quality of Information *Content*
- Quality of Information *Presentation*
- Quality of *Business Communication*

Total Information Quality Management results in:

- Increased *Customer* Satisfaction
- Increased *Employee* Satisfaction and *Productivity*
- *Decreased Costs* and *Increased Profits / Surplus*

5027 [0802, 5408] U3/31/10 QP>IQ 19

P6
Pt 1

TOTAL INFORMATION QUALITY MANAGEMENT

"Consistently
meeting*
all Knowledge Workers' and end-Customers'
Expectations"

through Information and Information Services so:

- *Knowledge Workers* accomplish enterprise objectives
- *Customers* are Successful with your products

Larry P. English, TIQM®

Components of Information Quality:

- Information Product Specifications (Definition and Business Rules) and Information Architecture
- Information Content
- Information Presentation

*World-class organizations do not stop here—they strive to "delight" their customers

3851 [3891Gov] /QAp32SB U/5/1/10 QP>IQ 20

P6

THE DISCIPLINE OF INFORMATION QUALITY MANAGEMENT

Information Quality Management is:

The application of *proven Quality Management Principles, Processes and Practices* to Information as a *Product* of the Enterprise Processes (business, manufacturing & service) to meet or exceed Information Consumers' *expectations* so they can accomplish the Mission of the Enterprise

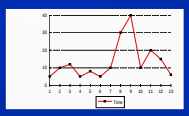
Larry P. English

5719 [5233Q, 5338QO, 5240MQ, 5236M, 5237KM] *IQA*p33SB U5/1 QP>IQ 21

P6

THE FUNDAMENTAL QUALITY PRINCIPLES

- ☐ *Customer* Focus
  - Customer satisfaction
  - Supplier / Customer Partnership
- ☐ Continuous Process *Improvement*
  - Process definition
  - Product specification (customer-focused)
  - Process Improvement (CPI) and Business Process Reengineering (BPR)
- ☐ Proven, scientific *Methods*
  - Statistical quality control
  - PDS/CA (Shewhart) cycle
  - SIPOC*
- ☐ Management *Accountability*



CPI = Continuous Process Improvement
BPR = Business Process Reengineering
SIPOC = Supplier-Input-Process-Output-Customer

0870 [0807, 0896, 8818] QP>IQ 22

P6

TOTAL QUALITY MANAGEMENT
Deming's 14 Points

1. Create constancy of purpose toward improvement of product and service, with the aim to become competitive and to stay in business, and to provide jobs.
2. Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.
3. Cease dependence on mass inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.
4. End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.
5. Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs.
6. Institute training on the job.
7. Institute leadership. The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of overhaul, as well as supervision of... workers.

Source: Deming, *Out of the Crisis*

P6

TOTAL QUALITY MANAGEMENT
Deming's 14 Points (Cont.)

8. Drive out fear, so everyone may work effectively for the company
9. Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service.
10. Eliminate slogans, exhortations, and targets for the work force asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force.
11. a. Eliminate work standards (quotas) on the factory floor. Substitute leadership.

    b. Eliminate management by objective. Eliminate management by numbers, numerical goals. numerical goals. Substitute leadership.
12. a. Remove barriers that rob the hourly worker of his right to pride of workmanship. The responsibility of supervisors must be changed from sheer numbers to quality.

    b. Remove barriers that rob people in management and in engineering of their right to pride of workmanship. This means, *inter alia*, abolishment of the annual or merit rating and of management by objective.
13. Institute a vigorous program of education and self-improvement.
14. Put everyone to work to accomplish the transformation. The transformation is everybody's job. Management will explain by seminars and other means why change is necessary, and that the change will involve everybody.

Deming, *Out of the Crisis*, Chapter 2

P6 Pt 1

IQ 1. CREATE CONSTANCY OF PURPOSE FOR IMPROVEMENT OF *INFORMATION* PRODUCT & SERVICE

- Management's two sets of problems:
  - Those of today: "It is easy to stay bound up in the tangled knots of the problems of today, becoming even more efficient in them."
  - Those of tomorrow: "No company without a plan for the future will stay in business." *Deming*
- "The *obligation* to the *Customer* never ceases"
- Information Quality ramifications:
  - Define IM / IQ Mission, Vision and Objectives based on enterprise mission and vision to include quality for information products & services to meet information consumers' needs
  - Develop IM / IQ plans with both long term and short term deliverables that enable *Strategic* Business Objectives
  - Implement and define IM / IQ processes & tools with customer focus that leads to quality & process improvement
- "The *obligation* to the *Knowledge Worker* never ceases"

IM = Information Management

P6 Pt 2

IQ 2. ADOPT THE NEW PHILOSOPHY— *QUALITY INFORMATION REDUCES COSTS*

- The economic realities of today require new standards
  "Reliable service reduces costs" *Deming*
  "Point two really means . . . a transformation of management" *Deming*
- Information Quality ramifications:
  - Enable a paradigm shift to information as a shared business resource and quality information as a product
  - Implement quality information philosophy and policy:
    - "Reliable, *managed* information reduces costs and increases value"
    - "Reliable, *quality* shared information reduces costs and increases value"
  - *This means a transformation of business and information systems management*
    - Business management *accountability* for information
    - Systems management *accountability* for value delivery

P6 Pt 3

IQ 3. CEASE DEPENDENCE ON DATA ASSESSMENTS & INSPECTIONS ALONE—*DESIGN QUALITY INTO PROCESS*

- Quality assurance (inspection) has a goal to discover faulty products and correct them (rework) or throw them out (scrap)

  "Quality comes not from inspection but from improvement of the process"
  Deming

- Information Quality ramifications:
  - Replace data model and definition "review and approval" with front-end; cross-functional, business-driven data modeling that builds quality in and produces databases that are *(1) stable, (2) flexible, and (3) reused*
  - Reengineer processes to eliminate causes of defects before automating them
  - Design error-proofing techniques into the databases, process, forms, application screens and programs, and procedures and training that prevent cause of defects

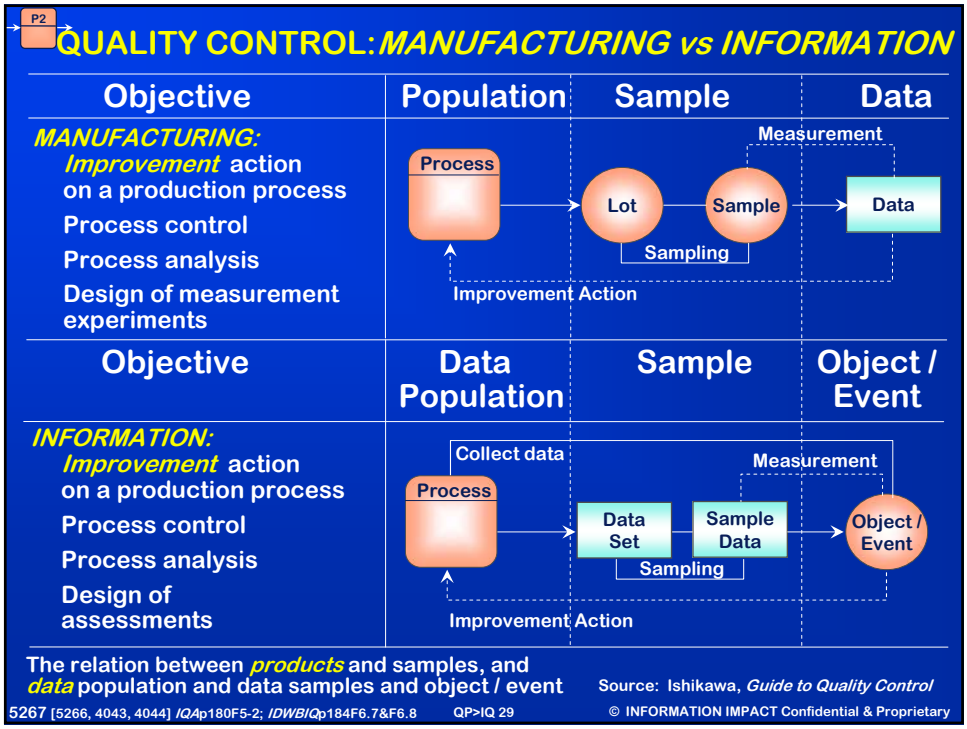
0859 [4832-45, 4714-16] *IDW&BIQ*p345+ U4/17/10 QP>IQ 27

P3

THE BUSINESS CASE FOR IQ MANAGEMENT: Poor Quality Information Costs

- "As much as 40 to 50 % or more of the typical IT budget is really 'information scrap and rework'" and waste of moving and transforming data to disparately defined redundant databases*
- "Poor quality information often causes 40 to 60 % of manufacturing scrap and rework costs"
- *"The direct costs of poor quality information, including irrecoverable costs, rework of products and services, workarounds, and fines and customer compensation can be as high as 20 to 30+ percent of a large organization's [operating] revenue or budget."**

5215 [5229] *IDW&BIQ*p12 U4/25/10 QP>IQ 28


P2
QUALITY CONTROL: MANUFACTURING vs INFORMATION
Objective
Population
Sample
Data
MANUFACTURING:
Improvement action
on a production process
Process control
Process analysis
Design of measurement
experiments
Process
Lot
Sample
Measurement
Data
Sampling
Improvement Action
Objective
Data
Population
Sample
Object /
Event
INFORMATION:
Improvement action
on a production process
Process control
Process analysis
Design of
assessments
Collect data
Process
Data
Set
Sample
Data
Measurement
Object /
Event
Sampling
Improvement Action
The relation between products and samples, and
data population and data samples and object / event
Source: Ishikawa, Guide to Quality Control
5267 [5266, 4043, 4044] IQAp180F5-2; IDWBIQp184F6.7&F6.8
QP>IQ 29
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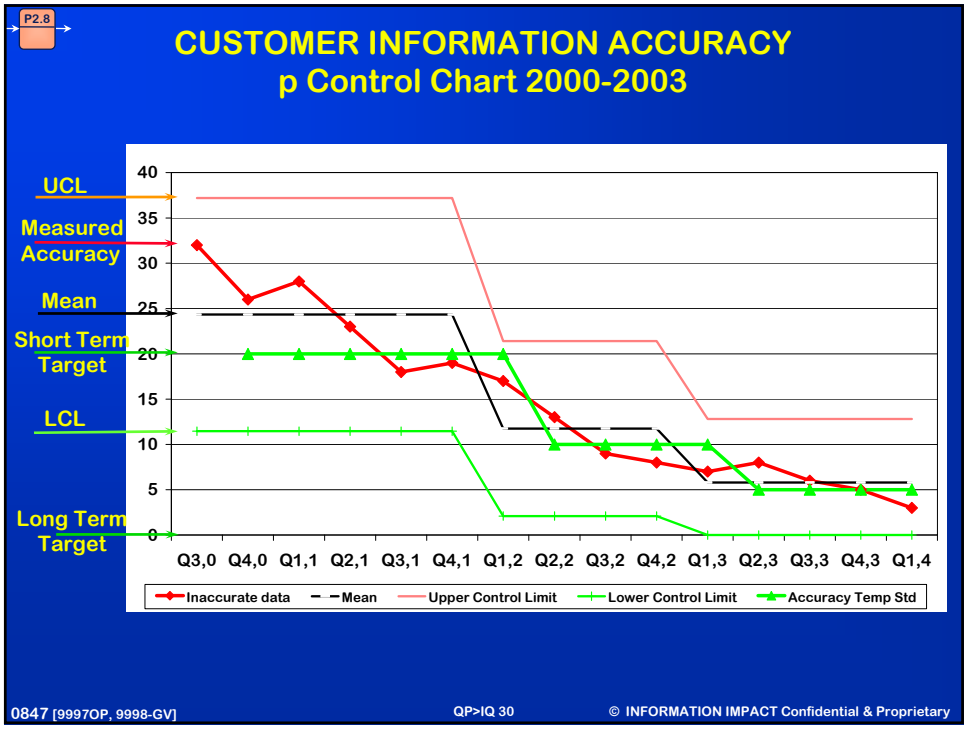
P2.8
CUSTOMER INFORMATION ACCURACY
p Control Chart 2000-2003
UCL
Measured
Accuracy
Mean
Short Term
Target
LCL
Long Term
Target
40
35
30
25
20
15
10
5
0
Q3,0 Q4,0 Q1,1 Q2,1 Q3,1 Q4,1 Q1,2 Q2,2 Q3,2 Q4,2 Q1,3 Q2,3 Q3,3 Q4,3 Q1,4
Inaccurate data
Mean
Upper Control Limit
Lower Control Limit
Accuracy Temp Std
0847 [9997OP, 9998-GV]
QP>IQ 30
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P6 Pt 4

IQ 4. END THE PRACTICE OF PROJECTS OR DATA CAPTURE ON COST OR TIME MEASURES ALONE

- The practice of lowest price has had the impact of actually *increasing costs* while increasing defects—instead, minimize *"total costs"* of ownership

  "Price has no meaning without a measure of the quality purchased" *Deming*

  "Purchasing should be a team effort and ... include ... representatives ... of [all] departments involved with the product" *Deming*

  "A buyer will serve his company best by developing a long-term relationship of loyalty and trust with a single vendor" *Deming*

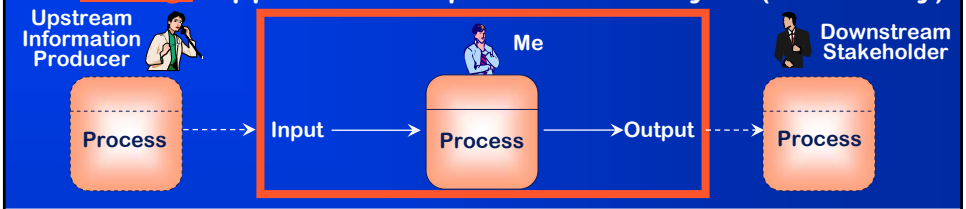
- Information Quality ramifications:
  - Include quality guarantee / measures in cost estimate
  - Measure software & information "cost of ownership"
  - Develop databases to support *all* Knowledge Workers
  - Develop relationships of trust in natural Information Producers

0861 [4832-45, 4714-16] *IQA*p64IQ4; *IDW&BIQ*p350+ U4/17/10 QP>IQ 31 © INFORMATION IMPACT Confidential & Proprietary

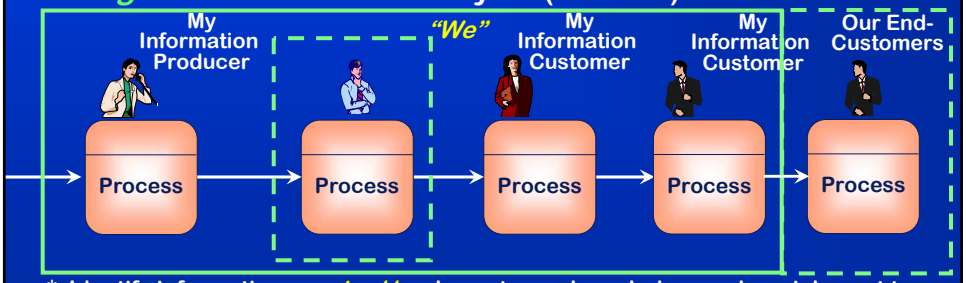
P6 Pt 4

APPLICATION DEVELOPMENT PARADIGMS

- Wrong: Application Requirements Analysis ("IPO"*only)



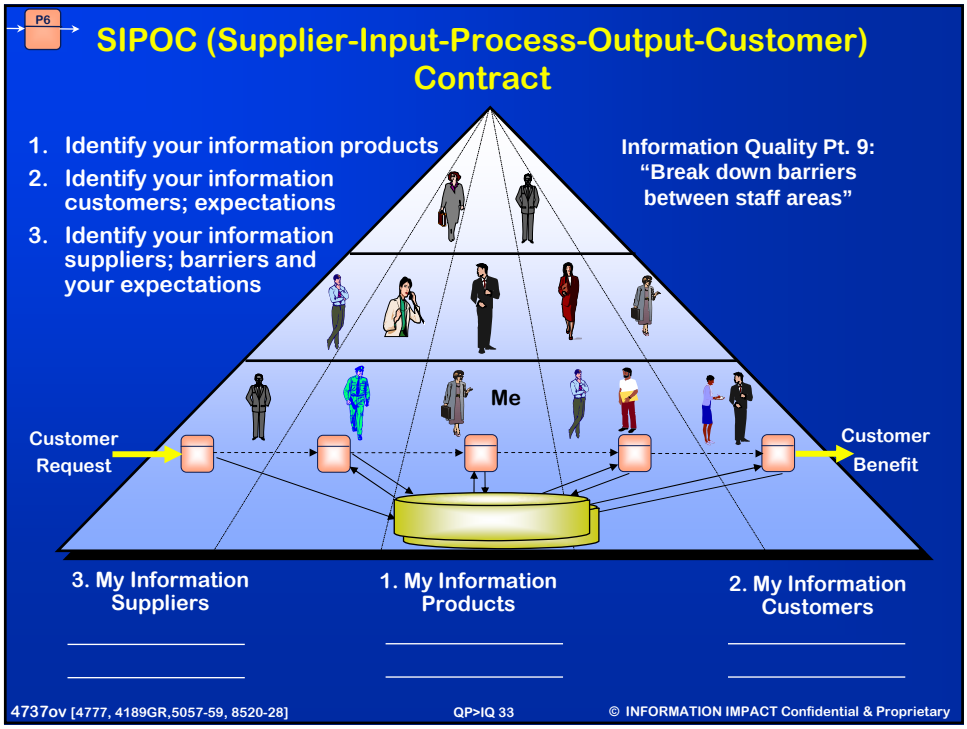
- *Right:* *Value Circle Analysis (SIPOC*)



* Identify information *required by* downstream knowledge workers inherent to *create* processes & *information required* from upstream information producers

*SIPOC = Supplier-Input-Process-Output-Customer

1372 [1370, 1330] *IQA*p721F15-4&p722F15-5 U4/17/10 QP>IQ 32 © INFORMATION IMPACT Confidential & Proprietary


P6
SIPOC (Supplier-Input-Process-Output-Customer) Contract
1. Identify your information products
2. Identify your information customers; expectations
3. Identify your information suppliers; barriers and your expectations
Information Quality Pt. 9: "Break down barriers between staff areas"
Me
Customer Request
Customer Benefit
3. My Information Suppliers
1. My Information Products
2. My Information Customers
4737ov [4777, 4189GR,5057-59, 8520-28]
QP>IQ 33
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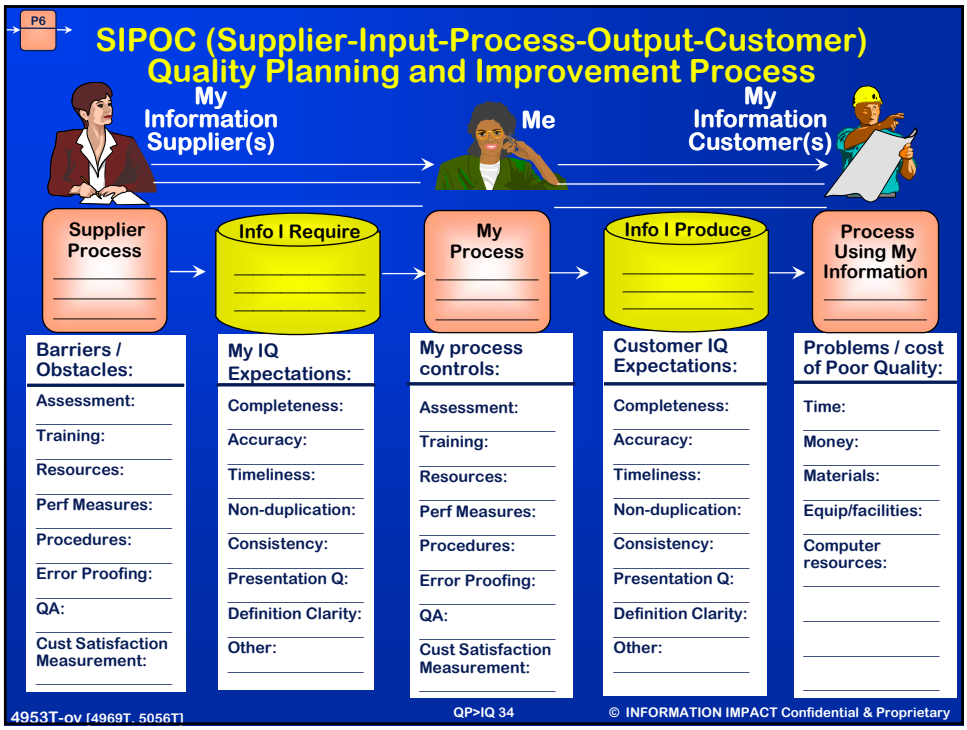
P6
SIPOC (Supplier-Input-Process-Output-Customer) Quality Planning and Improvement Process
My Information Supplier(s)
Me
My Information Customer(s)
Supplier Process
Info I Require
My Process
Info I Produce
Process Using My Information
Barriers / Obstacles:
Assessment:
Training:
Resources:
Perf Measures:
Procedures:
Error Proofing:
QA:
Cust Satisfaction Measurement:
My IQ Expectations:
Completeness:
Accuracy:
Timeliness:
Non-duplication:
Consistency:
Presentation Q:
Definition Clarity:
Other:
My process controls:
Assessment:
Training:
Resources:
Perf Measures:
Procedures:
Error Proofing:
QA:
Cust Satisfaction Measurement:
Customer IQ Expectations:
Completeness:
Accuracy:
Timeliness:
Non-duplication:
Consistency:
Presentation Q:
Definition Clarity:
Other:
Problems / cost of Poor Quality:
Time:
Money:
Materials:
Equip/facilities:
Computer resources:
4953T-ov [4969T, 5056T]
QP>IQ 34
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P6

SIPOC (Supplier-Input-Process-Output-Customer) Quality Planning / Improvement Procedure Steps (1 of 3)

1. Identify the process(es) you or your work team(s) perform
2. Identify the important Information Groups (such as Customer Address data, or Product Price data) created or updated by your process(es)
   - Create a SIPOC chart for each Information Group
3. Identify all customer groups who require that data
   - Document in the enterprise Data Dictionary or repository for future reference

4a. Identify all processes that depend on the data

4b. List the general (or specific, if known) costs incurred if the data is wrong, missing or not available on an acceptable time frame

5057 [4777, 5056T, 4953T] QP>IQ 35

P6

SIPOC (Supplier-Input-Process-Output-Customer) Quality Planning / Improvement Procedure Steps (2 of 3)

5a. List and understand the quality requirements each customer group has for the information

5b. Measure or have the data measured against the quality requirements

6. If there are gaps, conduct a PDCA* to identify root cause and plan, test and implement improvements
   - Note: measure costs of nonquality before, and cost-reductions / opportunity gain afterwards
   - Document ROI (return on investment) and lessons learned in the Information Quality knowledge base
7. List the Information Group(s) (such as Product Inventory data or Supplier Contact data) you require to perform your process(es)

*PDCA= Plan-Do-Check-Act Process Improvement

5058 [4777, 5056T, 4953T] QP>IQ 36

P6

SIPOC (Supplier-Input-Process-Output-Customer) Quality Planning / Improvement Procedure Steps (3 of 3)

8. Identify your Information Producer(s) (Supplier(s))
9. Identify the processes that create or update the information you require
10. Understand the obstacles and barriers, if any, confronted by the information producers
    - If the information does not meet your expectations work with the Information Producers or with the Information Quality team to conduct a PDCA* to eliminate root causes of Information Quality problems
11. Share your ongoing Information Quality requirements for the data you require with your Information Producers

*PDCA= Plan-Do-Check-Act Process Improvement

5059 [5056,5057-59, 4953T] QP>IQ 37

P6 Pt 5

IQ 5. IMPROVE CONSTANTLY & FOREVER PROCESSES OF I/S+ DEVELOPMENT & INFORMATION "PRODUCTION"

☐ Improvement is not a one time effort–management is obligated to continual improvement

Quality "must be built in at the design stage" *Deming*

"Everyone and every department in the company must subscribe to constant improvement" *Mary Walton*

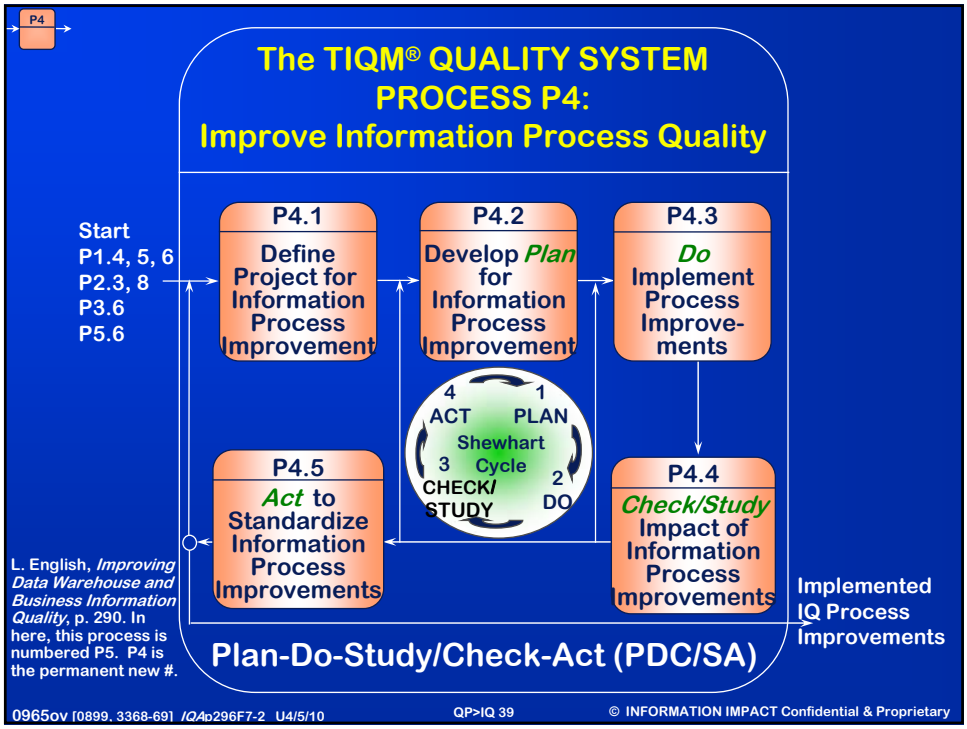
☐ Fixing a problem is not the same as process improvement

↖ Information Quality ramifications:

- Data cleansing is *not* same as *process improvement*
- Identify and involve the customers of IRM products and services—understand their information req's
- Design *quality into* process, application and database involving knowledge workers in the design (QFD**)
- Everyone and every unit must participate in continual information process improvement

+I/S = Information Systems
*IRM = Information Resource Management
** QFD = Quality Function Deployment

0863 [4832-45, 4714-16] *IDW&BIQ*p358+ U4/17/10 QP>IQ 38


P4
The TIQM® QUALITY SYSTEM PROCESS P4:
Improve Information Process Quality
Start
P1.4, 5, 6
P2.3, 8
P3.6
P5.6
P4.1
Define Project for Information Process Improvement
P4.2
Develop Plan for Information Process Improvement
P4.3
Do Implement Process Improve-ments
4 ACT
1 PLAN
Shewhart Cycle
3 CHECK/ STUDY
2 DO
P4.5
Act to Standardize Information Process Improvements
P4.4
Check/Study Impact of Information Process Improvements
L. English, Improving Data Warehouse and Business Information Quality, p. 290. In here, this process is numbered P5. P4 is the permanent new #.
Implemented IQ Process Improvements
Plan-Do-Study/Check-Act (PDC/SA)
0965ov [0899, 3368-69] IQAp296F7-2 U4/5/10
QP>IQ 39
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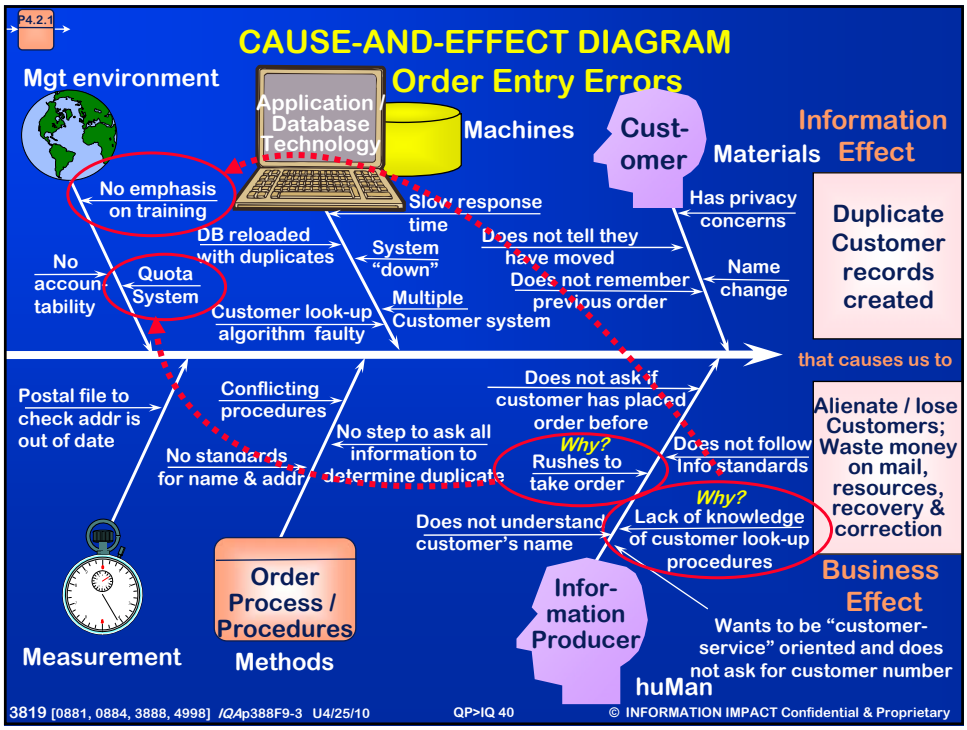
P4.2.1
CAUSE-AND-EFFECT DIAGRAM
Order Entry Errors
Mgt environment
Application / Database Technology
Machines
Cust-omer
Materials
Information Effect
Duplicate Customer records created
No emphasis on training
Slow response time
Has privacy concerns
DB reloaded with duplicates
System "down"
Does not tell they have moved
Name change
No account-tability
Quota System
Multiple Customer system
Does not remember previous order
Customer look-up algorithm faulty
that causes us to
Postal file to check addr is out of date
Conflicting procedures
Does not ask if customer has placed order before
No step to ask all information to determine duplicate
Why? Rushes to take order
Does not follow Info standards
No standards for name & addr
Why? Lack of knowledge of customer look-up procedures
Alienate / lose Customers; Waste money on mail, resources, recovery & correction
Does not understand customer's name
Business Effect
Order Process / Procedures
Infor-mation Producer
Wants to be "customer-service" oriented and does not ask for customer number
Measurement
Methods
huMan
3819 [0881, 0884, 3888, 4998] IQAp388F9-3 U4/25/10
QP>IQ 40
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P6 Pt 6

IQ 6. INSTITUTE TRAINING FOR INFORMATION QUALITY

- Proper training is essential for workers to perform their jobs effectively
  - "If someone learns how to play the piano from a self-taught piano teacher; they will learn a lot wrong, some right" and "neither pupil nor teacher will know what is right and what is wrong" *Deming*
- Information Quality ramifications:
  - Institute IQ education and training at all levels:
    - ↓ Executive Leadership
    - ↓ Business Management
    - ↓ Knowledge Workers and Information Producers
    - ↓ Information Systems Management
    - ↓ Information Resource Management staff
    - ↓ Application Developers
    - ↓ New employees (Orientation)

0864 [4832-45, 4714-16] *IDW&BIQ*p337-399 U4/17/10 QP>IQ 41

P6 Pt 7

IQ 7. INSTITUTE LEADERSHIP FOR INFORMATION QUALITY

- Management is *Leadership*—not "supervision"
  - Leaders enable workers to improve their processes
  - Most supervisors are just the opposite, because they implement inappropriate measures and rewards
- Information Quality ramifications:
  - Take the *lead* in information quality improvement
  - Educate and *coach* executives
  - Implement management *accountability*
  - Learn how your customers use information
  - Measure and reward the right things:
    - ↓ Teamwork, customer satisfaction, waste reduction, total cost of ownership

0865 [4832-45, 4714-16] *IDW&BIQ*p367+ U 4/17/10 QP>IQ 42

P6 Pt 8

IQ 8. DRIVE OUT FEAR SO INFORMATION PRODUCERS & KNOWLEDGE WORKERS CAN WORK EFFECTIVELY

- Improvement in quality requires people to feel secure
  - "Most people … do not understand what their job is, nor what is right or wrong" *Deming*
  - "So seldom is anything done to correct problems that there is *no incentive* to expose them" *Mary Walton*
- Information Quality ramifications:
- Establish a *non-blame, non-judgmental* environment
  - Provide producers training in information quality requirements, information customer expectations; and *empower them to improve processes*
  - Implement accountability and encourage eliminating information problem *causes and take action*
  - Create an *anonymous* information quality hotline
- Allow risk to try and fail without punishment

0866 [4832-45, 4714-16] *IDW&BIQ*p372+ U 4/14/10 QP>IQ 43

P6 Pt 9

IQ 9. BREAK DOWN BARRIERS BETWEEN STAFF AREAS (INFO SYSTEMS TO BUSINESS & BUSINESS TO BUSINESS)

- Enterprise Failure occurs when organizational units *operate autonomously toward their own goals*
  - The parable of the shoes
- Information Quality ramifications:
  - Create IRM* / Application Development partnership
  - Create Information Systems to Business Partnerships
  - Define *Cross*-functional *Business Value Circles*
  - Develop Business Area Partnerships across *Business Value Circles*
- *Define Supplier-customer "contracts" between Business Area Managers for Information Quality*
- *Provide Training and Resources to deliver quality*

*IRM = Information Resource Management

0867 [4832-45, 4714-16] *IQA*p67Pt9 *IDW&BIQ*p376Pt9 U4/17/10 QP>IQ 44

P6 Pt 10

IQ 10. ELIMINATE SLOGANS AND EXHORTATIONS; REPLACE WITH ACTIONS FOR INFORMATION QUALITY

- Slogans do not help people do a good job
  - "Don't skate on an oil slick" (sign in a U.S. factory)
    versus
  - Elimination of oil slicks
- Information Quality ramifications:
  - Develop *effective* information management and information quality improvement processes
  - Develop IQ improvement processes that prevent information "oil slicks" by eliminating the causes
  - Then, when you discover data defects, don't just fix or ignore them–identify and eliminate the cause(s)

0872 [4832-45, 4714-16] *IDW&BIQ*p385+ U4/17/10 QP>IQ 45

P6 Pt 11

IQ 11. ELIMINATE QUOTAS OF "PRODUCTIVITY" WITH METRICS OF QUALITY

- Quotas and other work standards hurt quality probably more than any other single working condition
- Quotas cause above-average workers to slow their output and cause below-average workers frustration
- Information Quality ramifications:
  - Replace "productivity" metrics with focus on real business performance:
    - ↓ Management ownership (total) costs of doing business
    - ↓ Reduced costs of information scrap and rework
    - ↓ Internal knowledge worker satisfaction surveys of information products, both immediate and downstream, and both after implementation and on continued basis
    - ↓ External end-customer satisfaction, including communication and information

0873 [4832-45, 4714-16] *IDW&BIQ*p387+ U4/17/10 QP>IQ 46

P6 Pt 12

IQ 12. REMOVE BARRIERS TO PRIDE OF WORKMANSHIP: Let Information Producers Improve Their Own Processes

- Workers, apart from management, know the problems of their jobs and given an opportunity, will fix them
- *Management must listen* to their Employees, *involve them actively*, not with "quick fix" programs to defuse Employee frustration but to solve the real problems
- Information Quality ramifications:
  - Systems and Business Management must listen to their Employees as sources of quality improvement
  - Involve Employees actively in information planning, root cause analysis and process improvement
  - *And* incorporate their suggestions to improve information processes

0877 [4832-45, 4714-16, 4979-93] *IDW&BIQ*p390+ U 4/17/10QP>IQ 47

P6 Pt 13

IQ 13. INSTITUTE A VIGOROUS PROGRAM OF EDUCATION & SELF-IMPROVEMENT FOR EVERYONE

- It is not enough to have good people with today's skills
  - "What an organization needs is not just good people; it needs people that are improving with education"
  - Quality must not cost jobs. An organization "must make it clear that no one will lose their job because of improvement in productivity"
- Information Quality ramifications: Information-Age Paradigm shift
  - Knowledge worker paradigm: "information products" and "information customers"
  - Information systems paradigm shift: information as a shared resource; value-centric applications
  - Mgt: the *Information Revolution requires* business management *across* value chains; not down functions

Source: L. English, *Improving Data Warehouse and Business Information Quality*, p 393+

0878 [4832-45, 4714-16, 4979-93] *IDW&BIQ*p393+ U4/17/10 QP>IQ 48

P6 Pt 14

IQ 14. TAKE ACTION TO ACCOMPLISH THE TRANSFORMATION FOR INFORMATION QUALITY

- Management must put everyone to work to transform org.
  - Must organize itself to administer the other 13 points
  - Senior management must feel the pain of status quo
  - Senior management must communicate to a critical mass of people why change is necessary for all
  - Every activity is a process that can be improved
- Use the Shewhart Cycle

4. Roll the process out and study the results– what did we learn?

3. Study the effects of the "improvement"

1. Study a defective process to identify root cause(s) and define improvement(s)

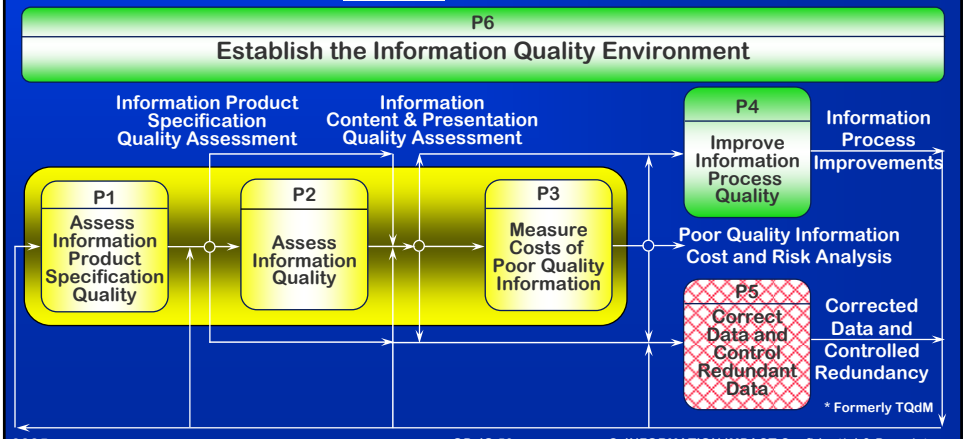
2. Implement the improvement in a controlled way

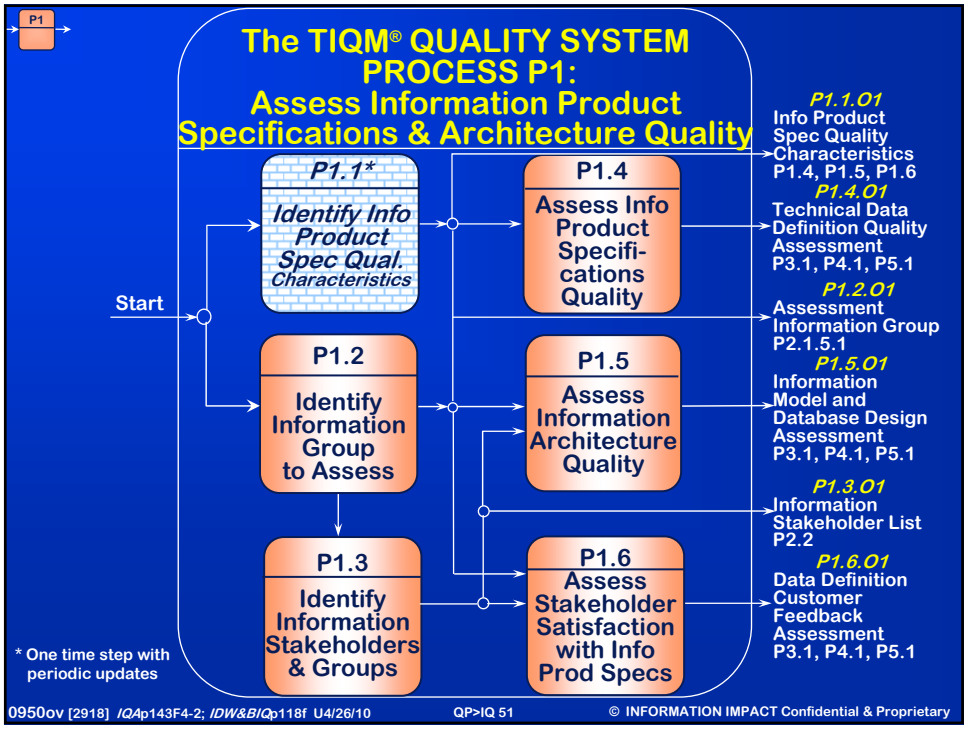
P6

The TIQM® QUALITY SYSTEM FOR INFORMATION

- TIQM®* is *not* a program; it is a *value system*, *mind set*, and *habit* of continuous improvement of:
  1. *Application and data development processes*
  2. *Business processes*

By integrating *quality* management *values*, *principles* and *methods* into the *culture*




P1
The TIQM® QUALITY SYSTEM PROCESS P1:
Assess Information Product Specifications & Architecture Quality
Start
P1.1*
Identify Info Product Spec Qual. Characteristics
P1.2
Identify Information Group to Assess
P1.3
Identify Information Stakeholders & Groups
P1.4
Assess Info Product Specifi-cations Quality
P1.5
Assess Information Architecture Quality
P1.6
Assess Stakeholder Satisfaction with Info Prod Specs
* One time step with periodic updates
P1.1.O1
Info Product Spec Quality Characteristics
P1.4, P1.5, P1.6
P1.4.O1
Technical Data Definition Quality Assessment
P3.1, P4.1, P5.1
P1.2.O1
Assessment Information Group
P2.1.5.1
P1.5.O1
Information Model and Database Design Assessment
P3.1, P4.1, P5.1
P1.3.O1
Information Stakeholder List
P2.2
P1.6.O1
Data Definition Customer Feedback Assessment
P3.1, P4.1, P5.1
0950ov [2918] IQAp143F4-2; IDW&BIQp118f U4/26/10
QP>IQ 51
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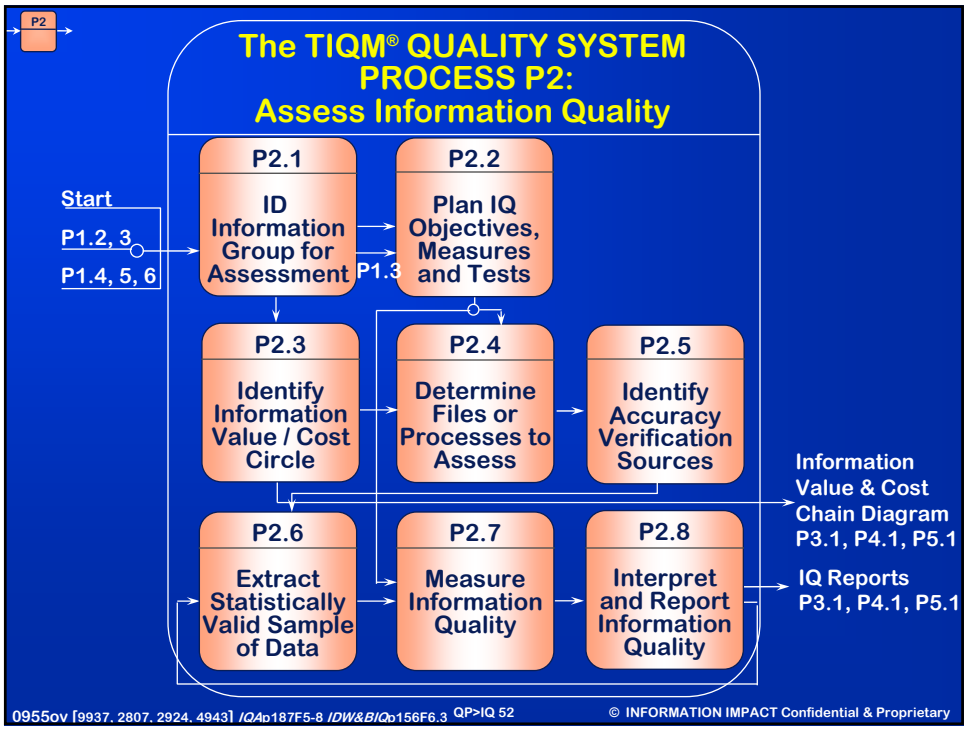
P2
The TIQM® QUALITY SYSTEM PROCESS P2:
Assess Information Quality
Start
P1.2, 3
P1.4, 5, 6
P2.1
ID Information Group for Assessment
P2.2
Plan IQ Objectives, Measures and Tests
P1.3
P2.3
Identify Information Value / Cost Circle
P2.4
Determine Files or Processes to Assess
P2.5
Identify Accuracy Verification Sources
P2.6
Extract Statistically Valid Sample of Data
P2.7
Measure Information Quality
P2.8
Interpret and Report Information Quality
Information Value & Cost Chain Diagram
P3.1, P4.1, P5.1
IQ Reports
P3.1, P4.1, P5.1
0955ov [9937. 2807. 2924. 4943] IQAp187F5-8 IDW&BIQp156F6.3
QP>IQ 52
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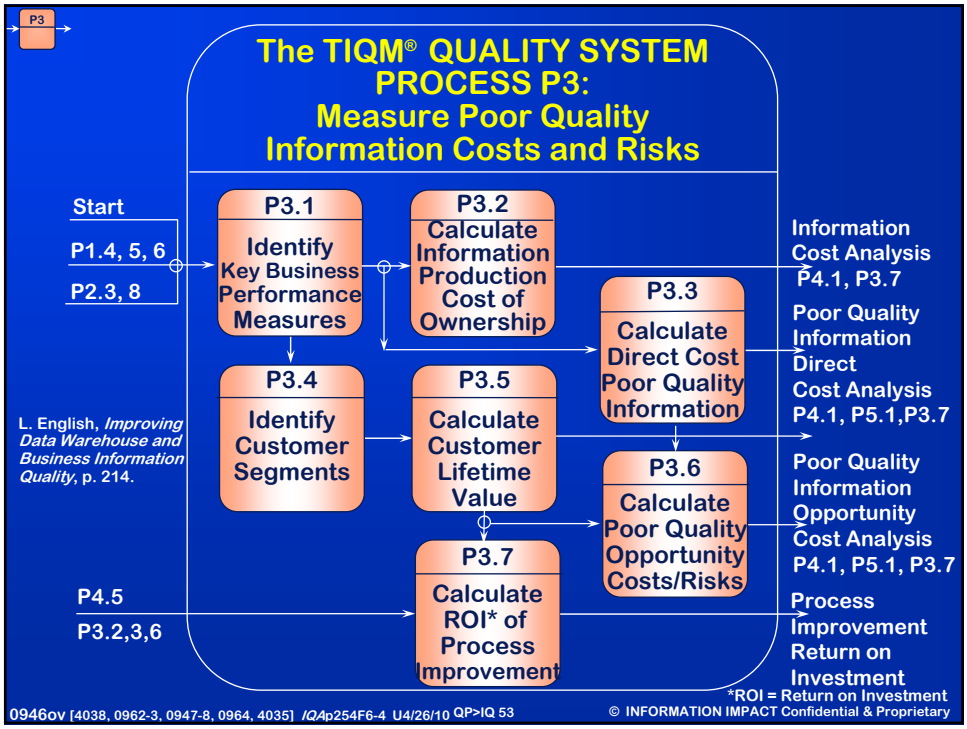
P3
The TIQM® QUALITY SYSTEM PROCESS P3: Measure Poor Quality Information Costs and Risks
Start
P1.4, 5, 6
P2.3, 8
P3.1 Identify Key Business Performance Measures
P3.2 Calculate Information Production Cost of Ownership
P3.3 Calculate Direct Cost Poor Quality Information
P3.4 Identify Customer Segments
P3.5 Calculate Customer Lifetime Value
P3.6 Calculate Poor Quality Opportunity Costs/Risks
P3.7 Calculate ROI* of Process Improvement
P4.5
P3.2,3,6
Information Cost Analysis P4.1, P3.7
Poor Quality Information Direct Cost Analysis P4.1, P5.1,P3.7
Poor Quality Information Opportunity Cost Analysis P4.1, P5.1, P3.7
Process Improvement Return on Investment
*ROI = Return on Investment
L. English, Improving Data Warehouse and Business Information Quality, p. 214.
0946ov [4038, 0962-3, 0947-8, 0964, 4035] IQAp254F6-4 U4/26/10 QP>IQ 53
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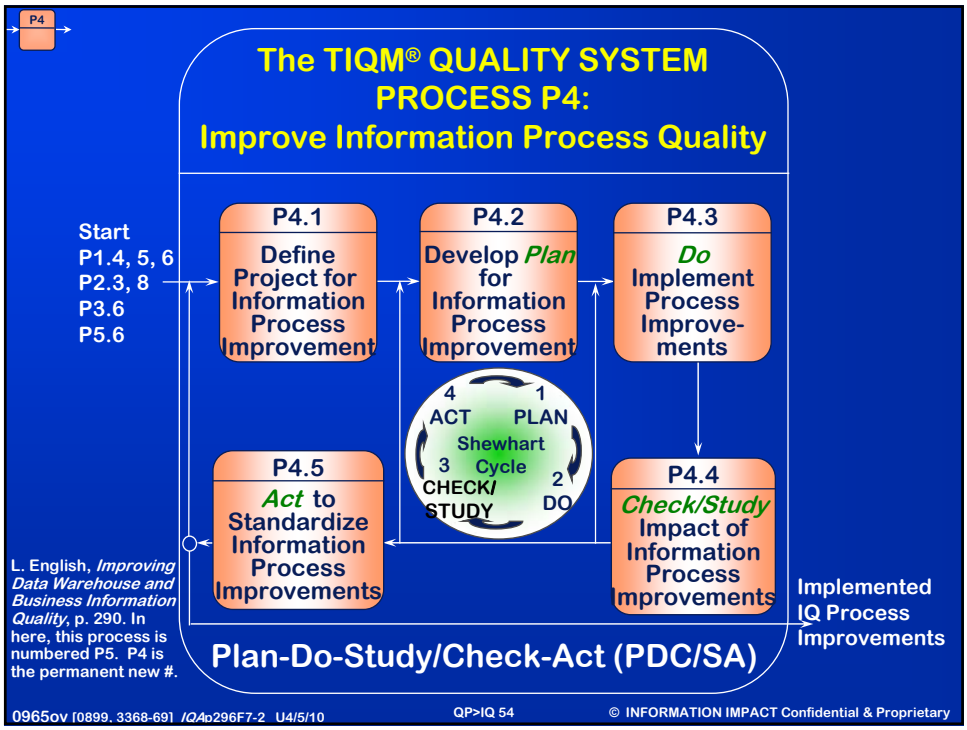
P4
The TIQM® QUALITY SYSTEM PROCESS P4: Improve Information Process Quality
Start
P1.4, 5, 6
P2.3, 8
P3.6
P5.6
P4.1 Define Project for Information Process Improvement
P4.2 Develop Plan for Information Process Improvement
P4.3 Do Implement Process Improve-ments
4 ACT
1 PLAN
Shewhart Cycle
3 CHECK/ STUDY
2 DO
P4.5 Act to Standardize Information Process Improvements
P4.4 Check/Study Impact of Information Process Improvements
Implemented IQ Process Improvements
Plan-Do-Study/Check-Act (PDC/SA)
L. English, Improving Data Warehouse and Business Information Quality, p. 290. In here, this process is numbered P5. P4 is the permanent new #.
0965ov [0899, 3368-69] IQAp296F7-2 U4/5/10
QP>IQ 54
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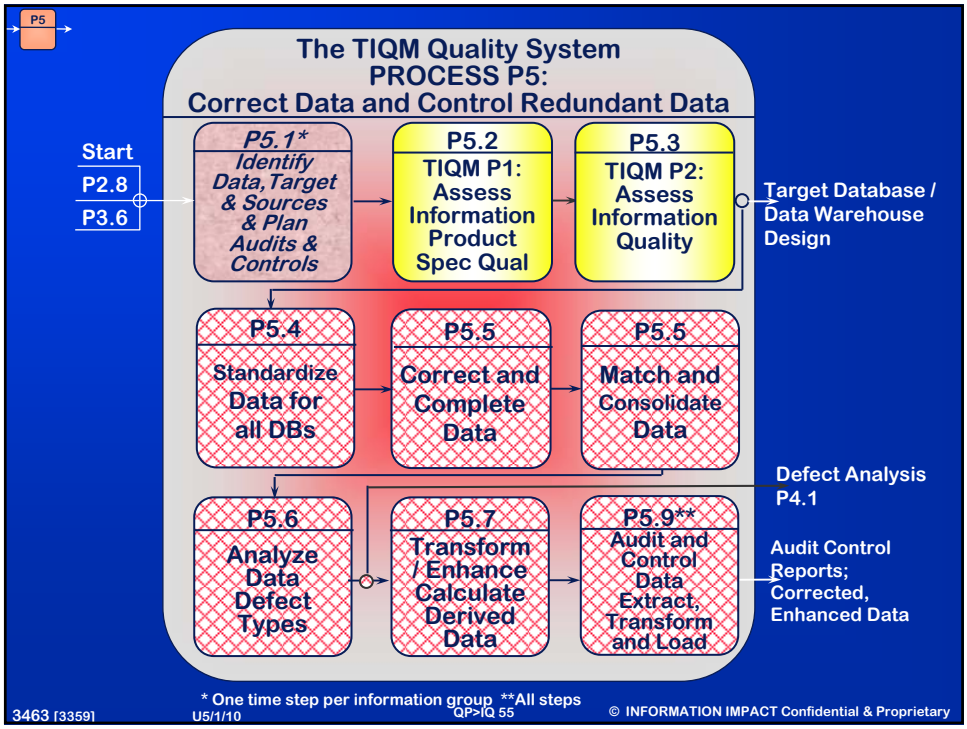
P5
The TIQM Quality System
PROCESS P5:
Correct Data and Control Redundant Data
Start
P2.8
P3.6
P5.1* Identify Data, Target & Sources & Plan Audits & Controls
P5.2 TIQM P1: Assess Information Product Spec Qual
P5.3 TIQM P2: Assess Information Quality
Target Database / Data Warehouse Design
P5.4 Standardize Data for all DBs
P5.5 Correct and Complete Data
P5.5 Match and Consolidate Data
Defect Analysis P4.1
P5.6 Analyze Data Defect Types
P5.7 Transform / Enhance Calculate Derived Data
P5.9** Audit and Control Data Extract, Transform and Load
Audit Control Reports; Corrected, Enhanced Data
* One time step per information group **All steps
3463 [3359]
U5/1/10
QP>IQ 55
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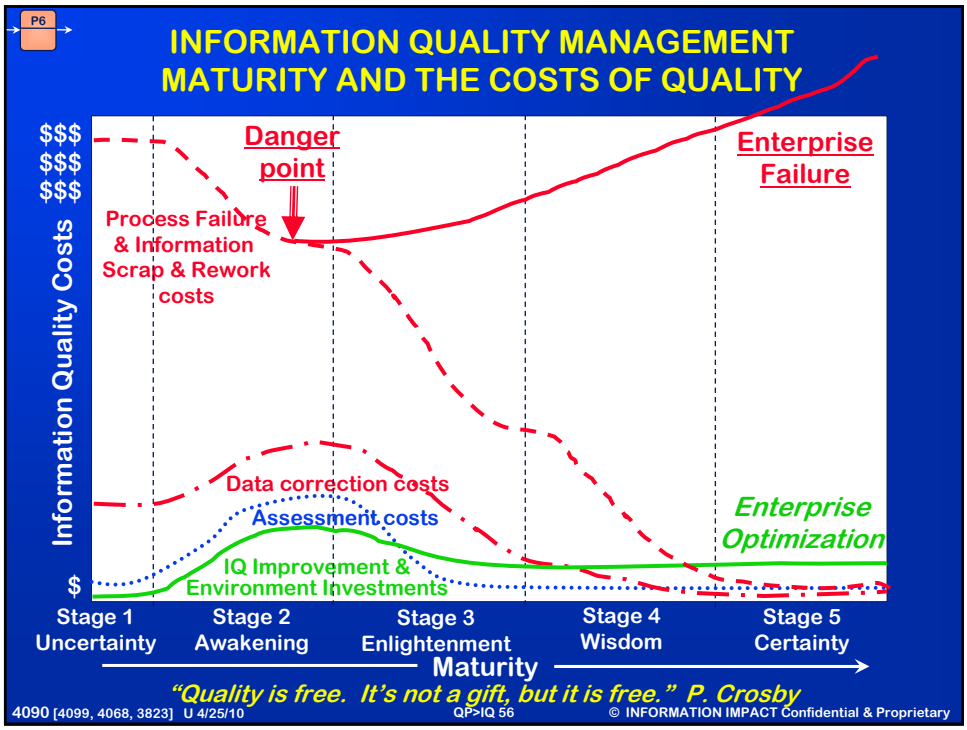
P6
INFORMATION QUALITY MANAGEMENT
MATURITY AND THE COSTS OF QUALITY
$$$
$$$
$$$
$
Information Quality Costs
Danger point
Enterprise Failure
Process Failure & Information Scrap & Rework costs
Data correction costs
Assessment costs
IQ Improvement & Environment Investments
Enterprise Optimization
Stage 1 Uncertainty
Stage 2 Awakening
Stage 3 Enlightenment
Stage 4 Wisdom
Stage 5 Certainty
Maturity
"Quality is free. It's not a gift, but it is free." P. Crosby
4090 [4099, 4068, 3823] U 4/25/10
QP>IQ 56
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P6

EPILOGUE

"Quality is free. It's not a gift, but it is free. What costs money are the unquality things–all the actions that involve not doing jobs right the first time.

"Quality is not only free, it is an honest-to-everything profit maker. Every penny you don't spend on doing things wrong, over, or instead becomes half a penny right on the bottom line. If you concentrate on making quality certain you can probably increase your profit by an amount equal to 5 to 10 percent of your sales. . . . . That is a lot of money for free."

Philip B. Crosby, *Quality Is Free*

And this does not count the increased opportunity gain that comes from exploitation of high quality information

To re-iterate:

"QUALITY IS FREE. IT'S NOT A GIFT..."

3823 [4090, 4099, 4068] QP>IQ 57

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Thank you for your valuable time. Please share your feedback and comments as you apply your new knowledge (Larry.English@infoimpact.com) *Larry P. English*

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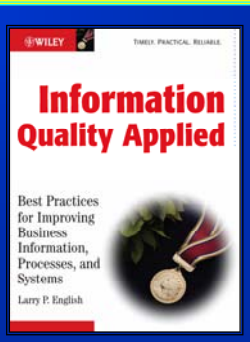

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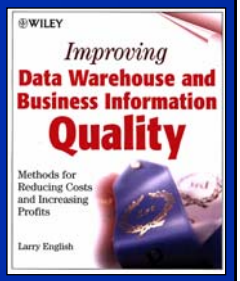

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