"QUALITY BASICS"

PROCESS MANAGEMENT GROUP, LTD.

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PROCESS MANAGEMENT GROUP, LTD.
Burton J Greenberg, CSQA, CSTE
BGreenberg@PMGLtd.com
(847) 550-0977

The IT quality and testing experts
www.pmgltd.com

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PRESENTATION OBJECTIVES

PROCESS MANAGEMENT GROUP, LTD.

- **"Quality" Disciplines are Universal**
- **Concepts are rooted in Manufacturing and Service Industries**
- **Totally Applicable to the IT Industry**

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PRESENTATION AGENDA

- **What is "Quality"?**
- **Who are the "Quality Pioneers"?**
- **Quality Movements**
- **Why "Quality"?**
- **"Quality" and IT**
- **What Can Be Done?**
- **Recap**

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QUALITY is Defined as:

- **"performance to the standard expected by the customer"**
  - Fred Smith, CEO of Federal Express
- **"providing our customers with the products and services that consistently meet their needs and expectations"**
  - Boeing
- **"doing the right thing right the first time, always striving for improvement, and always satisfying the customer"**
  - U.S. Department of Defense

Dimensions of Quality

- **Viewed from the end product / service**
  - Does the product or service meet or exceed expectations?
- **Viewed from the process**
  - Total Quality includes the processes, environment and people
- **Perception**
  - Instinctive association with a product or service

QUALITY PIONEERS

- **W. Edwards Deming**
  - Quality means "Pride of Workmanship"

  - Deming's Fourteen Points
  - Deming's Seven Deadly Diseases
  - The Deming "PDCA Cycle"

Dr. W. Edwards Deming

- **Engineering Degree-University of Wyoming**
- **Masters Degree in mathematics and physics from the University of Colorado**
- **Doctorate in physics from Yale in 1928**

- **In 1947 helped with Japan's census**
  - The Japan Union of Scientists and Engineers (JUSE) became keenly interested in Deming's statistical methods

Deming's PDCA Cycle

- **Plan**
  - Study the process under consideration and decide what changes might improve it
- **Do**
  - Make the change, on a small scale
- **Check**
  - Observe the effects
- **Act (aka Adjust)**
  - Fine-Tune the change and broaden its applications

QUALITY PIONEERS

- **Joseph M. Juran**
  - Quality means 'Fitness for Use"
    - Quality Product serves Customer Needs and gives Customer Satisfaction
    - Quality Product is free of Deficiencies and does not create Customer Dissatisfaction

  - The Juran Trilogy
  - Juran's Ten Steps to Quality Improvement
  - The Pareto Principle

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JURAN TRILOGY

- **Quality Planning**
  - Developing the products, systems, and processes needed to meet or exceed customer expectations
- **Quality Control**
  - Assess and Act on results
- **Quality Improvement**
  - Constant Improvement to the Practices and Processes

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QUALITY PIONEERS

- **Philip B. Crosby**
  - Quality means 'Conformance to Requirements'
    - Obtained through prevention
    - Performance standard of Zero Defects
    - Managed by 'Price of Non-Conformance'

  - Crosby's Fourteen Steps to Quality Improvement
  - Quality Management Maturity Grid

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Crosby's
Quality Management Maturity Grid

- **A means to evaluate a company's quality approach at any moment of time**
- **Recognizes various stages of maturity**
  - Uncertainty
  - Awakening
  - Enlightenment
  - Wisdom
  - Certainty
- **At each stage, has various measurement categories**

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QUALITY PIONEERS

- **Walter Shewart**
  - Introduced statistical controls at Bell Labs in the 1920's
  - Created the 'Shewart Cycle' adopted by Deming as the PDCA Cycle
- **Frederick Taylor**
  - Instituted Techniques such as 'Time and Motion' Studies
- **William Scherkenbach**
  - Guided the implementation of Deming's principles at Ford Motor

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ISO

- **International Organization for Standardization**
  - Network of 148 National Standards Institutes
  - Central Secretariat in Geneva, Switzerland coordinates the system
- **"ISO" is derived from Greek (isos) "equal"**
- **Based on the foundation that "Standardization" is critical for quality**

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ISO 9000 & ISO 14000

- **ISO 9000**
  - primarily concerned with "quality management"
- **ISO 14000**
  - primarily concerned with "environmental management"
- **Common ISO 9000 and ISO 14000 Standards**
  - known as "generic management system standards"

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Total Quality Management (TQM)

- **Set of management practices to ensure the organization consistently meets or exceeds customer requirements**
- **Focused on process measurement and controls as means of continuous improvement**

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Six Sigma

- **Six Sigma**
  - stands for Six Standard Deviations from mean
- **Six Sigma methodology**
  - Techniques and tools to improve the capability and reduce the defects in any process
  - Improves existing business process by constantly reviewing and re-tuning the process

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Malcolm Baldrige Award

- **Malcolm Baldrige**
  - Secretary of Commerce (1981-July 1987)
  - Proponent of Quality Management

- **Malcolm Baldrige National Quality Award**
  - To Businesses
    - Manufacturing & Service (Small & Large)
   - Education & Health Care
  - Criteria based on Seven Categories

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Deming Award

- **Deming Award for Quality Control**
- **Developed in 1951 by the Japanese Union of Scientists (JUSE)**
  - The examination process is extremely thorough with strict judging; criteria includes:
    - corporate policy
    - quality systems
    - education and training
    - results
    - future plans

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COST OF QUALITY:

PROCESS MANAGEMENT GROUP, LTD.
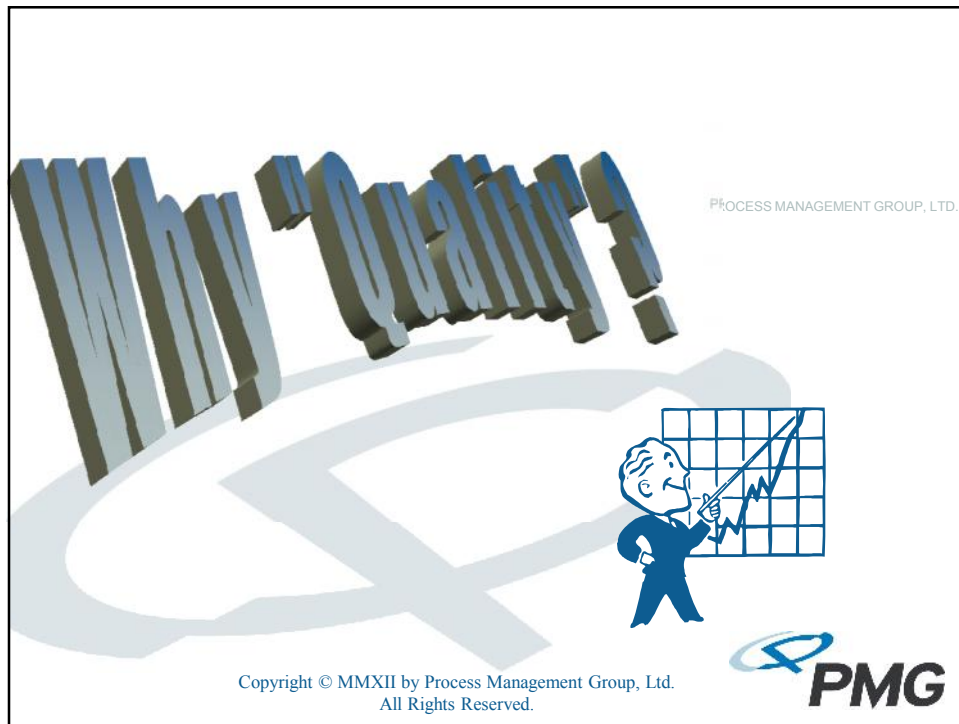
Costs associated with ensuring products and services comply with requirements

- **GOAL:**
  - Minimize the Cost of Quality

COMPONENTS of COST OF QUALITY

- **Prevention Costs**
  - Cost incurred prior to development for those processes that ensure requirements are satisfied
- **Appraisal Costs**
  - Cost incurred after a product is built and prior to delivery, to detect non-compliance with requirements
- **Failure Cost**
  - Cost incurred after delivery due to non-compliance to requirements

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The Dimensions of Quality In IT

- **Viewed from the end product / service**
  - Conformance to Requirements
- **Viewed from the process**
  - Processes in place for Development, Testing, Implementation, etc.
- **Perception**
  - Customers' instinctive confidence level in the IT organization

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COST OF QUALITY WITHIN IT

- **Prevention**
  - Quality Assurance
    - Establish IT Standards & Procedures
    - Review and Improve Practices
- **Appraisal**
  - Quality Control
    - Test Planning and Execution
    - Product Reviews

Failure
- Rework
- Business Impact

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NATIONAL INSTITUTE OF STANDARDS & TECHNOLOGY (NIST) May, 2002 Report

- **Buggy software costs users, vendors nearly $60B/Year**
- **Better testing infrastructure could reduce the cost by $22.5 billion, though it wouldn't eliminate all software errors**

Relative Costs of Defect Removal
Baziuk Study (1995)

	Requirements	System Testing	Installation Testing	Acceptance Testing	Operations & Maintenance
Costs	1x	90x	90x~440x	440x	470x~880x

Published in NIST
"The Economic Impact of Inadequate Infrastructure for Testing" 5/2002

The Bigger They Are ....

- **The Larger the Project, The greater the chance of Failure**
  - < $750,000   55% Succeed
  - $1 Million ~ $2 Million   18% Succeed
  - $5 Million ~ 10 Million   7% Succeed

Source: The Standish Group International Inc., Dennis Mass

TOP 10 REASONS IT PROJECTS FAIL

1) **Incomplete Requirements**
2) **Lack of User Involvement**
3) **Lack of Resources**
4) **Unrealistic Expectations**
5) **Lack of Executive Support**
6) **Changing Requirements**
7) **Lack of Planning**
8) **Software no Longer Needed**
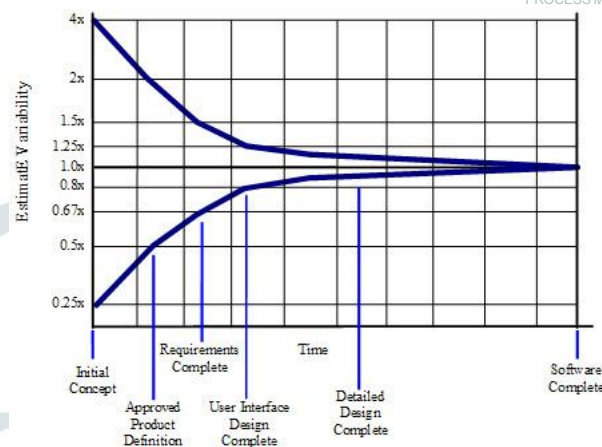9) **Lack of IT Management**
10) **Technology Illiteracy**

Source: The Standish Group International Inc., Dennis Mass

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Cone of Uncertainty

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Agile ....

- **Drives Projects to smaller, more manageable components**
- **Does <u>not</u> eliminate practices required of a quality product**

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IT Quality Leaders

Watts Humphrey
- Fellow at the Software Engineering Institute (SEI)
- Established the Process Maturity Model leading to Capability Maturity Model® (CMM®)

- **William Perry**
  - Founder of Quality Assurance Institute (QAI)

- **Dr. Howard Rubin**
  - Internationally Recognized in areas that include IT Performance, business value of technology and software processes
  - Established a 'Worldwide IT Benchmark Project'

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SOFTWARE ENGINEERING INSTITUTE (SEI)

- **Established in 1984**
- **Based at Carnegie Mellon University**
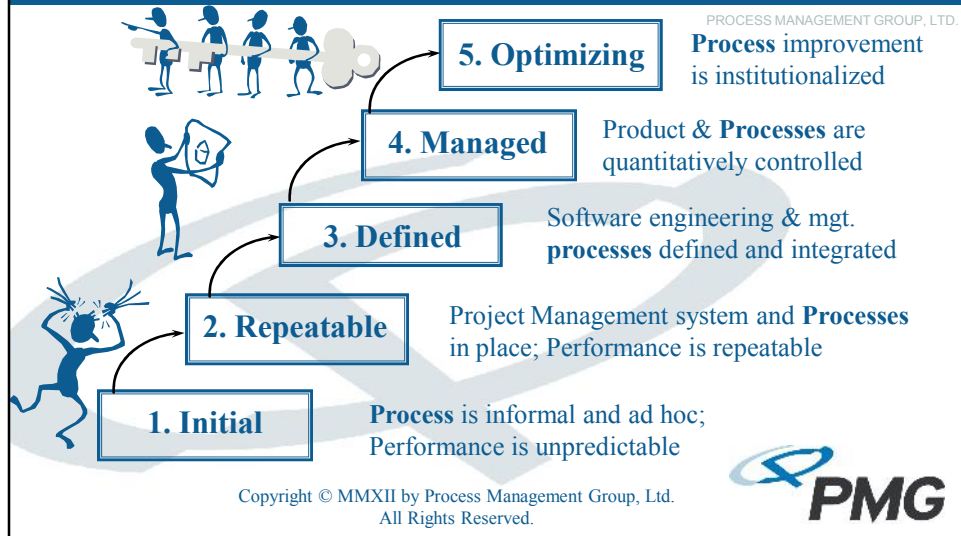- **Developed the Capability Maturity Model**

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CAPABILITY MATURITY MODEL (CMM)

- **Serves as an objective means of assessing IT organizational maturity**
- **Based upon five levels of organizational maturity**
- **Represents an evolution through maturity levels**

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SEI MATURITY LEVELS

5. Optimizing — **Process** improvement is institutionalized

4. Managed — Product & **Processes** are quantitatively controlled

3. Defined — Software engineering & mgt. **processes** defined and integrated

2. Repeatable — Project Management system and **Processes** in place; Performance is repeatable

1. Initial — **Process** is informal and ad hoc; Performance is unpredictable

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SUMMARY

- **Review of "Quality" Principles**
  - What is Quality?
  - Quality Pioneers
  - Quality Movements
- **Relationship of Quality within IT**
  - Application of Quality Concepts
  - Common Themes
- **Potential Approaches**

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"There is nothing more difficult to plan, more doubtful of success, nor more dangerous to manage than the creation of a new system.

For the initiator has the enmity of all who would profit by the preservation of the old system and merely lukewarm defenders in those who would gain by the new one"
Machiavelli, 1513

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