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DEPARTMENT OF AEROSPACE ENGINEERING

19MEE304 Total Quality Management

Topic: Contributions of Deming, Juran, and Crosby – Barriers to TQM

Introduction

- TQM (Total Quality Management) was shaped by **three key quality pioneers**:
 - **W. Edwards Deming** (Statistical Process Control & Continuous Improvement)
 - **Joseph M. Juran** (Quality Planning & Cost of Quality)
 - **Philip B. Crosby** (Zero Defects & Quality Culture)
- Understanding their **contributions** helps in implementing effective TQM frameworks.

Contributions of W. Edwards Deming

- **Father of Modern Quality Management**
- Focused on **statistical control, process variation reduction, and leadership involvement.**
- **Key Contributions:**
 1. **Deming's 14 Points for Quality Management:**
 - Drive out fear, break down barriers, eliminate numerical quotas.
 2. **System of Profound Knowledge:**
 - Focus on **systems thinking, variation analysis, knowledge building, and psychology.**
 3. **PDCA (Plan-Do-Check-Act) Cycle:**
 - Foundation for **continuous improvement.**
 4. **Statistical Process Control (SPC):**
 - **Control charts** for monitoring process variations.
- **Industry Impact:**
 - **Japan's manufacturing transformation (1950s)**, leading to Toyota's **Kaizen** philosophy.
 - **Six Sigma** incorporates **Deming's statistical methods.**

Contributions of Joseph M. Juran

- Known for **Quality Trilogy** and **Cost of Quality** concepts.
- Advocated **quality as a business strategy**, not just an operational concern.

- **Key Contributions:**
 1. **Juran's Quality Trilogy:**
 - **Quality Planning** – Define processes to meet customer needs.
 - **Quality Control** – Monitor and inspect processes.
 - **Quality Improvement** – Reduce defects, optimize efficiency.
 2. **Cost of Poor Quality (COPQ):**
 - Prevention, appraisal, internal failure, and external failure costs.
 3. **Pareto Principle (80/20 Rule):**
 - 80% of defects come from 20% of causes → **focus on critical few.**
- **Industry Impact:**
 - **Lean Manufacturing & Six Sigma** integrate **Juran's cost analysis.**
 - Used by **Boeing, Motorola, and healthcare industries.**

Contributions of Philip B. Crosby

- Developed **Zero Defects Philosophy** and **Quality is Free** concept.
- **Key Contributions:**
 1. **Zero Defects Concept:**
 - Quality should be **built into the process** (Prevention, not Inspection).
 2. **Four Absolutes of Quality Management:**
 - **Quality means conformance to requirements.**
 - **Prevention is the key to quality.**
 - **Zero defects is the standard.**
 - **Quality is measured by the cost of nonconformance.**
 3. **Quality Improvement Process (QIP):**
 - A structured approach to **defect elimination.**
- **Industry Impact:**
 - **NASA & IBM** implemented Crosby's Zero Defects.
 - Drives **Total Productive Maintenance (TPM)** practices.

Comparison of Deming, Juran, and Crosby

Aspect	Deming	Juran	Crosby
Focus	Process variation & continuous improvement	Strategic quality management & cost of quality	Zero defects & prevention
Approach	Statistical control & leadership involvement	Quality planning, control, and improvement	Cultural change & management commitment
Key Concept	PDCA Cycle, 14 Points	Quality Trilogy, Pareto Principle	Four Absolutes, Quality is Free
Industry	Toyota, Six Sigma, Lean	Healthcare, Aerospace,	NASA, IT Industry

Aspect	Deming	Juran	Crosby
Adoption		Banking	

Barriers to TQM Implementation

Despite its advantages, organizations **face challenges** in TQM adoption.

A. Organizational Barriers

1. **Lack of Top Management Commitment**
 - Leaders fail to integrate quality into company culture.
 - **Example:** Poor executive support in Ford's early TQM efforts.
2. **Resistance to Change**
 - Employees resist **new quality initiatives**.
 - **Solution: Training & incentives** can improve engagement.
3. **Silo Mentality & Poor Communication**
 - Lack of **cross-functional collaboration**.
 - **Example:** Traditional supply chains resist lean integration.

B. Operational & Technical Barriers

1. **Inadequate Training & Resources**
 - Employees lack **statistical tools & problem-solving skills**.
 - **Solution:** Invest in **Six Sigma & SPC training**.
2. **Complexity in Data-Driven Decision Making**
 - SPC & Six Sigma require **advanced analytics**.
 - **Example:** SMEs struggle to implement **AI-based quality control**.
3. **Supplier Quality Issues**
 - **Inconsistent raw materials lead to defects**.
 - **Solution:** Implement **supplier audits & partnerships**.

Cultural & Customer-Related Barriers

1. **Short-Term Focus Over Long-Term Quality Gains**
 - Many companies prioritize **profits over quality investments**.
 - **Example:** Boeing's 737 MAX crisis due to quality oversights.
2. **Customer Expectation Gaps**
 - Organizations fail to **align product quality with market needs**.
 - **Solution:** Use **Quality Function Deployment (QFD)**.

Case Study: Toyota's TQM Success

- **Challenges Faced:** Early **supplier quality issues** and employee resistance.
- **Solutions Implemented:**
 - Adopted **Deming's PDCA cycle**.
 - **Juran's Trilogy** guided **process improvements**.
 - Crosby's **Zero Defects** reduced recalls.
- **Outcome:** Toyota became a **global benchmark** for quality.

Conclusion

- **Deming, Juran, and Crosby** provided the foundation for **modern TQM practices**.
- Organizations must **overcome cultural, operational, and leadership barriers**.
- Successful TQM **requires continuous commitment, training, and data-driven decision-making**.