

MA4854

QUALITY ASSURANCE AND MANAGEMENT

Wednesdays 15:30 (1hr) LT5
Fridays 10:30 (2 hrs) LT2A

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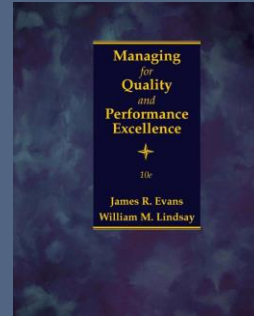
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Managing for Quality and Performance Excellence



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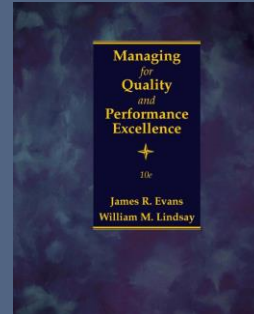


Why Must Engineers Know Quality

- Scientists study theories and principles of material and energy utilization and conversion
- Engineers make use of the resulting knowledge to develop methods to create man-made goods and services
- Such goods and services are generated for useful purposes for human beings
- Quality is a reflection of how well such goods and services are generated to meet the intended purposes

Chapter 1

Introduction to Quality



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Importance of Quality

- Quality is uniquely positioned to accelerate organizational growth through better execution and alignment
- Quality provides the voice of the customer critical to developing innovative products and services.
- Quality can provide an organization with a competitive edge
- “No quality, no sales. No sales, no profit. No profit, no jobs.”

Two views of quality

Internal view	Customer-focused view
Compare product to specification	Compare product to competition and to the best
Get product accepted at inspection	Provide satisfaction over product life
Prevent plant and field defects	Meet customer needs on goods and services
Concentrate on manufacturing	Cover all functions
Use internal quality measures	Use customer-based quality measures
View quality as a technical issue	View quality as a business issue
Efforts coordinated by quality manager	Efforts directed by upper management

Source: Juran's Quality Handbook: The Complete Guide to Performance Excellence 6e, 2010.

Two dimensions of quality

Manufacturing industries	Service industries
Features	
Performance	Accuracy
Reliability	Timeliness
Durability	Completeness
Ease of use	Friendliness and courtesy
Serviceability	Anticipating customer needs
Esthetics	Knowledge of server
Availability of options and expandability	Appearance of facilities and personnel
Reputation	Reputation
Freedom from deficiencies (failures or non-value-added costs)	
Product free of defects and errors at delivery, during use, and during servicing	Service free of errors during original and future service transactions
All processes free of rework loops, redundancy, and other waste	All processes free of rework loops, redundancy, and other waste

Defining Quality

Perfection

Fast delivery

Providing a good, usable product

Eliminating waste

Consistency

Doing it right the first time

Delighting or pleasing customers

Total customer service and satisfaction

Compliance with policies and procedures

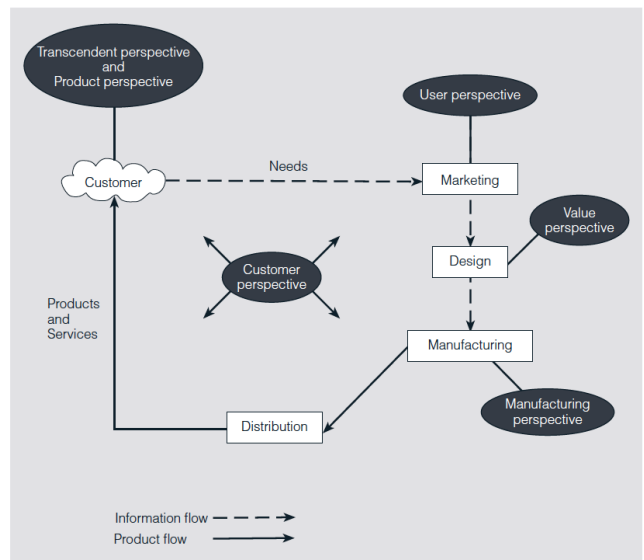
Formal Definitions of Quality

- **Transcendent Perspective:** excellence
- **Product Perspective:** quantities of product attributes
- **User Perspective:** fitness for intended use
- **Value Perspective:** quality vs. price
- **Manufacturing Perspective:** conformance to specifications
- **Customer Perspective:** meeting or exceeding customer expectations

Customers

- Consumers
 - Ultimate buyers of goods and services
- External customers
 - Business-to-business
- Internal customers
 - Anyone who receives goods or services from someone else within an organization

FIGURE 1.1
Quality Perspectives
in the Value Chain



History of Quality Management

(1 of 4)

- Ancient History
 - Zhou Dynasty in China
- The Age of Craftsmanship
 - Skilled workers during the Middle Ages
 - Industrial Revolution
- Early 20th Century
 - Separate quality departments
 - Ford Motor Company
 - Statistical methods and quality assurance
 - Professional societies and publications

History of Quality Management

(2 of 4)

- Post World War II
 - Evolution of quality management in Japan
 - W. Edwards Deming and Joseph Juran
- U.S. “Quality Revolution”
 - Quality crisis around 1980
 - Growth of product quality awareness in manufacturing industries
- Rapid Growth in Business
 - Malcolm Baldrige National Quality Award (1987)
 - Books, consulting, training

History of Quality Management

(3 of 4)

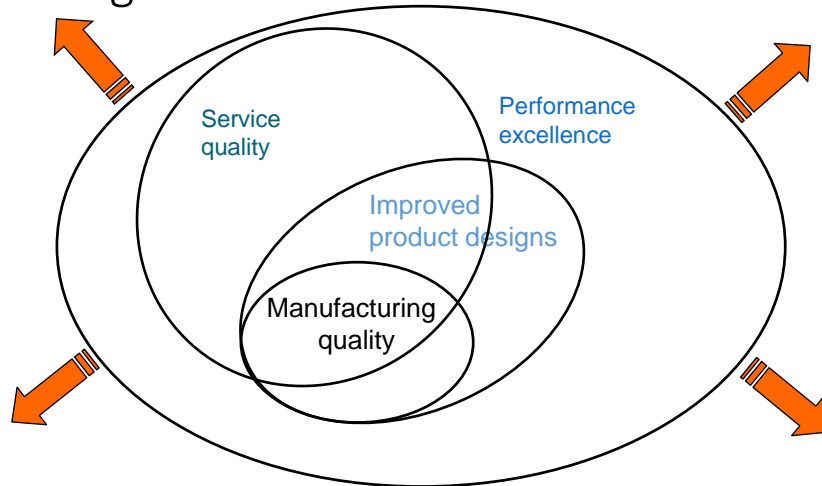
- From Product Quality to Total Quality Management
 - “Little Q” vs. “Big Q” and TQM
- Early Management Failures
 - Cynicism and disinterest
 - “No, TQM isn’t dead. TQM failures just prove that bad management is still alive and kicking.”
- Performance Excellence
 - Focus on customer value, organizational sustainability, improvement of effectiveness and capabilities, and organizational and personal learning

History of Quality Management

(4 of 4)

- Emergence of Six Sigma
 - a customer-focused, results-oriented approach to business improvement
- Globalization of Quality
 - National quality efforts
 - No significant differences among regions around the world
- Current and future challenges
 - Continue to apply the principles of quality and performance excellence.
 - Quality is “a race without a finish line.”

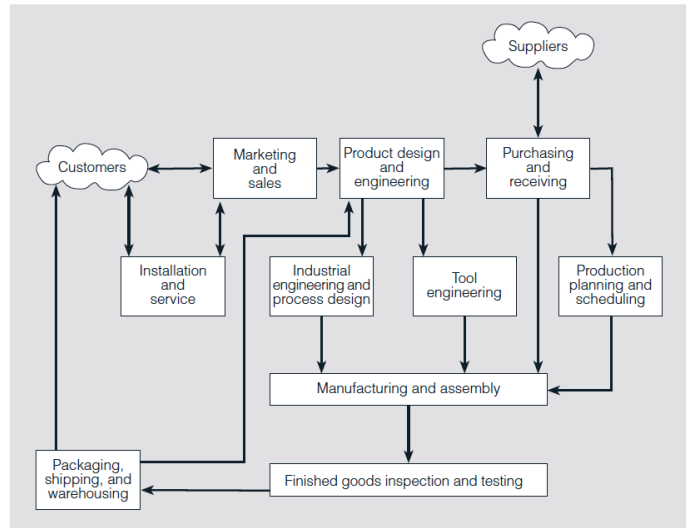
Growth of Modern Quality Management



Contemporary Influences on Quality

- Global Responsibility
- Consumer Awareness
- Globalization
- Increasing Rate of Change
- Workforce of the Future
- Aging Population
- Twenty-first Century Quality
- Innovation

FIGURE 1.2
Functional Relationships in a Typical
Manufacturing System



Quality in Marketing

Marketing and sales personnel are responsible for determining the needs and expectations of consumers.

Quality in Product Design

Product design and engineering functions develop technical specifications for products and production processes to meet the requirements determined by the marketing function.

Quality in Purchasing

A purchasing agent should not simply be responsible for low-cost procurement, but should maintain a clear focus on the quality of purchased goods and materials.

Quality in Production Planning & Scheduling

Poor quality often results from time pressures caused by insufficient planning and scheduling.

Quality in Manufacturing and Assembly

Both technology and people are essential to high-quality manufacturing.

Quality in Process Design

Manufacturing processes must be capable of producing output that meets specifications consistently.

Quality in Finished Goods Inspection and Testing

The purposes of final product inspection are to judge the quality of manufacturing, to discover and help to resolve production problems that may arise, and to ensure that no defective items reach the customer.

Quality in Installation and Service

Service after the sale is one of the most important factors in establishing customer perception of quality and customer loyalty.

Quality in Services

- *Service* is defined as “any primary or complementary activity that does not directly produce a physical product – that is, the non-goods part of the transaction between buyer (customer) and seller (provider).”

Some features of Service Quality studies

1. The process can be, and often is, more relevant or felt more important than the product
2. A defect or defective is often more noticed (and seems more critical) than a “good” outcome
3. Level of quality tends to be measured and compared via a negative scale (e.g. *dpmo* instead of yield; complaints about service received tend to be more attention-catching than compliments)
4. What constitutes a defect or defective could be very subjective

Some features of Service Quality studies

5. An instance of service tends to have to be highly customized (vs. standardization or mass production in manufacturing)
6. Specification limits or tolerances not only tend to be subjective or impossible, it could also be location-dependent and time-varying
7. Standardization, calibration and benchmarking could be inadequate, difficult, or impossible
8. Delays are common in the recognition of defects or defectives

Some features of Service Quality studies

- 9. Service quality relates much more with information flow and utilization than what many traditional quality practitioners are used to
- 10. Available information tends to be qualitative (i.e. discrete or attribute data) rather than quantitative (i.e. continuous or measured data)
- 11. Service systems do not lend themselves readily to data-intensive methodologies such as Six Sigma
- 12. System boundary could be difficult to draw in a study; noise is usually large and, by definition, not controllable

Some features of Service Quality studies

- 13. The role of raw material is usually low
- 14. Inventorization, i.e. accumulation of services, is normally not possible
- 15. Customers themselves could be voluntarily or involuntarily involved in the way service is generated
- 16. Cultural factors, values and ethics could be involved in judgments