Quality and Innovation in the Digital Era

by

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Founding Members of IAQ - 1966

Val A. Feigenbaum  Kaoru Ishikawa  Walter Masing

Focus was for efficient use of resources to support human life.
International Academy for Quality (IAQ)

"A community of the world's leading executives, practitioners and academics dedicated to promoting the cause of quality."

131 members – 91 active
From 45 countries
The IAQ Way: Quality for Humanity

“By our mutual contributions IAQ advances quality throughout the world for the benefit of humanity, pursuing excellence through professionalism based on uncompromising fundamental values of respect for individual, integrity in thought and action and compassion for all living beings.”
Century of Quality? Whither Quality?

- Innovation
- Break-through
- Environment
- Conservation
- Sustainability
- Lean
- Productive

Ecosystem
Important Driving Forces

➢ Globalization
➢ Digitalization
➢ World-wide Competition
➢ Quality for Competitiveness
➢ Innovation as a Key Process
Future Development

The technology landscape is richer and more promising than even before.
The digital transformation is leading us toward connected intelligent automation: smart, hyperconnected agents deployed in environments where humans and machines cooperate – and average data – to achieve shared goals.
How did we arrive in this circumstance?

- **First Industrial Revolution:**
  Humans harnessing water and steam power (1784)

- **Second Industrial Revolution:**
  Mass production based on electric energy (1870)

- **Third Industrial Revolution:**
  Introduction of electronics and IT (information technology) to further automatization of the production lines (1969)

- **Fourth Industrial Revolution:**
  Integrating the cyber-physical mechanisms of working (our days)

  **Industry 4.0** ....

  .... creating a smart “Factory of the Future”
What will be the factory of the future?

“The factory of the future will have only two employees, a man and a dog.”

“The man will be there to feed the dog.”

“The dog will be there to keep the man from touching the equipment.”

~ Warren Bennis
Changes by the Fourth Industrial Revolution

- Production and availability of information
- Connectivity (Internet)
- Intelligent processing
- New modes of interaction
- New modes of production
Quality 4.0 is the name given to the pursuit of performance excellence during the time of potentially disruptive digital transformation. It comes from Industry 4.0 – a term coined at Hannover Fair in 2011 to describe the fourth industrial revolution.
Quality 4.0

The Fourth Industrial Revolution brought about new tools and technologies to improve quality and to develop innovation.
Quality 4.0 Tools

- Artificial intelligence
- Bid Data
- Blockchain
- Deep learning
- Enabling technologies
- Machine learning
- Data science
Route of Creation of Knowledge

Fact → Data → Information → Knowledge → Wisdom

Knowledge Triangle

(wisdom)

(knowledge)

(information)

(data)

(fact)
Concluding Remarks

➢ In the intelligent digital transformation society of the 4th industrial revolution, the concept of quality, quality management and innovation should be changed.

➢ The era of the 4th industrial revolution will be characterized by intelligence, software and data, and their quality will be the major issue in the future society.

➢ The best way to predict the future is to create it. (Peter Drucker)

➢ To create something, we need 3C’s (Change, Challenge and Cooperate)
Economic growth is only possible when innovations constantly surface, and that the market adapts. A company can hardly survive without innovations that produce profit. Anyone who undertakes the path to excellence should be in front, has to overtake others, must achieve a leap forward. One can only reach the top through major changes, through major innovation in high quality.
All innovations start with a consumer insight

What is an insight?
A focused understanding of unfulfilled needs, problems, wants or desires

Watch
Listen
Ask
Two different types of consumers

I think all products do the same basic task. Price is most important.

Mass

Price is important, but I pay a premium for a product with features that meet my needs and a brand I prefer.

Premium
1. Demands analysis  
   *(demand exploration, market segments)*

2. Basic research  
   *(new concepts and scientific principles)*

3. Applied research  
   *(materials with new composition)*

4. Product development  
   *(competitive product)*

5. Prototype  
   *(model, specimen)*

6. Manufacture planning  
   *(system plans)*

7. Investment  
   *(conditions to manufacture)*

8. 0 series  
   *(trial production)*

9. Manufacture arrangements  
   *(business organization)*

10. Productive manufacture, market preparation  
    *(marketing)*

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**Innovation processes**
On the Other Hand

Successful innovation brings large success in the future. It gives some guarantees for any customer of dealer on the new markets. Old products or services have restricted time for real life. New products, new process, new technologies are inevitable. It is a key condition for long time competitiveness. This process can be performed on the basis of ISO 9004.
On the Other Hand

In traditional style of management innovations and quality are „Enemies”. If the quality tries to stable of the process, then innovations try disturbing a stabile situation.

But for market we need both.
Harmony - Is The Key Word

➢ But innovation create many times huge troubles for the stable quality.

➢ What can we doing in such a situation?
Harmony - Is The Key Word

➢ Management usually deals with a mass of contradictions.
➢ Relationships between quality and innovations are a very typical example of such kind.
➢ Lessons learned from the past
Improvement as Innovation

➢ The better improvement we implement, the deeper turbulence we have.
➢ But improvement is just a kind of innovations.
➢ Improvement and Innovation together – Path to Excellence
Quality Management and Innovation

➢ We need a bridge between QM and innovation, but not confrontation or fighting between them.

➢ We need a deep harmony between QM and innovation.

➢ How can we achieve the required harmony?
A competitive Company combines Quality Management, Continuous Development and Innovation
Kaizen

Kaizen in Gemba
Continuous improvement – the shorter way to development and implementation of smaller innovation steps.
Continuous Improvement

- Small Steps
- Project by Project
- Everybody involved
- No or low Investments
- Continuous
Improvement through Innovation

- Big Improvements
- Management controlled
- Not everybody involved
- Investments necessary
- Not continuous
Success Factor for Innovation Number 1: People

Most important success factor:

- their knowledge
- their know-how
- their creativity

People must want changes and not persist in existing situation.

Creative people who welcome change are convinced of their ideas and are often individualists who do not care for work in project teams.
Success Factor for Innovation Number 2: Leadership

➢ Motivation and guidance of staff
➢ Selection of the best solution
➢ Timely decisions in the innovation process
➢ Managing the implementation in high quality
Success Factor for Innovation Number 3: Culture of Innovation

- Communication
- Transparency
- Failure tolerance
- Willingness to take risks
- Willingness for ongoing learning
- Wanting to change
- Environment that calls for enthusiasm, fun and happiness in work
Success Factor for Innovation Number 4: Company Strategy

- Conditions between which the innovation process runs (otherwise maybe chaos)
- Optimisation between steps of large and small changes Revolution / Re-engineering or Evolution / Continuous improvement
- Strategy should determine how the quality capability of the company will be developed.
Success Factor for Innovation Number 5: Organisation

➢ The innovation process can take different forms depending on size, branch, environment and complexity of the innovation process.

➢ Sources of innovation:
  • ideas and inventions
  • technological possibilities
  • requirements of customers, partners and society

➢ Benchmarking and research
Continuous Improvement or Kaizen - Fundament for Harmony

➢ Quality Management Standards ISO 9001 and 9004 include the principle of continuous improvement as important requirement of quality management system.

➢ At the same time continuous improvement or Kaizen is in practices first step to innovation.

➢ In this case quality and innovation works together.
Tools for Innovations

➢ QFD
➢ FMEA
➢ Taguchi Approach
➢ Seven New Quality Tools
➢ Breakthrough
➢ Digitalization
➢ Big Data Processing
New Moment – Relationship between Innovations and Sustainability

➢ Eco-design now create the new motive for innovations.

➢ New criteria for development of products and processes.

➢ It leads to principal another products and processes with different features and with new competitiveness.
Knowledge is the Goal of a Business and the Sense of It

- Search of knowledge is a way to innovation and a way to quality too.
- If two ways coincide we have the harmony.
- Quality 4.0 in the digital era is a big possibility also for innovation.
Thank you very much.