June 21, 2011 (Tuesday) 55th EOQ Congress

CONCURRENT SESSIONS **Tuesday 13:30 – 17:30**
KEMPINSKI HOTEL CORVINUS **Erzsébet tér 7-8, Budapest V.**

REGINA BALLROOM I.

10.1. INNOVATION AND QUALITY I.

Session Chair: ***Robert E. Cole****, Doshisha Business School, Japan and University of California, Berkeley, USA*

14.30 Quality Chicken or Innovation Egg?
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Bluvband, Zigmund (Israel), Member of the International Academy for Quality (IAQ)

Zigmund Bluvband is the President of ALD Ltd. His PhD (1974) was in Technical Sciences. He is a Fellow of ASQ and is an ASQ–Certified Reliability Engineer, Quality Engineer, Quality Manager and Certified Six Sigma Black Belt. He has accumulated more than 30 years of industrial and academic experience. He was the President of the Israel Society for Quality (1989 – 1994). He has published more than 70 papers and tutorials, ten patents and four books.

In 2006 Dr. Zigmund Bluvband has been honored with the IEEE Advancing Technology for Humanity Reliability Society Lifetime Achievement Award. In 2009 Dr. Z. Bluvband was elected as an IAQ (International Academy for Quality) Academician.

Quality Chicken or Innovation Egg?

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Summary.

The paper is dealing with two concepts: Innovation and Quality. Those two notions are well known, much desired, but to most of us they look like just mutually exclusive alternatives.
The paper shows the unity and struggle of these two sides of a profitable organization, and discusses the fundamental rules for achieving their balance driving to business sustainability and success. In conclusion, the QIQI cycle is introduced.
It seems that finally the ***Quality is primary!***
What Quality? Quality of the main processes in an organization, especially ***Quality*** *of the Decision Making and the Change Process Management - this Quality is the* ***primary condition for success***.
But *to achieve such a Quality of the Process you have to…*

Innovate an existing one.

Introduction.

Quality and Innovation: Let's start from the definitions.

Quality. One of well known and acceptable definitions of Quality, which helps us to analyze the stated problem, is that Quality mainly is a Composite of tree characteristics (factors) of the built-up Product[1]:

- Uniformity
- Dependability
- Suitability to the market

Considering the above,
the more uniform, unvarying, consistent and identical are the outputs of our activities (minimal piece-to-piece and time-to-time variability) the more Quality we have.
Is Innovation meets this requirement?

Innovation. Innovation is a successful exploitation of new ideas; introduction of changes that are significant departures from the usual and standard way of doing things, or transformation of an idea into a novel product, operational process or new service [2].
Innovation is an introduction and implementation of something different.
Speaking the Innovation language is always speaking about changes, about the ability to get a diverse outcome, not the usual , not the standardized one! It looks like being totally opposite to the Uniformity…
The only way to Innovation is to go through new ideas, bringing proposals, planning and designing experiments, and finally getting the desired effect by conducting the experimentation and trials, i.e. "trial and errors" (sorry to say, mostly - errors…).
But errors are what Quality assurance is challenging to avoid!
The reasonable conclusion from the above is:
"the more quality the more stability and fewer innovations"…
From another side, everyone knows that no one can get the superior Quality without improvements – small or big ones, i.e. without "good" changes!

Consequently, “What is coming first: Quality or Innovation?” is a typical “chicken and eggs” question.
Moreover, taking in account our never ending Shriving for Quality, the most intricate and intriguing question is: ***“Whether on not the Quality chicken brings the Innovation Eggs”?***

The Innovation faces.

Let’s see a blogged Innovation definition, using the British Standard BS 7000 [2]:

Innovation

<*ideas*>
successful exploitation of new ideas

<*process*>
introduction of changes that are significant departures from the usual way of doing things

<*product*>
transformation of an idea into a novel product, operational process or new service

<*techniques, materials*>
employment of design or construction techniques, or materials, that do not have a proven history of performance or are not covered by an organization’s current practice

Taking into account the above thorough descriptions one can distinguish at least tree different possible faces of an **Innovation** - “**3I**s” (“I + I + I”):

1. **Improvement**
2. **Invention**
3. **Interruption**

Let’s understand the common and the unique features of the above partition.
The common of all tree faces is that all of them are Innovations, i.e. successful utilization of new Initiatives (one can see that most of the Innovation-related words are beginning with “I” – symbolically hinting that this is in all and every one of us: to **I**nitiate the **I**nnovation!).
Along with that, every one of the above tree faces have different level of deepness, level of surprise and suddenness, amplitude and wideness of application into an organization. Let’s analyze them:

1. **The first face is “Improvement”.**
Improvement is an evolutionary change or upgrading one or more features in the product or process.
Improvement is an incremental innovation, change that involves one or more relatively minor innovations that are predictable extrapolations from the present state [3].

For example, “reduction of the waiting time in a line: from 10 minutes down to 5 minutes” is an improvement statement.
A typical tool to such an improvement methodology is DMAIC – Define, Measure, Analyze, Improve, and Control [1].
This is a “Six Sigma” framework for the “disciplined engineering” approach keeping the improvement engineering task on track and closely controlled, with well defined roadmap and analytical tools incorporated. Although the engineering is a “free” profession, the DMAIC framework dictates certain behavior and brings to us the high-quality solutions and the best results.
Another improvement type, actually connected to a new service, and related to the intangibles, is dealing not with upgrade of a measurable metrics (like a waiting time), but with the

product/process by creating a better feelings of people in the process.

For example, at one of the airports in China, staying and waiting in the line, I observed an indication: “from this point you will wait approximately 5 minutes”, see Fig.1.

This innovation is relatively simple but very important, especially today, when all of us are involved in the tedious and time-consuming lines, many-many check-ins and checkouts…

Fig.1. Announcement in the line “5 minutes from here”

2. **The second face is “Invention”.**

Invention is a sharp progression to a new advanced product/process type yet unexpected before, which belongs to a new generation, i.e. new technological solution but within same product/process category.

In accordance with the source [3] definition, this is the *breakthrough innovation*, i.e. a change that breaches a previously perceived limit in configuration, performance or technology.

Let’s see an example with the well known “wet napkin” usually you get from a steward (flight attendant) before landing, see Fig. 2.

Fig. 2. Wet napkin in flight

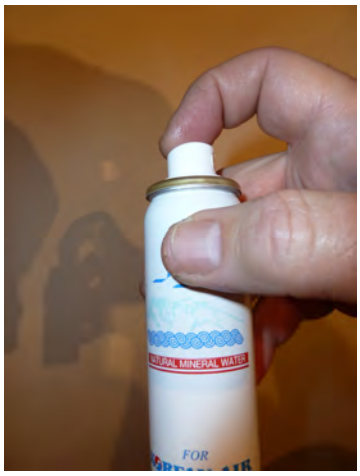


Fig. 3. Natural mineral water spray

Using the Kano terminology [5,6], the Natural mineral water spray was an Exciter for the passengers!

Exciter - at the time of writing this paper…The problem is that as the time is running, people will be more and more familiar with the product, will require it, and then (maybe at period of the paper presentation) will expect it, i.e. the spray will become to be “Must Have”, like an airbag in a car.

3. **The third face is “Interruption”.**

Interruption relates to “Emergency Stop” and concerns rethinking your way and then drastic breaking of almost all existing psychological and rational boarders across the organization to prevent the upcoming crash (crash will break everything as well, but including your business back). This includes a radical change of the organizational approach to the product or process nature, often named “reengineering” [4] which requires the out-of-box thinking toward a totally different solution type for same or distinct market share.

For example, the Telegraph (Telex) products development / manufacture / services organizations.

Telex is an international telegraphic message-transfer service consisting of a network of Teleprompters connected by a system of switched exchanges. Subscribers to a telex service can **exchange textual communications** and data directly and securely with one another. Communication is opened by entering the assigned call number of the destination subscriber [3].

Telegraph grew around the world even more rapidly then automatic telephony, supported by large networks of Telex on wire and radio communication lines.

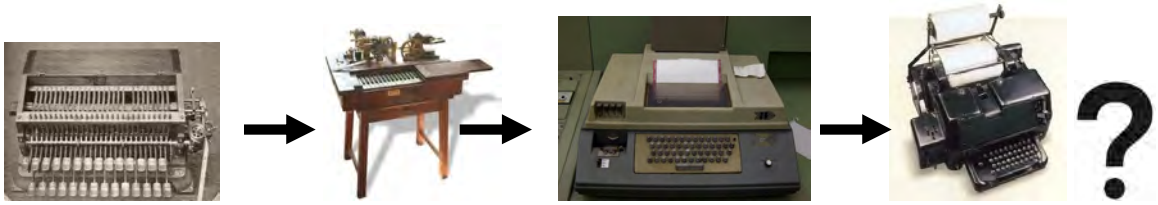
Following are presented a few improvements and intentional historical steps - just for illustration of the **Quality improvement**

framework of Telex enhancements and perfection during number of decades in the last century:

- Error-correcting codes instead of the initially invented Morse code
- Retransmitting time division multiplexers
- Using wireless Radio transmission
- Establishing of global network of International Telegram (commonly called Cablegram)
- Developing a Teletypewriter Exchange Service, or TWX with 75 bps, Baudot code and dial selection
- Four-row TWX used 11-bit characters to provide an expanded code set including "control characters" that permitted the TWX machine to be operated much like an office typewriter
- Incorporation of Electronics and eliminating of the moving parts – maybe except the print heads.
- Introducing advanced Computer programming to facilitate the man-machine interface, high speed and reliability of the data communication.
- Incorporation of the integrated circuits for coding, transmission, reception and decoding.
- Etc., etc., etc. improvements of the Telex services and technology…

Nevertheless, because the Telex service itself is dealing with TEXT communications, one can improve, and improve, and improve the **text** communication (accuracy, timing, usability, dependability, quality, etc.), this type of communication is already more than 20 years under threat from the widespread use of FAX, and the TELEX improvements will not help to sell

the product and service: its destiny is “Dead end”, no meter how brilliantly one can improve the printed text transfer! (And the FAX in his turn is under continually growing threat of the e-mail…)



What next?

No room for just improvement of the Telex. Dead end: no one needs Telex. New itinerary should be accepted: Fax!

Fig. 5. Quality Improvements in the world of Telegraph and TELEX interrupted by FAX

Another example is KODAK: they will better not go to improve the Quality of the Camera films - in the nowadays world, where almost 100% of cameras are electronic ones – no one needs 35mm Color Film Roll!

Today you need just a memory stick or/and a hard drive.

From the above, one can understand that the Quality improvement and Innovation are **two sides of the same coin,** they don’t exist one without other.

Quality as an engine for Innovation

Successful business combine the need for improvement in all tree Quality components (from the above mentioned definition, just sometimes the order or importance is different) with constant call for Innovation.
Let's see how the Innovation is important for every one of the Quality components.

1. **Uniformity**

This feature is extremely important at stage when the market wants the product; the manufacturer is trying to achieve more cost-effective repeatability and reuse for both short and long time period, i.e.

- Within (Short Term Uniformity) and
- Between the production batches (Long Term Uniformity).

At this stage of the life of the Product and Organization the Innovations are related to better control, improved materials, healthier partnership with the suppliers, shortening times, manufacturing process small changes for improvement, supply chain optimization - those are the subjects of innovations in the existing product and process framework.
As an Innovation, for example, may be considered Introduction of new control charts, Quality cost tracking, Cost reduction, etc.

2. **Dependability**

Dependability has two faces too:

- Producer dependability (promises, obligations, deliveries, etc.) and

- Product dependability (Reliability, Maintainability, Safety, and Logistics)

Producer Dependability is a consequence of a supply chain optimization, professional surveys of the suppliers and critical reviews of the contracts, etc. The Main business processes as well as the Managerial and Supporting processes should be analyzed periodically and their critical factors continuously measured, traced and improved.

Product Dependability is an ability of the Product to operate in accordance with their Intended inherent Features without Failures during stated Time period and under stated Conditions.
Every supplier in striving to supply the product with High Dependability along with the high customer satisfaction!
"High Dependability" with "High Satisfaction" brings us to an "**Excellent Product**".
"High Dependability" along with "Low customer Satisfaction" brings us to a product we call the "**Perpetual Junk**"…

D \ S	High **S**atisfaction	Low **S**atisfaction
Low **D**ependability	*One-shot*	*Bad*
High **D**ependability	*Excellent*	*Perpetual Junk*

Here we have to look for an Innovation that fits our request for Suitability to the market.

3. Suitability to the market

Reaching the Higher Suitability to the market has also two faces:

- "**ConSA**" – **Consistent Advancement** (**Ordinary)** – Small changes for Suitability (i.e. **Upgrade:** Change of Parameters, Values, minor additional Features, etc.) and
- "**ConFA**" – **Conflicting Advancement** (**Extraordinary)** – Large changes for Suitability (i.e. **Exchange**: Different inputs-outputs, New Technology, New media and Way of operation, Construction, etc.)

ConSA requires just upgrading of the existing product, so belongs to first two faces of Innovation (Improvement and Invention), although Invention in this case is dealing with small modifications of the product. A suitable example for such a kind of Invention is Photo Camera with better resolution inside the cellular phone.

Nevertheless, the cellular phone that came instead of portable home line phone belongs to the **ConFA** because here we are second and third faces of an Innovation: Invention and Interruption (Interruption - of the previous product type at all), see the table below.

	Improvement	Invention	Interruption
ConSA	Consistent Improvement Ordinary Upgrade	Consistent Invention Ordinary Upgrade	
ConFA		Conflicting Invention Extraordinary Exchange	Conflicting Improvement Extraordinary Exchange

<u>The QIQI cycle.</u>

To be able to combine the High level of Customer Satisfaction (Quality) and ability to follow the Customer's changing needs, the

Organization should have the **High Organizational Quality** (developed and implemented) for tree main Processes:

- Product change Management
- Process change Management
- Technology change Management,

supporting the QIQI Cycle (**Quality – Innovation – Quality – Innovation Cycle,** See. Fig.6).

Then for the question: Quality Chicken or Innovation Egg?" the answer is:

Quality first – but… the **Quality of Change Management!**

Based on it one can provide the ability of "**Keeping finger on the pulse**" and **Timely require** and **implement** the **Innovation –** (**ConSA** or **ConFA** respectively)
to bring the high level of Quality to the Process and as a result - to the final Product followed by High Customer Satisfaction.

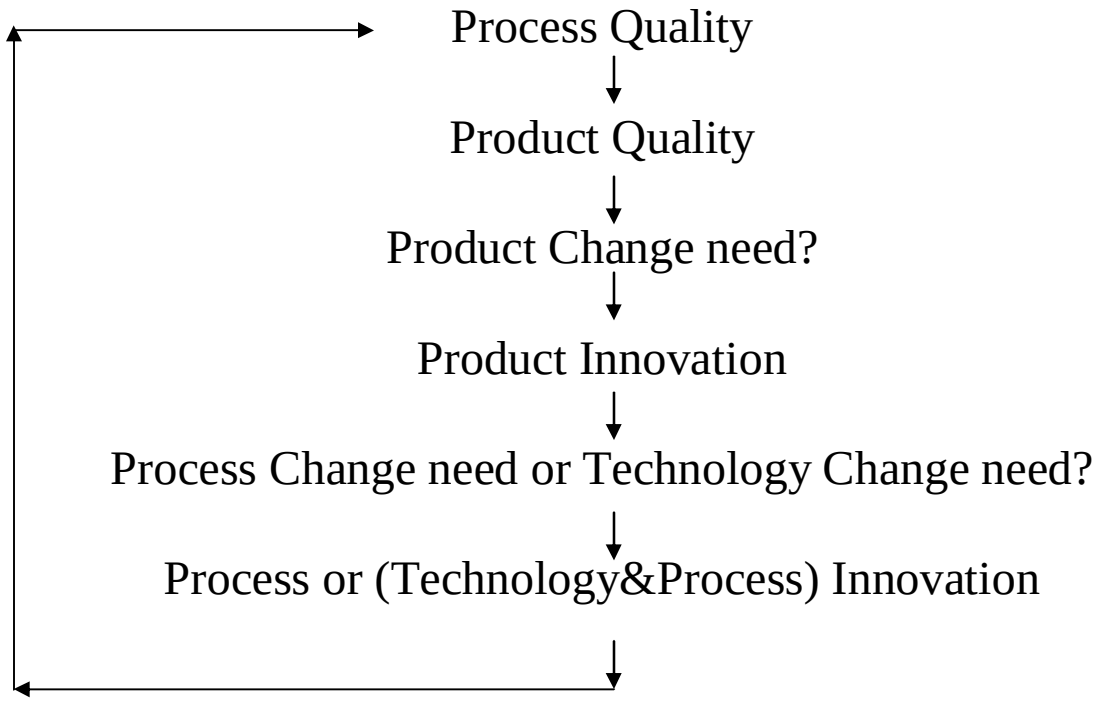


Fig.6. The **QIQI Cycle**

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