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# Innovation and Quality

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**Abstract.** This is not a theoretical or applied paper, but with appropriate relevant discussion about the influence of progress in the fields of quality and innovation. These two important achievements of human intelligence can not certainly be fully accepted as wonders in service of humanity, as well as for the issue of sustainability. At the end of the discussion, it is placed by the authors the challenge of creating. The discussion is enriched writer the presentation of existence of case in where the presence of innovation may not lead to the dared results an indicator for quality of innovation.

**Keywords:** Sustainability · Quality of life · Quality of innovation · Pros and cons

## 1 Introduction

There is no question on the importance of quality of products, services and processes, as also is not in discussion the importance of innovation to improve the quality of life in society. However, the undeniable importance of these achievements of human intelligence can not be accepted without a minimum of discussion, for what a vast early observation of present reality gives abundant material.

Subsidy to this discussion is the purpose of this article which focuses not on technical issues, related to quality and innovation, but on those linked to their social and human surroundings.

In the text, are avoided existing discussions contributing on the concept and the achievement of quality, as, for example, the well known five approaches to quality: transcendental, based on the product, based on the user, based on the process, and based on the value, as proposed in [1].

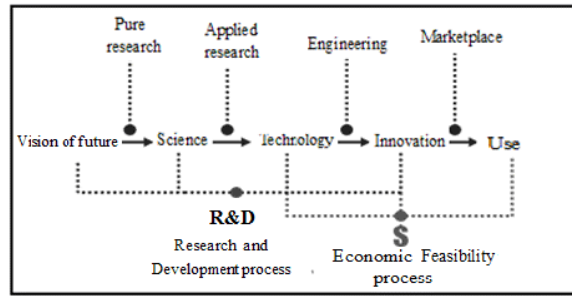
These visions of quality, however, are eminently technical and do not consider ethical, social and human aspects. Another definition, of interest to this present discussion, dared in his master work by a graduate student at the Polytechnic School of São Paulo University named Fabio Cerquilho, under guidance by one of the authors of this article, is: Quality is the sum of all the characteristics and properties of the goods and services offered to meet the reasonable needs of customers, along with the set of situations involved in the obtenance and use of these products that promote a healthy and truly human existence to all that are affected [2].

For innovation there are certainly, among others, the following definitions: Technological innovation is defined as the implementation of new or substantially improved products (goods or services) or processes. The implementation of innovation occurs when the product is accepted by the market or the process is operated by the company [3].

Technological Innovation in Products and Processes (TIPP) is understood by the implementations of technologically new products and processes and significant technological improvements in products and processes. A TIPP is considered implemented if it has been introduced in the market (product innovation) or used in the production process (process innovation). A TIPP involves a series of scientific, technological, organizational, financial and commercial activities [4]. To [5], innovation is idea more action more results.

The first two definitions emphasize the use of technology, but this feature, while important, is not a necessary condition for the existence of innovation. The condition actually necessary is to add value to its use. Many inventions are not innovations for this reason.

Technological innovation is, as a rule, the result of an extensive process, as illustrated in Figure 1.



**Fig. 1.** The innovation process (Source: [6])

**Pure research** (or basic, or fundamental) is the research conducted with the aim of enhancing scientific knowledge, without looking for the possibility of practical applications.

**Applied research** is the search for new scientific knowledge or not, that offer solutions to objective problems, previously defined.

**Science** is the organized body of knowledge concerning the objective universe, involving its natural, environmental and behavioral-phenomena.

**Technology** is the ordered set of all scientific knowledge, empirical or intuitive, employees in the production and commerce of goods or services.

Innovations have undoubtedly brought great contribution to the progress of mankind, but can also bring undesirable consequences. Indeed:

**Innovation can bring:** Competitive advantage; More knowledge / technology; More recreational possibilities; More health and safety; Better use of time; and Better quality of life.

**Innovation may bring:** Isolation of people; Technological dependence; False illusion of status; Culture vulgarization; Excessive specialization; Worse quality of life.

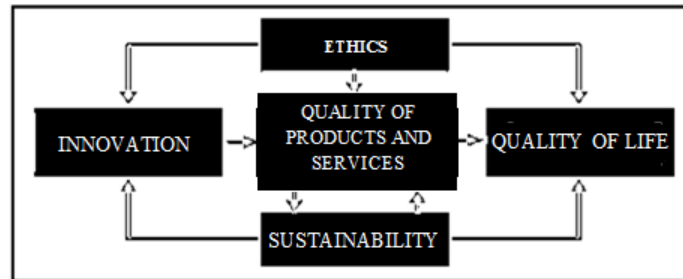
These considerations suggest thinking innovation in its overall abrangence, as made Fabio Cerquinho with his definition of quality.

So does the Brazilian National Quality Foundation, which has innovation among the basements for excellence in management, but requiring for it the promotion of an environment of creativity, experimentation and implementation of new ideas capable of generating growing earnings of competitiveness with sustainable development [7].

By the way, according to Gro Harlem Brundtland, former prime minister of Norway, "Sustainable development is one that meets the needs of the present without compromising the ability of future generations to meet their own needs" [4].

## 2 Innovation Classifications

The main objective in seeking quality and innovation is to promote quality of live for people in the society. This truism is represented in Figure 2. Given the precariousness of the world situation in the search for global sustainability, which will not be discussed in this work, this figure also serves as a background for those who aim a true and permanent quality of life in the world.



**Fig. 2.** Ingredients of Quality of Life

### 2.1 Classification Based in Knowledge

- Technological
- Organizational

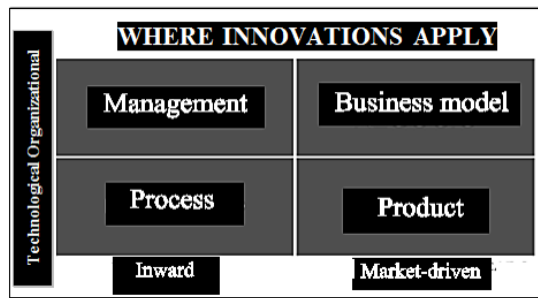
Examples of organizational innovations:

- Use of appropriate technologies
- Cargo containers
- Urban transportation by buses in Curitiba and Bogota cities
- Restaurants per kilo
- In soccer, restriction to the goalkeeper in retracted balls

## 2.2 Classification Based in Focus

- Generated inside (inward)
- Generated for the market (market - driven)

The intersection of these two classifications points to where innovations apply, as shown in Figure 3.



**Fig. 3.** Incidence of innovations (Source: Adapted from [5])

## 2.3 Classification Based in the Degree of Novelty

- Incremental: produces continuous improvement
- Radical: produces improvement jump

Incremental al innovations consist of small successive improvements with the objective of continuous improvement of performance. The cumulative result of a continuous series of small ideas can in many cases be greater than that of a single radical innovation [8]. This statement suggests a new vision for the process of improvement, as shown in Figure 5.

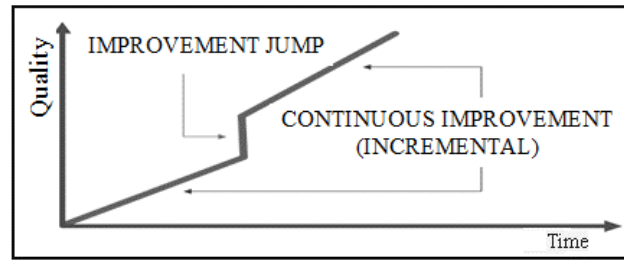


Fig. 4. The improvement process (Source: [6])

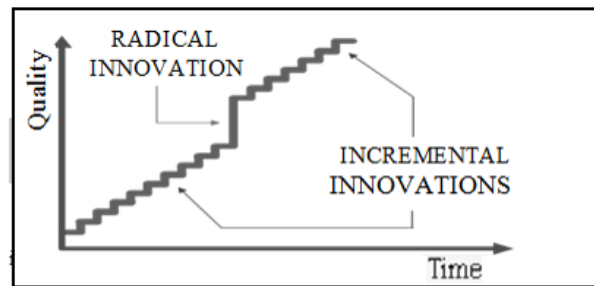


Fig. 5. Alternative view of the improvement process

### 3 Food for Thought

Innovation is the source of great opportunities in the twenty-first century. Right? Of course, but let's look at Figure 6.

However, nothing against innovation. To paraphrase the words of the great Portuguese poet Fernando Pessoa ("Sailing is necessary"), to innovate is necessary!

But perhaps it is also necessary to work the concept of innovation quality, in a similar way of Fabio Cerquinho's definition of quality. Therefore, it is suggested the creation of an indicator called Innovation Quality – IQ, which:

- It is a measure of the benefits or harms that innovation brings to individuals and society;
- It is proposed for this measure a range between -1 and +1.

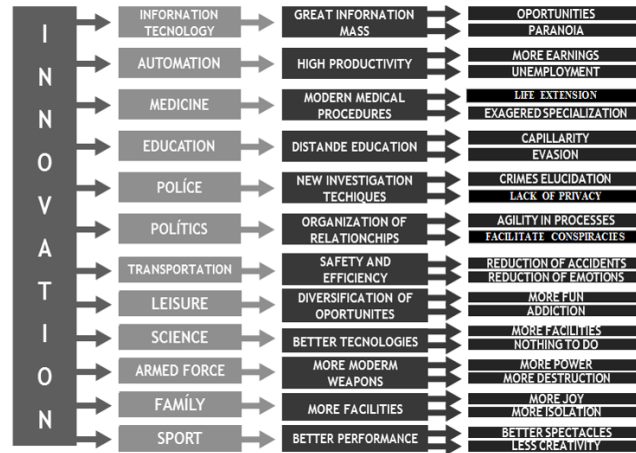
This leads to a new classification for innovation:

- With  $IQ > 0$
- With  $IQ \leq 0$

Theorem 1: The IQ value is a function of the time of use of the innovation.

Theorem 2: The time value of IQ depends on the long term planning of the use of the innovation.

Factors affecting IQ:



**Fig. 6.** Pros and cons of innovation

- Level of use of innovation
- Market amplitude
- User satisfaction
- Ethical aspects
- Contribution to sustainability
- Easy to use
- Real provided advantage

Exercise: Establish a IQ value for the following innovations:

- Car
- Zeppelin
- Atomic bomb
- Television
- Computer
- Telemarketing

It is launched the challenge to researchers!

## 4 Conclusion

The present article seeks to call attention to the negative aspects that may arise from the indiscriminate and widespread use of innovations without regard to their actual interest in improving quality of life of society.

The challenge of building an indicator for the real benefits or harms of innovation is placed. The authors are ready to discuss it with the interested parties.

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