Preface – invited paper

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Biographical notes: Quirico Semeraro is a Full Professor of the area manufacturing and production systems and teaches design of experiment for manufacturing and industrial quality management and control at Politecnico di Milano where he actually serves as Dean of Faculty of Ingegneria Industriale. Between 1988 and 1994, he has been Scientific Secretary and member of the Steering Committee of the National Research Council of Italy (CNR) in the area of engineering and architectural sciences. Between 2001 and 2005, he has been President of The Italian Association of Manufacturing Engineers (AITEM). His research interest are in the field of quality management and production system design and control where he published more than 150 papers. Eventually, he is scientific consultant of several public and private organization for the evaluation of industrial research proposals.

Nowadays, Quality is more and more often invoked as one of the recipes required to compete with emerging countries such as China and India. A certain similarity can be found in recent history, precisely in the reaction of US manufacturers to Japanese success in the latter half of the 20th century. In order to hold back Japanese competitiveness, the USA, firstly, adopted a strategy aimed at reducing imports and production costs, a solution sometimes also suggested in the actual competing scenario. These actions, unfortunately, did not create the desired effects, reducing US competitiveness in quality. By the end of the 1970s, the quality crisis in the USA reached major proportions and quality competition began to merge with price competition. The reaction delay, however, caused important and long-lasting loss in the world automotive and electronic markets.

Although many differences can be found between the actual and the past competing scenario, the lesson learnt should be helpful in the actual context, too.

In the last decades, attention devoted by some companies to Quality often resulted in some 'cosmetic' actions aimed at satisfying just standard (ISO 9000) requirements, without causing an in-depth analysis of organisational procedures and appropriate adoption of quality tools in production processes.

For instance, many certified companies do not adopt any control chart or barely go beyond the standard $\bar{X}$ –R chart. Although this type of control chart could be very effective, (its simplicity was an essential requirement at the time of the birth, the 1930s, where automated inspection and computerised data analysis were just mirages), the actual situation is quite different (for example, let us consider the spreading of automatic

measurement systems) and complexity related with enhanced techniques presented in the literature should not be seen as an obstacle to their adoption in industrial practice. Probably, researchers should better investigate the reasons of these obstacles.

A similar gap between industrial practices and approaches proposed in the literature can also be observed in the field of quality improvement.

In this case, newly developed methods are proposed by applied statistic researchers, while industrial engineers, who should properly merge their industrial knowledge with information coming from empirical models, often pay slight attention to opportunities offered by newly developed techniques for empirical model building. Why?

Despite the specific objective, quality control and/or improvement, the effectiveness of the implemented actions can be strongly undermined by the reliability of the analysed data. This is why a renewed attention has been recently devoted to assure and control the measurement system quality. With reference to production processes, as outlined in the Six Sigma approach, repeatability and reproducibility are basic requirements for the measurement system. Furthermore, the advent of automatic measurement systems can also suggest the effective use of online software tools for monitoring measurement system performance.

The role played by the measurement technology becomes even more crucial as we move away from the shopfloor level to the whole organisational level or to the service companies. In fact, if at the shopfloor level, Quality can still be interpreted as conformance with functional property requirements of manufactured items, when it refers to services or to the whole organisation, the metrics assumes a relevant role and the real problem becomes what has to be measured and how it should be measured.

Criteria for Performance Excellence of the Malcolm Baldrige National Quality Award Criteria stresses the role of non-financial measurements such as customer satisfaction, process excellence and employees' satisfaction. These types of performances should be used together with traditional accounting measures (return on capital employed, profit, market share, *etc.*) to assess, track and drive organisational success. Intangible aspects related with satisfaction are even more crucial when service quality is of interest.

The actual challenge is in designing new approaches to measure, control and improve quality in a wider framework in which intangible aspects play a relevant role. In fact, something that is not measured can be hardly controlled and improved. By accepting this challenge, organisations may enhance their quality competitiveness and positively affect their future.