
Editorial

Michele Dassisti

Dipartimento di Ingegneria Meccanica e Gestionale
Politecnico di Bari
Viale Japigia, 182–70126, Bari, Italy
Fax: +39 080 596.2788/2766
E-mail: m.dassisti@poliba.it

Biographical notes: Michele Dassisti is Professor at the Engineering Faculty of the Politecnico di Bari, Bari, Italy. Since 1987, his scientific activity has dealt with various aspects in the field of Manufacturing Systems and Technologies. In particular, his research interests concern with various advanced techniques (finite element analysis, decision-making theories, fuzzy theory, artificial intelligence techniques, advanced statistical techniques) applied to solve a number of practical industrial process improvement problems related to: the optimisation of several manufacturing technologies (in particular conventional metal cutting processes, conventional and non-conventional welding processes), the design and implementation of different methodologies for production planning and control (just-in-time, FMS), the design of distributed manufacturing systems (inter-operability and integration of manufacturing settings), and the implementation of several advanced techniques for quality management and control (integrated Quality Management Systems, acceptance quality control, technological signatures for metrology). At present, he is involved in various research activities concerning with the development of new techniques for the design of enterprise inter-operability based on Product Data Management, the implementation of advanced techniques for quality assessment and design of measurement processes. His scientific work is proved by several scientific contributions published on reviews and proceedings. He has been involved as member in a number of national research programmes; he has also been responsible for international research programmes: European project ESPRIT n. EP 28974 *Total Quality On Line* developing a Virtual Learning Environment for continuous training industrial personnel on quality topics based on advanced Information Technologies; European Project LEONARDO *Total Quality On Line European Automotive Suppliers Quality Development Network* n. EUR/98/2/05029/PI/II.1.1.c/CONT, promoting Total Quality Management culture and the use of advanced Information Technologies for training industrial personnel of the automotive sector. Project INTEROP –*Interoperability Research for Networked Enterprises Applications and Software* – FP6 – contract no. 508011 placed within the largest network of excellence of the 6th EC framework program to promote excellence research on enterprise interoperability and integration. Project INTERREG A.D.A. Programma di Iniziativa Comunitaria – Asse III – Mis. 3.2 – *Azioni positive per la Diffusione di buone prassi Ambientali in Albania* – to promote best practices on integrated quality management systems in Albania.

Quality has been one of the fundamental concepts strongly influencing several aspects of human life and operations. This fascinating concept continues to remain ambiguous. This descends probably from the fact that one can refer to *Quality* whenever a generic transaction (of any nature) takes place between two or more actors; it therefore turns to change over time, depending also on the actors themselves and the nature of transaction. This definition may give the rationale of the utmost importance and universality of the *Quality debate*, which turns out to be a general concept and more than just being a fashion or a fad. The efforts spent in the name of Quality, by using appropriate methods and tools, have always brought positive effects on economic activities all over the world, as witnessed by the vast documentation available.

In the present phase of the *Quality debate*, efforts related to Quality are quite often perceived as tied to refinement or optimisation purposes more than to creativity. There seems to be, in fact, a common belief that Quality efforts do not bring about relevant results for the wealth of enterprises. Despite the strong governmental commitment in most countries to stimulate the spread and the promotion of best practices for Quality, these efforts continue to be perceived as sufficient and not as a necessary condition for the sustainability of enterprises.

As in its title 'Innovation behind quality: the new challenge for quality methods and tools', this special issue was conceived with the aim to explode this myth and try to defend the thesis that efforts related to Quality are value-adding ones. In some sense, the thesis sustained here is that Quality is strongly related to innovation and, thus, is a prerequisite for the growth of enterprises and, finally, for the wealth of nations.

Both theoretical and practical contributions submitted have been carefully reviewed and selected coherently. The aim of the special issue is to contribute new stimuli to the *Quality debate* and provide practical suggestions for operators of the real world.

I take this occasion to deeply acknowledge first of all those anonymous referees who contributed to improve the scientific levels of the debate, providing careful reviews and suggestions to the original manuscripts. Without their precious support, the present edition would not come to light. Many thanks are also extended to all the authors who believed in this initiative and patiently contributed following all the step of the long revision process. I appreciate so much their scientific esprit and their courageous effort to the progress of the *Quality debate*. I also thank the many authors, whose work will not appear in this special issue, but who have witnessed several time a great interest in this initiative by submitting papers that, I am sure, will find the right resonance in other editorial initiatives.

Finally, I wish to thank the two invited experts, Professors Q. Semeraro and A. Jiju, who contributed their conceptual notes to provide different perspectives to the debate.

The papers are ordered in a sort of plan-do-check-act sequence, according to the concept that the famous improvement cycle can be applied also to research and innovation. The PLAN contributions (from R. McAdam, D.S. Saroso and D.N.P. Murthy) face more theoretical issues, whereas the DO contributions (from Bokov, Colosimo *et al.*, Carnimeo *et al.*, Franceschini *et al.*, P. Castagliola *et al.*) face strictly technical topics, analysing some specific tool or methodology related to Quality that can contribute to the innovation effort in the enterprise. The CHECK contributions (from A. Medina-Borja and K. Triantis, C-Y. Tseng and L-Y. Wu) treat the measurement of performances. Finally, the ACT contributions (from L-H. Lin and I-Y. Lu, C. Lin and C. Wu) give the flavour of the embodiment of the Quality and innovation concepts in real operating environments.

PLAN contributions

The paper from R. McAdam brings new theoretical ideas on the relationship between quality management and innovation management. The author explores the idea of the quality-innovation continuum to show that Quality is not in opposition to innovation. The multiple and segmented case analysis used shows how an organisation can use its quality models to achieve innovation objectives.

The paper from D.S. Saroso and D.N.P. Murthy provides an interesting decision-making conceptual framework by facing different notions of Quality from a product life cycle perspective. The discussion on the different approaches to Quality improvement provides new hints on the Quality debate. The framework presented characterises the interactions between different Quality notions and the interactions between product quality and other variables (technical, commercial, *etc.*) of a manufacturing business.

DO contributions

The paper from V. Bokov presents novel techniques for Quality improvement of mathematical models of measuring systems to extract information from experimental data. Models are widely used quality tools to understand how a real system is expected to respond to input data. The author discusses either additive or multiplicative modelling to combine information from theoretical and empirical sources and to improve the quality of information about a known type of behaviour. A practical application example provides evidence of the use of the techniques proposed and how these can support the innovation process.

The paper from B. Colosimo, F. Godio and L. Palmieri originates from a real-case application in an automotive industry, where a Shewhart control chart for individual measurements was adopted for monitoring a non-normal process. This is a typical real situation indeed, where it is necessary to understand data to drive sound decisions for improvements. The shape of the paper and the case addressed are such that information conveyed results extremely useful for problem solving in a number of practical situations, where innovation may come from a clear identification of the state of a system.

The paper from L. Carnimeo and M. Dassisti provides a contribution to increase automatic quality process control. The idea proposed consists in designing Cellular Neural Networks (CNN) to behave as associative memories for recognising unnatural behaviours of patterns recognised in control charts. This application promises to support efforts of continuous innovation, as a consequence of the learning features embedded into the neural networks adopted. Allowing the CNN to behave as associative memories for continuous monitoring and recording of critical control parameters – thus performing an appropriate statistical analysis of these – can, in fact, be viewed as a learning process.

The paper from F. Franceschini and M. Galetto presents a taxonomy of methods for online performance verification of three-axes Coordinates Measuring Machines. A general framework for the application of the analytical redundancy methods is presented with a series of very simple examples. This is one of the most advanced topics of applied research that can bring new hints in the everyday operational practice, while providing interesting suggestions for future research. Innovations in metrology open the road toward product improvement.

The paper from P. Castagliola, S. Fichera, F. Giuffrida and G. Celano proposes a modified version of the Fixed Sampling Interval (FSI) S^2 -EWMA control chart with Variable Sampling Interval, which is dedicated to the monitoring of the sample variance of a process. This new chart significantly improves the statistical efficiency of FSI S^2 -EWMA chart, thus representing an effective tool in the detection of process out-of-control conditions and guaranteeing the possibility of reducing the probability of non-conforming items. The question indirectly put in this paper is whether optimisation techniques – such as the approach proposed – might give place to innovation of processes or product. Is it a better process control to find the right path to recognise its intrinsic limits and potentialities for improvement? This question remains open to future debate and research.

CHECK contributions

The paper from A. Medina-Borja and K. Triantis provides a conceptual framework that can be used for the design and implementation of an integrated performance measurement system for non-profit organisations. This conceptual framework integrates different performance approaches presented in the literature. The framework is generic enough to be modified and includes a variety of performance dimensions for the profit and non-profit sector, thus allowing a useful support to decision-making processes in the enterprise. Performance is the lens for recognising problems and improvements direction in the enterprise. This is one of the most crucial research field where a clear solution has still not been defined.

The paper from C.Y. Tseng and L.Y. Wu addresses two major issues related to innovation quality in automobile companies:

- 1 the indicators of innovation quality
- 2 the relationship between innovation quality and firm performances.

Measuring innovation quality is so important to firms because they can know their strategic assets. As a consequence, quality measure is a relevant problem, particularly in the automotive sector which is now facing the strong challenge of globalisation. Despite being limited to US patents, the relationship found shows a positive correlation between firm performance and quality innovation, opening new routes for future research and analysis in this sector, which is one of the most representative of manufacturing activities.

ACT contributions

The study by L.H. Lin and I.Y. Lu stimulates the debate on process management implementation and product quality. It shows how these two factors affect technological innovation in Taiwan's information and electronic industry. This testimonial paper emphasises the fact that, in that region of the world and for that industrial sector, the implementation of process management promotes process innovation activity, and that product quality is positively correlated with product innovation. Findings of this study indicate also that product quality might positively influence product innovation, but not necessarily process innovation. The results presented imply that firm size positively moderates the relationship between product quality and product innovation for the sample sector analysed.

Finally, the paper from C. Lin and C. Wu gives interesting clues on organisational innovation by way of the ISO 9000 knowledge-creation process. A comprehensive ISO 9000 based knowledge-creation system framework is proposed based on existing literature. A case study illustrates the proposed framework, giving the flavour of the easiness of its implementation into the organisation to foster the creation of corporate knowledge.

As a concluding remark, either new theoretical ideas or practical applications provided in this special issue show clearly the existence of a link between Quality and innovation. Even though not providing rigorous proofs, I hope this editorial effort brought new elements to the Quality debate mentioned above, which need to be continued in the near future to contribute to the important research field on the sustainability of enterprises.