Guest editorial: Quality in the digital transformation era

Organizations have always gone through industrial transitions marked by technical and technological innovation. Such innovation has consistently allowed the pursuit of new levels of development (Popkova *et al.*, 2019). However, never before has technology had such an impact in the management of quality and performance as it has today under the digital transformation processes that entities and societies are facing.

With the emergence of Industry 4.0 and related concepts, organizations seem to be adopting a new approach to produce fast customized products and services while addressing the highest quality standards. Such efforts are taken in a highly unstable context where a growing variety of stakeholders pushes for different goals. This Special Issue aims to help define Quality 4.0 and address the challenges faced by companies when integrating their quality management (QM) efforts into the digital transformation era. It is set against a background of Industry 4.0 changes, driven by concepts such as the Internet of things (IoT), cyber-physical systems (CPS), cloud computing and robotics, digitalization, digitization, big data, artificial intelligence (AI), machine learning (ML), among others.

While the term "Digital Transformation" is often used interchangeably with that of Industry 4.0, it has been argued that technology should not be considered as its most important driver (Kane *et al.*, 2015), being only a part of the complex puzzle that must be solved for organizations to remain competitive (Vial, 2019). However, in practice this transition is still often technology-driven. It has been claimed that, in the scope of digital transformation, there has been limited innovation in the field of quality (Lee *et al.*, 2014; Shubin and Zhi, 2017). To avoid the generalist approach and promote new contributions about quality topics in the digital transformation, it is crucial to create opportunities for these topics to be discussed in quality-specific spaces and fora.

QM has been successful in planning, deploying, controlling and improving productivity in times of change, over time and in organizations from virtually any sector – ranging from governmental and public institutions to private companies (Schuurman, 1997; Organisation for Economic Co-Operation and Development (OECD), 2013; World Economic Forum, 2018). It has been associated with the post-war Japanese "Economic Miracle" (Dahlgaard-Park, 2011), the homogenization of Germany's industry post-reunification (Krüger, 1999) or the tremendous evolution made in South Korea, and as the basis of China's ongoing and redefining industrial development master plan (Li, 2018). Furthermore, it is seen as vital for the future of industrial development (United Nations Industrial Development Organization, 2020).

However, the integration between quality principles and practices and technologies and advanced manufacturing processes is not always clear nor straightforward (Carvalho *et al.*, 2020). The lack of such a quality-led perspective means that the technologists rather than the quality experts are making the decisions that will affect the way we think Quality Engineering and Management in the future. It has been argued that it is hard to find studies on the impact of technologies on QM (Gunasekaran *et al.*, 2019) and that new quality perspectives do not transition to practical deployment (Bossert, 2018). It is in this perspective that we outlined this Special Issue, highlighting both the need and importance of discussing the implications for quality brought by the digital transformation.

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An organization's ability to constantly provide customers high-quality products or services and meet their needs is key to their competitive advantage, expansion or even survival. The development of better, faster, inexpensive and more informative technologies may enable rapid advances towards these goals. Supported by the development of smart technological solutions, organizations aim to improve efficiency, effectiveness, customer satisfaction and empower their human capital to continuous learning and adaptation.

The Special Issue guest editors invited authors to submit papers, with both theoretical and practical applications, in topics that included but were not limited to:

(1) Defining Digital Quality

(2) Quality and Technology

(3) Supply Chain Quality Management in the Digital Era

(4) Data Quality and Quality in Information Management Systems

(5) Applications of Predictive Quality

(6) Quality for Advanced Manufacturing Systems

(7) Quality for Additive Manufacturing

(8) Digital Quality and Risk Management

(9) Quality Management Systems in the Digital Era

(10) Work systems and human factors in Quality 4.0.

More than 20 papers were received. However, after the review process, only 10 papers have been selected and were accepted for publication in this Special Issue. Those 10 papers cover topics about Quality 4.0 definition and dimensions, digital quality implementations, factors for a successful Quality 4.0 project implementation, Supply Chain Quality Management 4.0, quality and additive manufacturing systems, Quality Control 4.0, among others.

We would like to thank the authors for their effort, dedication and commitment, without whom this Special Issue would not have been made possible. Furthermore, we would particularly like to thank the reviewers for their valuable time and efforts to give feedback on all the papers submitted. We hope that the authors did appreciate the feedback and advice given to them.

This Special Issue is the first compilation of scientific papers about Quality 4.0 published by a scientific journal such as the *International Journal of Quality and Reliability Management*. Thus, this Special Issue aims to contribute to the development of pioneering knowledge in this topic, both from theoretical and practical perspectives. Enjoy it!

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