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Guest Editorial : Socially responsible and sustainable operations through digital transformation: Deepening understanding of digital tools in operations management

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Guest Editorial

Socially responsible and sustainable operations through digital transformation: Deepening understanding of digital tools in operations management

The study of AR and VR enjoys a long and rich history in information sciences. However, the rise of industry 4.0 has generated vigorous debate about the merits of augmented reality (AR) and virtual reality (VR), particularly in quality control and product development, and its implications for a more sustainable society. For practitioners and researchers, sustainable and socially responsible digital business operations are at the center of the discussion about how digital transformation impacts the firm's social, environmental and economic goals. Manufacturing firms require real-time information exchanges at all phases of the product lifecycle, including design, prototyping, production process, assembly, repair or maintenance, to stimulate and improve procedures before they are implemented. Recent researchers' interest in big data and the internet of things enable the combination of AR and VR as a distinction information source. Companies that defined and managed the "Total Quality Management" (TQM) revolution in the 21st century are gaining much attention from academics and practitioners in logistics and operations management. Quality control is a complex and multifaceted process with profound implications for manufacturing organizations' production decision-making.

AR and VR are becoming the reality of today's businesses and shaping everyday operations. It is becoming one of the cornerstone quality control in many firms. It is the primary tool for firms in obtaining information about damaged product components in a short period. On the other hand, quality control experts might use AR and VR to update their operations to achieve the best possible results. AR has the potential to speed up the time it takes for personnel to locate and diagnose complex product components. There is increasing interest of firms in adopting AR and VR technology. However, many firms still lag and have little fear of why they should adopt AR and VR technologies in the quality control process. In the future, IoT sensors integrated into product components will provide information on whether or not the parts meet the quality requirements. When the technician looks at a certain product, this important information will be displayed on the AR screen, allowing the professional to complete the inspection in a fraction of the time. Furthermore, it will prevent unintentional mistakes from being made that would otherwise be made.

SPECIAL ISSUE PAPERS

In this special issue, we present five papers. The first of these papers, "The role of emerging technologies in implementing green practices to achieve sustainable operations," rely on collected data from 234 manufacturing firms in Pakistan. The findings of Umar et al. (2021) revealed that implementing intelligent technologies associated with industry4.0 minimizes energy consumption and waste management practices. This study explains how emerging digitization processes can develop green logistics operations more generally. In the second paper, "Future perspectives on progressive farming with the adoption of virtual reality technology for sustainable quality in agriculture," Kumari et al.(2021) investigate the perceptions of progressive stakeholders toward the adoption of VR technology in an emerging economy. They posit that VR technologies may enable sustainabile quality in

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agriculture production. They find that technical skills and institutional pressure play an essential role in adopting VR technology in emerging economies.

A third paper, "Illustrating scholar-practitioner collaboration for data-driven decision-making in optimizing logistics facility location and implications for increasing the adoption of AR and VR practices," Rohani et al. (2022), used a mixed-method approach. The authors examine the consequences of such cooperation for adopting VR and AR technologies and developing competencies for optimizing their value "in mature low-medium technology businesses", such as food logistics. Moreover, this study provides practical implications that, without multi-stakeholder cooperation, the full potential and advantages of VR and AR technologies will be delayed to materialize without multi-stakeholder collaborations. The fourth paper, "Enhancing operations management through smart sensors: measuring and improving well-being, interaction and performance of logistics workers, " Aloini et al. (2021), explains how intelligent technologies affect firm operations management. They demonstrated that failing to consider such elements means foregoing a comprehensive, effective, and accurate research of work dynamics in logistics systems. In the fifth paper, "An augmented reality-based system for improving quality of services operations: a study of educational institutes", the study results Egaji et al. (2021) suggest that AR-based training programs potentially increase their knowledge retention and are essential for improving the quality of service operations.

THE FUTURE OF AR AND VR IN INDUSTRY5.0

As the papers collected in this Special Issue indicate, there is great potential for expanding the scope of quality management to include the whole supply chain operations and product life cycle management both in the manufacturing and services industries. We need to learn more about how risk may be identified and controlled across product development and customer demand. In-depth qualitative and quantitative case study research and more optimization and simulation research could yield valuable information. Business executives and practitioners must include cybersecurity planning of mixed reality in their strategic plans. It appears that researchers are still unable to adequately explain the importance and grasp VR and AR adoption at the logistics and production level. As previously noted, recent human-machine interaction and industrial transformation from industry 4.0 to industry 5.0 are posing more value co-creation and agility challenges for supporting and managing sustainable operations processes.Still, limited understanding exist as how industry 5.0 can positively impact on agility. Industry 5.0 alters the production paradigm to control processes' effectiveness and brings unprecedented invention and advancement in the automation environment.

Given the importance of human-machine interaction, future researchers must focus on how Human capabilities empower their decision-making by collaborative work in a mixed reality environment. Does industry 5.0 minimize the environmental and economic challenges in operations management? The selected papers in the special issue have an advanced understanding of establishing sustainable quality control operations. Thus, we

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call for more research on other facets of AR and VR in different industries. Notably, in the industry 5.0 manufacturing business, AR and VR applications are becoming increasingly popular in many industries, such as Fashion, logistics, tourism and sports. Since augmented reality alters a person's experience of their physical surroundings, they are concerned with changing raw resources into completed things for product design, monitoring and controlling the process, machinery maintenance or plant inspection and training purposes. However, there is still a great deal we don't understand about how virtual networks are established on digital platforms and support digital and socially responsible practices.

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The TQM journal special issue aims to advance the state of AR and VR research within sustainable quality control by disseminating empirical investigations. The editor of The TQM journal, Prof. Alex Douglas, has made it possible to publish a collection of the top papers submitted in the special issue on "Expanding Sustainable Quality Control in Operations Management: Virtual and Augmented Reality". We are greatly appreciated their assistance and cooperation. There were a total of 5 x papers submitted for consideration for inclusion in this particular issue. TQM journal's rigorous review approach was applied to all submissions, which comprised a preliminary blind peer review by two independent reviewers and a final round of revisions.Some articles were accepted, while others had to be revised and re-evaluated before being considered for publication. We want to express our gratitude to the countless reviewers for their efforts and assistance. The finest papers were selected for inclusion in this edition. We express our gratitude to all authors who initially submitted their articles. Still, a particular word of appreciation and congratulations goes out to the authors selected for publication in this special issue for their significant contribution.

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