

Adoption of Industry 4.0 and lean concepts in hospitals for healthcare operational performance improvement

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Abstract

Purpose – This paper proposes the adoption of Industry 4.0 (I4) technologies and lean techniques for improving operational performance in the healthcare sector.

Design/methodology/approach – The research adopted a systematic literature review and feedback of healthcare professionals to identify the inefficiencies in the current healthcare system. A questionnaire was used to get feedback from the patients and the hospital staff about the current practices and issues, and the expected impact of technology on existing practices. Data were analysed using descriptive statistics, correlation analysis and multiple regression analysis.

Findings – The results indicate that I4 technologies lead to the improvement of the operational performance, and the perceptions about I4 technologies are made through the pre-medical diagnosis. However, a weak correlation between lean practices and healthcare operational performance compared to that of I4 technologies and operational performance indicate that lean practices are not fully implemented in the Sri Lankan healthcare sector to their full potential.

Research limitations/implications – This study is limited to two government hospitals, with insights from only the doctors and nurses in Sri Lanka. Furthermore, the study is limited to only selected aspects of I4 technologies (big data, cloud computing and IoT) and lean concepts (value stream mapping and 5S). Therefore, recommendations on the adoption of I4 technologies in the healthcare sector need to be made within the scope of the study investigation.

Practical implications – The implementation of I4 technologies needs careful consideration of process improvement as part of the overall plan for achieving the maximum benefits of technology adoption.

Originality/value – The findings of the research can be used as a benchmark/guide for other hospitals to explore the adoption of I4 technologies, and how process improvement from lean concepts could influence the overall operational performance.

Keywords Healthcare, Lean management, I4, Operational performance

Paper type Research paper



1. Introduction

Today, we are experiencing the fourth industrial revolution called Industry 4.0 (I4) where computers and automation come together in a new way. I4 is an industrial concept which influences digitalization and virtualization across different industrial domains where most companies and operations tend to be service-oriented rather than product-oriented (Sony and Naik, 2019). I4 uses the Internet of Things (IoT), cyber-physical systems (CPS) such as sensors, big data, powerful analytics and communication infrastructures. Smart factories will be the heart of I4, in which CPS monitors the physical processes of the factory and make decentralized decisions. The physical systems become the IoT, and they are communicating and cooperating both with each other and with humans in real-time via the wireless web.