9th North American Conference on Industrial Engineering and Operations Management
Washington D.C., USA, June 4-6, 2024
Publisher: IEOM Society International, USA DOI: 10.46254/NA09.20240052
Published: June 4, 2024

Exploring the Impact of Telemedicine and Referral on Carbon Emissions from Healthcare Organizations

Yao-Te Tsai
Associate Professor, Department of Information Management
National Kaohsiung University of Science and Technology
Kaohsiung, Taiwan
yaottsai@nkust.edu.tw

Chia-Hui Yu
Assistant Professor, Department of Business Administration
National Taipei University of Business
Taipei, Taiwan
crystal.yu@ntub.edu.tw

Shao-Jen Weng
Dean, College of Interdisciplinary Innovation
Chair, Professor, Department of Industrial Engineering and Enterprise Information
Tunghai University
Taichung, Taiwan
sjweng@thu.edu.tw

Abstract

Sustainability issues and carbon emissions have become the focus of governments and companies in recent years. In particular, Taiwan's medical institutions generate a large amount of carbon emissions. This project will focu on hospital carbon emissions and try to understand and improve the process of medical treatment. In terms of the process, first of all, we will explore whether the choice of different patients for medical treatment (telemedicine) can reduce the transportation carbon emissions to the hospital. The study then uses IoT devices to monitor carbon emissions and utilize the medical resources used in the patient consultation process. Finally, the project aims to find the best strategy for outsourcing the sterilization process of reusable devices used by healthcare professionals

Keywords
Carbon Emission, Telemedicine, Referral service, Simulation

Biographies
Yao-Te Tsai is an associate professor in the Department of Information Management of National Kaohsiung University of Science and Technology. He is also served as the Chief Operating Officer in Healthcare Systems Consortium and the executive secretary in Ergonomics Society of Taiwan. Dr. Tsai received his Ph.D in the Department of Industrial and Systems Engineering at Auburn University in 2015. Dr. Tsai started his academic career as a research fellow in the Logistics Institute-Asia Pacific, National Singapore University in 2016. In the institute, he collaborated with several FMCG companies and aimed to optimize their supply chain networks. From 2017 to 2023, he served in the Department of International Business of Feng Chia University and mainly taught/researched in the area of logistics

and supply chain. In addition, Dr. Tsai started to establish partnership with healthcare organizations and initiated more than 30 projects. The objective of these projects was all about how to improve operational efficiency in healthcare. His current research interests include supply chain management, operations management, healthcare system improvement, and ESG related topics. Dr. Tsai's research works can be found in Journal of Retailing and Consumer Services, Transportation Research: Part F, Journal of Industrial Information Integration, International Journal of Engineering Business Management, etc.

having previously served as Dean of Engineering at Lawrence Technological University and Dean of Research at the University of Hartford. While with the University of Hartford, Dr. Shetty was first Chair of the Vernon D. Roosa Endowed Professorship. In addition, he was the Director of the Engineering Applications Center, through which he established partnerships with more than 50 Connecticut industries. During 2008 and 2009, Dr. Shetty served as Dean of the College of Engineering for Lawrence Technological University in Michigan. During that time, he initiated several new academic programs, established partnerships and contributed to curricular innovation. Prior to coming to Hartford, Dr. Shetty held academic positions at the Albert Nerkin School of Engineering at the Cooper Union for the Advancement of Science and Art in New York City. Dr. Shetty is the author of three books and more than 200 scientific articles and six patents. His books on Mechatronics and Product Design are widely used as a textbooks in many universities around the world. Dr. Shetty's research work has been cited for original contribution to the understanding of engineering surface measurement, for significant intellectual achievements in mechatronics and for contributions to product design. He is especially well-known for his contributions in establishing partnerships between the University and industries. He is the recipient of academic and research grants from organizations like National Science Foundation, Society of Manufacturing Engineers, US Army, Air force etc. Dr. Shetty had been leading research efforts in a U.S. Army research project on Unmanned Aerial Vehicles. In partnership with Albert Einstein College of Medicine in New York, he invented the patented mechatronics process for supporting patients. Dr. Shetty has chaired several international conferences and presented keynote lectures. Major honors received by Prof. Shetty include James Frances Bent award for Creativity, the Edward S. Roth National Award for Manufacturing from the Society of Manufacturing Engineers, American Society of Mechanical Engineer Faculty Award, and Society of Manufacturing Engineers Honor award. He is an elected member of the Connecticut Academy of Science and Engineering.

Chia-Hui Yu is an assistant professor at the Department of Business Administration, National Taipei University of Business. Her research expertise includes Intelligent Marketing, Service Innovation, Intelligent E-commerce, Social Commerce, Technology Management, Innovative Business Models, Technology policies, sustainability-related issues, etc. She has published 4 SSCI papers, 3 SCI papers, 1 international journal paper, and 22 international conference papers. Her publications can be found in Computers in Human Behavior, International Journal of Information Management, and International Journal of Production Economics, etc. In terms of research projects funded by the National Science Council (NSC), she has received grants for 3 projects in the past two years. The topics include innovation, sustainable supply chains, and low-carbon healthcare. In terms of industry-academia collaboration projects, she has also implemented plans related to digital transformation and OMO brand-integrated marketing strategies. The content includes big data analysis, smart marketing, and other related topics. Her future research will focus on Intelligent Marketing/ Intelligent E-commerce, with plans to (1) integrate big data analysis and applications; (2) integrate sustainability issues: green AI, green supply chain, green service process reengineering, sustainable finance, sustainable healthcare, etc.; (3) explore innovative business models.