

Application of Sharing Economy to Address Shortage of Medical Equipment in COVID-19 Pandemic

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Abstract

The novel coronavirus has caused a global pandemic of over 10 million infected cases which lead to over 500,000 deaths ^[1]. The rapid transmission rate of this virus forced countries to impose nationwide lockdowns with the aim of decelerating infection rate and warding off the inevitable overloading of their healthcare systems. A few months after the lockdown, countries are now looking into lifting lockdown measures and reopening economies. While some nations are able to exercise precautions and safety measures to reopen securely, other countries still face many challenges. In particular, these nations can no longer be closed for business and must reopen to sustain their economy. Inevitably, this reopening, if not done securely will lead to rapid rise in the infection rates which cannot be absorbed by their healthcare systems due to shortage of medical equipment ^[2].

This shortage is a critical problem which can lead to rationing of healthcare, and eventually, a high fatality rate for the country in this pandemic. In countries where the manufacturing capabilities for large scale production of medical equipment do not already exist, or manufacturing will require large amounts of time, these countries must rely on external procurement for which they require financial aid. As a global recession post-pandemic lures ahead ^[3], global healthcare funding is becoming difficult ^[4]. Therefore, an alternate solution must be proposed that fulfills two purposes: (i) solves the shortage of medical equipment in these nations (ii) incentivizes and ensures economic viability for the companies or governments that are providing the medical equipment to these nations in need. To this end, this paper investigates the competitive advantages of applying the concept of sharing economy to facilitate the procurement of necessary medical equipment while maintaining profitability.

Sharing economy is a concept that allows pooling and allotment of resources, commodities and services, allowing recirculation of goods and increased utilization of durable assets ^[5]. The concept can successfully be applied to sharing of ventilators and medical equipment during the coronavirus pandemic.

This paper explores a conceptual model of using sharing economy to alleviate medical equipment shortages in Bangladesh. During the early stages of the coronavirus, industrially advanced countries were able to ramp up production of medical ventilators ^[6]. Over time, these countries will have stockpiles of excess ventilators and equipment with lowering hospitalizations ^[7, 8] leading to excess equipment that can be used for profitable sharing.

By using the case of Bangladesh for modeling, this paper will investigate how, using shared economy, the demand for equipment can be satisfied by a future surplus that can be made available from other countries. The paper will then discuss the benefit-cost of immediate and future profits of implementing a sharing economy model and its impact on improving global health, fulfilling social responsibility and initiating long-term collaborative relations that can potentially be extended to digitization of the developing countries.

Keywords:

Sharing economy, circular economy, medical equipment, pandemic

Biographies

Aamirah Mohammed Ashraf is a graduate from University of Windsor with a master's degree in Industrial Engineering. Her master's thesis, which addresses the challenges of reducing uncertainty in reverse logistics of smartphones, won an outstanding thesis award at IEOM 2019 in Toronto. Currently, she is a research associate at the University of Windsor at the Systems Optimizations Lab.

Walid Abdul-Kader is Professor of Industrial Engineering at the University of Windsor. He is also the Director of the Systems Optimization Research Laboratory in the Faculty of Engineering. His research works relate to performance evaluation of manufacturing / remanufacturing systems prone to random failure. Dr. Abdul-Kader received a bachelor's degree in Industrial Engineering from the University of Québec in Trois-Rivières, a master's degree in Mechanical Engineering from École Polytechnique de Montréal, and a PhD degree from Université Laval, Québec, Canada. His research works are published in various peer-reviewed journals in his field and cited by a worldwide audience of researchers.

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