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2023

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Recommended Citation

Tao, Youyou; Zhu, Ruilin; and Wu, Dezhi, "The Joint Effects of Smart Tracking Technology, Mobile IT, and Electronic Health Record" (2023). AMCIS 2023 TREOs. 42. https://aisel.aisnet.org/treos_amcis2023/42

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The Joint Effects of Smart Tracking Technology, Mobile IT, and Electronic Health Record

TREO Talk Paper

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Abstract

Substantial health spending has been a perennial issue facing most hospitals in the United States (US). In 2021, healthcare expenditure in the US reached \$4.3 trillion or \$12,914 per capita, which constituted 18.3% of the country's Gross Domestic Product. Hospital readmission has been identified as one of the main drivers of high healthcare expenditure, with preventable patient readmissions after hospital discharge comprising approximately \$25 billion per year. In addition to readmission costs, length-of-stay (LOS) can also be attributed to the soaring healthcare bill, serving as a measure of operational efficiency to quantify one of the key clinical and economic outcomes.

Hospitals have invested in and adopted Health Information Technology (HIT) to minimize excessive health spending, improve efficiency, and enhance clinical quality. Among various emerging HITs, smart tracking technology (STT) and mobile information technology (mobile IT) have been applied at point of care to facilitate clinical workflows between doctors, nurses, and other health practitioners. STT consists of a set of technologies, including radio frequency identification (RFID) and barcode technologies, compatible with and embedded in existing HIT infrastructure, enabling a novel IT structure to streamline clinical processes for seamless management and monitoring individuals. With the prevalence of mobile devices, such as smartphones and tablets, an increasing number of hospitals have also adopted mobile IT, especially those connecting them with electronic health record (EHR) at the point of care. With mobile IT, healthcare providers can enable mobile access to HER, allowing them to enter and access patient information and make clinical decisions anytime and anywhere while treating or caring for patients, resulting in a more streamlined information flow and reduced waste and delay in clinical processes.

While hospitals currently use STT for patient management and medicine administration purposes, and mobile IT is aligned with EHR to facilitate workflow and rapid responses at the point of care, most studies associated with these emerging HITs have been conducted to examine their stand-alone effects on hospital care and operational efficiency. To date, few studies have comprehensively examined the joint impacts on health outcomes associated with the latest integrated technologies in hospitals due to their relatively nascent nature and data access constraints. Thus, through a complementarity theory lens, this study aims to *examine the joint effects of mobile IT, STT, and EHR on three major patient outcomes: 30-day all-cause readmission risk, length-of-stay (LOS), and total charge.*

This study employs a large in-patient dataset from multiple sources from 2013 to 2015, including 213,648 in-patient admissions in 37 hospitals in the New York state in the US. Econometrics models were applied to assess the impact of HITs on patient outcomes.

Theoretically, this study enriches current HIT complementarity literature by providing empirical evidence of the effects of complementarity on STT, mobile IT, and EHR. This study also provides practical and managerial implications for how hospitals could optimize the benefits by implementing and utilizing mobile IT, STT, and EHR in their specific care contexts and HIT use cases.