

Advancing Social Marketing in Healthcare: Leveraging Internet of Behavior Technology to Overcome Data Collection and Analysis Challenges

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Received 2025 July 25; Accepted 2025 August 30.

To Editor,

Social marketing seeks to address public health challenges by promoting positive behavior change through the strategic application of marketing principles and techniques. This approach involves the creation, communication, and delivery of value-oriented interventions designed to drive social change and enhance public welfare (1). By drawing on concepts and tools used in commercial marketing, social marketing advances social objectives and improves societal well-being. It emphasizes understanding and addressing the needs, wants, motivations, and preferences of the target audience to influence behavior effectively (2). This method incorporates the systematic planning and execution of campaigns aimed at achieving specific social goals, including improving health outcomes, promoting environmental sustainability, and encouraging civic participation (3).

In healthcare, social marketing plays a crucial role by reaching diverse populations, raising awareness, changing attitudes, and ultimately motivating individuals to adopt healthier behaviors. Notable applications include smoking cessation (4), promoting vaccination uptake (5), combating obesity and encouraging healthy eating habits (6), raising mental health awareness and reducing stigma (7), HIV/AIDS prevention (8), road safety and injury prevention (9), pandemic control (10), and increasing awareness about organ donation (11).

Following situation analysis, the first stage of social marketing involves audience research, which involves gathering data on the behaviors, attitudes, beliefs, and preferences of the target group (1). In healthcare and medicine, social marketing faces several challenges related to data collection and analysis:

Complexity of Health Behaviors and Data Collection

Capturing the multifaceted nature of health behaviors in social marketing campaigns poses significant challenges for designing effective data collection instruments. Given that health behaviors are shaped by a variety of social, psychological, and environmental factors, it is difficult to

develop comprehensive methods that accurately reflect this complexity (12).

Accuracy and Reliability of Self-reported Data

A substantial portion of social marketing studies relies on self-reported data, which is susceptible to bias and may lack reliability, leading to incomplete or fragmented analyses. Therefore, the development of innovative approaches is needed to validate self-reported behaviors and outcomes (13).

Integration of Diverse Data Sources

The integration of qualitative and quantitative data from diverse sources, such as surveys, social media, and health records, is often inadequately addressed, often leading to incomplete or fragmented analyses (14).

Longitudinal Data Collection and Analysis

Although longitudinal studies are essential for generating insights into the long-term effects of social marketing interventions, methods for long-term data collection to monitor and evaluate the sustainability of behavior change remain underdeveloped. Without such longitudinal evidence, it is challenging to determine the true effectiveness of social marketing interventions, as short-term achievements may not necessarily translate into sustained behavioral change (15). Therefore, the development and implementation of more sophisticated longitudinal data collection methods are crucial for advancing the field and ensuring that social marketing efforts lead to lasting and meaningful outcomes.

Evaluation of Data Collection Methods

In social marketing, the collection of accurate and actionable data is fundamental to designing effective interventions. However, a significant gap exists in the systematic evaluation of the various methods used for data collection. This gap indicates that tools and techniques employed may not always be appropriate for capturing the complex, multifaceted data required in social marketing campaigns. Consequently, the resulting



data may lack reliable or practical value, which can undermine the effectiveness of the social marketing efforts (13,16).

A promising approach to addressing the challenges associated with data collection and analysis in social marketing is the Internet of Behavior (IoB). IoB involves the collection and analysis of data generated by users' behaviors to understand, predict, and influence human behavior. Such data are sourced from smartphones, wearable devices, social media, and other connected technologies (17). IoB extends the capabilities of IoT by focusing on behavioral data for applications in personalized marketing, healthcare management, and user experience enhancement (18). While IoT refers to networks of physical devices (e.g., sensors, cameras, smartwatches) capable of collecting and exchanging data, IoB focuses on analyzing and utilizing the behavioral data derived from IoT devices and other sources to influence or understand human behavior, often for improving decision-making or service delivery.

IoB seeks to understand the psychological aspects of behavior to drive specific outcomes, integrating data analytics, machine learning, and behavioral science (19). By leveraging data from IoT devices, organizations can gain insights into users' habits and preferences, enabling the creation of personalized interventions and potentially increasing the impact of social marketing campaigns (20). The use of real-time data collection and analysis tools, such as mobile health applications and other connected technologies (e.g., wearable, ingestible, implantable, and injectable smart objects), can significantly improve the accuracy and timeliness of data in social marketing (17). Moreover, IoB employs advanced analytical techniques, including artificial intelligence, machine learning, and data mining, to process and analyze large datasets within social marketing (21).

The IoB significantly enhances healthcare social marketing by integrating data analytics and behavioral science to influence health behaviors. It enables personalized health campaigns, improves medication adherence, and supports disease prevention through tailored interventions. Examples include Fitbit's activity tracking for lifestyle modification (22). During the COVID-19 pandemic, IoB informed targeted vaccination campaigns to reduce vaccine hesitancy. IoB's potential lies in its capacity to deliver personalized, scalable, and cost-effective health solutions that improve engagement and public health outcomes (18).

Overall, the IoB approach effectively addresses the challenges associated with collecting, integrating, storing, and analyzing large-scale data within social marketing programs. It provides implementers and developers of healthcare-focused social marketing initiatives with precise and profound insights into audience behavior. Future research in social marketing should prioritize addressing the potential challenges associated with IoB, including behavioral factors (e.g., motivating individuals to share their data), ethical

concerns (e.g., privacy, security, confidentiality, transparency), legal considerations (e.g., data ownership and access), and technological limitations (e.g., the high energy consumption of connected devices).

Authors' Contribution

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Competing Interests: None.

Data Reproducibility: Not applicable

Funding/Support: This work received no specific grant from any funding agency.

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