

Mobile Health and Wellness Applications: A Business Model Ontology-Based Review

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ABSTRACT

The rapid-pace development in mobile technology offers tremendous opportunities for both the public and private sector in healthcare domain. Unlike other forms of communications, e.g., the Internet, increasingly ubiquitous use of mobile technology and devices allow mobile health and wellness applications to have a greater impact on how care is delivered. Although, technology is an essential tool for healthcare provision, to fully leverage these opportunities other major issues on the emergence of more patient-centric healthcare solutions need to be addressed. A sustainable business model plays a significant role in exploration and exploitation of mobile health and wellness applications. Therefore, this paper presents a systematic literature review based on a business model ontology, in order to lay the basis for exploitation of these applications. The review shows that the extant literature mainly focuses on the service platforms components of business models and their underlying technological challenges, and that non-technological business model components such as value proposition, organizing and revenue models have not attracted the attention that is deemed necessary for exploitation of mobile health care solutions. This paper cautions that in a highly regulated yet often monopolistic industry such as healthcare, the regulatory and the legal issues must be considered as an external business factors.

KEYWORDS

Ageing-Adults, Business Model, Healthcare, Mobile Health, Telemedicine, VISOR Framework, Wellness Application

INTRODUCTION

Mobile health and wellness applications are expected to become an integral part of the daily routines for many, especially for elderly, disabled, and chronically ill people who seek to maintain or develop a healthy lifestyle to cope with health problems. Recently, Shaw et al. (2016) argued that the use of mobile technologies may have the potential to transform care delivery across populations and within individuals if mobile devices are tailored to meet specific patients' needs. The technological advancements and innovations in mobile (smart) phones equipped with built-in sensors and enhanced computing power provide immense business opportunities for actors in the mobile telecommunications and health applications market. Technological devices manufacturers such as Apple and Samsung recognize opportunities for developing native health and wellness applications to allow people such as those suffering from a chronic disease, to be in more control over their own health conditions (Liu, Zhu, Holroyd, & Seng, 2011). Application developers see opportunities to design and develop sophisticated applications for health care interventions (Liu et al., 2011). Health care service providers

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and physicians see opportunities to use mobile applications as an alternative channel to monitor patients' health condition remotely (Chung & Park, 2016; Weinstein et al., 2015). From pharmaceutical companies' standpoint, smartphone and tablet monitoring applications can be used in clinical trials to reduce error rates and enhance patients' remote monitoring systems (Milward et al., 2015). Needless to say, people of all ages may find these types of applications useful if their needs and value perceptions are fully addressed. For example, younger generations use mobile wellness applications to monitor their eating habits or to share results of their physical activities, while ageing adults may use them for self-management of health and well-being and to share real-time health-related data with their physicians or healthcare service providers (Mattila et al., 2010).

Mobile health interventions and wellness applications have been receiving increasing attention among both researchers and practitioners which in turn has led to an ever-growing, yet fragmented, body of knowledge. Although, the concepts of well-being, wellness applications, and mobile-technology-based health care interventions promote active life and healthy lifestyles, literature in these domains is inconsistent. Extant reviews of these concepts either focus on the technical challenges such as design aspects (Kuo, 2011) or concentrate on the adoption of such applications (Deng, Mo, & Liu, 2014; Holden & Ben-Tzion, 2010). For instance, on the importance of knowledge exchange in healthcare setting, Khuntia, Tanniru and Zervos (2015) argue that knowledge exchange among the key players such as doctors, family, patients and other care providers plays a crucial role and illustrate how synchronous video consultation with social media features can support the knowledge exchange among a network of health care professionals.

However, many mobile health and wellness applications are not well known, are underused, or are still in an exploration phase and the added value as formulated in the value propositions is unclear to consumers. Given the emergence of mobile-technology-based health interventions and wellness applications, academic research on issues such as business models and their components should be carried out to realize their underlying economic (profit) and health (public) benefits (Kumar et al., 2013). Chesbrough (2007) has pointed out that to realize the benefits of novel products and services, research should focus not only on technology and R&D but on business models as well. Moreover, despite barriers related to regulations and patient privacy and in view of concerns regarding users' acceptance, business-related factors must be carefully examined with a focus on platforms and ecosystem. To the best of our knowledge, sparse attention has been paid in current literature to mobile health and wellness applications related business models and how to make these applications commercially sustainable.

On that account and considering the previously specified lack of business model research, this study argues that in order to realize the economic as well as public (health) values and to move from exploration (investigation) of mobile health, wellness, and well-being concepts towards the exploitation (utilization) of these types of applications, we need to explore the body of knowledge on different business model components such as value propositions, service platforms, organizational arrangements (eco-system) and financial aspects. To address these issues, the objective of this research is twofold: (a) to identify the existing literature in mobile health and wellness applications from a business model ontology-based perspective, and (b) to provide through a systematic literature review, a coherent and comprehensive insights in the distribution of scholars' attention to specific components of a business model.

Although it is not the core focus of the current research, we acknowledge that health care is a highly regulated industry and that the legal and regulatory issues affect the design space for business models for mobile applications. Although regulation and institutional settings are highly relevant for treatment-focussed interventions, they are less determinant for preventive, posttreatment, or health applications. Regulation, specifically for treatment-related applications, is beyond the scope of our literature review given that health care regulation and policies are different from country to country and sometimes even from city to city. However, we come back on this issue in the Discussion section.

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