

# Digital therapeutics in healthcare ecosystem: a systematic literature review

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**Purpose** – Tremendous development in mobile technologies has emerged as a powerful tool in health care (Sedrati et al., 2016). Smartphone app, based on machine learning, flourished to address health issues, regarding i.e. mental health, circadian rhythm, diabetes (Cho et al., 2020). There are more than 400,000 healthcare apps available in the app stores but, according to the app usage data, most of the healthcare apps have less than 10,000 downloads (Georgiou, 2021). Moreover, in the last few years it emerged a need to involve expert healthcare professionals in the development of health apps and for healthcare providers to empower patients (Alhuwail et al., 2020), because it came up a failure in ensuring quality and safety control by App manufacturers and store managers, with particular regard to mental health problems and suicide (Martinengo et al., 2019). Consequently, digital therapeutics were born. A first definition in a published paper dates back to 2015, defining digital therapeutics as “evidence-based behavioral treatments delivered online that can increase accessibility and effectiveness of health care” (Sepah et al., 2015). Today, it is generally recognized that Digital therapeutics (DTx) are a digital health category defined by the Digital Therapeutics Alliance as products that “deliver evidence-based therapeutic interventions to patients that are driven by high quality software programs to prevent, manage, or treat a medical disorder or disease” (DTx Alliance, 2021). They are similar to popular wellness applications, but they focus on providing clinical results.

Over the past two years, the literature on digital therapeutics has grown at a tremendous pace. The study aims to systematically review the literature on digital therapeutics and to adopt the lenses of service research to identify the role of DTx in the healthcare ecosystem. Service ecosystems embeds the actors who are part of them to cooperate with each other through shared exchange logics and thus stimulate and facilitate the integration of resources, which leads to the creation of a 'network value' and, that is, the possibility of creating benefits for all the actors who are part of the network (Gummesson, 2008). With this in mind, there is a need to understand how digital therapeutics can be integrated into healthcare services as a means to facilitate interactions to create value for all the actors involved (patient, physicians etc..).

**Methodology** – For this paper, we firstly conducted preliminary interviews to DTx actors. Later, we identified and selected relevant articles by following the first four steps proposed by Kranzbühler et al. (2018): 1) identifying keywords, 2) peer-reviewing academic journals in English, 3) screening face validity, and 4) reviewing the full text of the remaining articles. In line with Tian et al. (2018), we search for peer-reviewed English-language articles in the following databases: ProQuest, Pubmed and Web of Science, which include a wide range of articles about digital therapeutics and allowed us to address every field of research, not focusing exclusively on management and business journals.

**Findings** – Our literature review led us to identify 7 macro arguments discussed in Digital Therapeutics literature: difference with apps; medicine benefits (abstinence, blood glucose, etc.); reimbursement and prescription; alliance; macroeconomics; market innovation and business model; technology.

Although most literature focused particularly on medicine and health analysis, there is emerging interest in addressing DTx in different subjects, such as in a macroeconomic or technological way. However, there is very scarce literature in service research, apart from one paper focused on market innovation.

**Research limitations/implications** - Our study is not without limits, which can be considered as fundamental preconditions for the development of future academic research. First, future service research could address the context of analysis of DTx, with a more in-depth analysis on value co-creation processes, actor engagement, service ecosystem. Digital therapeutics can represent an important subject for service research, mainly due to the disrupting role of technology in the healthcare ecosystem, strongly impacting on patient-doctor relationship and roles, physicians' decision-processes and healthcare provision.

**Keywords** – Service science, Digital Therapeutics, Value co-creation, Ecosystem

**Paper type** – Research paper

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