Telemedicine services: How to make them last over time

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Abstract

Objectives: Telemedicine is extensively used in healthcare settings, although we still lack knowledge on how to make telemedicine services last over time. This study aims to: investigate how the factors supporting the implementation of telemedicine services affect their duration over time; explore if further factors need to be considered, to foster the services duration.

Methods: We conducted a six-year in-depth study on three Italian cases of telemedicine services lasting more than 10 years. Dimensions explaining the duration of services over time are explored and discussed against existing literature.

Results: The three cases show that, to support the duration over time, financial and organizational stability should be set before the "champion" leaves the service. Financial stability was reached through different strategies. About organizational stability, we found that providing opportunities to enrich the competences and getting more responsibilities over the patients enhanced the professionals' acceptance, which, in turn, supports the organizational stability of the service over time. About patients, to meet their crucial needs for their health and to receive the nurses' support on the use of technologies contains the abandon and increases the chances for the service to last over time. Last, the three services observed pursued a strategy of focalization on a specific need.

Conclusions: The findings provide insights for policy makers and hospital managers on how to set effective services and avoid service abandon, thus reducing waste of resources, and on how to motivate the professionals and patients, by increasing the chances of duration of the services over time.

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Introduction

In the last decades, the services enabled by Information Technologies have supported the paradigm shifts in service delivery running over healthcare settings worldwide [1,2]. This is evident if we consider applications such as telemedicine (i.e. the use of Information Technologies to support the delivery of healthcare from a distance [34]). On the one hand, policy makers of developed countries are currently enacting a shift from acute/hospital centered health to primary care centered solutions, which can better meet the needs of chronic patients [26]; therefore, telemedicine provides a chance to keep the patients monitored, even at home or in primary care organizations [27]. On the other hand, in developing countries, telemedicine can increase the access to specialized care, by limiting geographic dispersion and health disparities, thus enhancing the citizens' quality of life [3-5]. Telemedicine services are implemented extensively in these contexts, even in a cross-country mode [6-8].

However, despite their undeniable potential, examples of telemedicine services, that were implemented but failed to last over time, are countless in practice and well documented in literature [1,8,10-13,27]. In this regard, we argue that a lot has been said on how to implement these services, that is how to put them into practice within healthcare organizations [14,27,31,33-35]. In contrast, few studies have been conducted on how to enhance the possibility of telemedicine services to last over time, once they are implemented [15,36]. According to recent reviews, to support the implementation of telemedicine services within healthcare organizations, policy makers and healthcare managers should provide appropriate legislative framework and financing, and leverage on the stakeholders' acceptance, on technology reliability, and on organizational factors, such as process, structure, culture, management [11,14]. However, limited research has been conducted on them until now, and in particular on "if" and "how" these factors affect the long-term duration of the services, once they are implemented.

We argue that furthering knowledge on how to support the duration over time of telemedicine services (and IT-enabled services more broadly) is crucial for policy makers and managers in the healthcare setting. From such knowledge, they can get useful insights to set effective services and avoid service abandon thus reducing waste of resources, and to motivate the actors, by increasing the chances of success of the services over time [16,36].

Therefore, to further inform the discussion on this issue, we conducted an in-depth exploratory study, guided by the following research questions: 1) how do the factors, which support the implementation of telemedicine services, affect their duration over time?; 2) are there further factors to be considered, to improve the chances of long-term duration of telemedicine services?

The paper is structured as follows: in the methods, we report the *rationale* for the definition of the theoretical framework and for the case selection, and we provide details on the data collection and analysis. Then, we report the findings about these two research questions, and we

discuss them, considering also the limitations of our study. Last, we push forward the implications of the study for policy makers and healthcare managers, together with new considerations for future research.

Methods

The theoretical framework

The primary goals of our study were to understand how the factors that support the implementation of telemedicine services within healthcare organizations affect their duration over time and, in this respect, to investigate if further factors should be considered. With this purpose, first, we conducted a literature review, to identify contributions about the factors supporting the implementation of telemedicine services within organizations, and we collected them in a research framework. Subsequently, we proceeded with the empirical part of the study, by investigating how and if these factors affected not only the implementation, but also the duration of the services over time.

The literature review was conducted in two steps. First, we performed a search in PubMed (keywords: "telemedicine" AND "implementation" AND "success"; "telemedicine" AND "implementation" AND "sustainability"; "telemedicine" AND "implementation" AND "duration"; "telemedicine" AND "implementation" AND "organization"). Second, we performed a search in those journals whose denomination specifically refers to "telemedicine" (i.e. *Journal of Telemedicine and Telecare; Telemedicine and e-Health*), with the same keywords. Most of the contributions we retrieved from this second search had already emerged at the first step of the review.

The contributions in scope are listed in the last column of Table 1, which represents the theoretical framework of our study. The dimensions of the framework (*technology, acceptance, organization, financing,* and *policy and legislation*) were adapted from contributions by Broens et al. [11] and Brebner et al., [12], while the sub-dimensions of the factor "organization" (i.e. *process, structure, culture,* and *management*) were adapted from contribution by Rassmussen et al. [14]. We grounded the framework on these three contributions because they provide rigorous reviews of factors emerging from both theory and practice; moreover, they are published on relevant Journals with up-to-date debates on telemedicine applications. The remaining part of the contributions in scope, emerging from the literature review, were used to better define the factors and to inform the data analysis.

Case selection

The goal of this study is to explore how to make telemedicine services last over time. Consistent with the need to perform and in-depth investigation of processes and organizational dynamics over time, a longitudinal case study was selected as the appropriate methodology to carry out the research [17,18].

Starting from the research questions and from the theoretical framework, we selected the cases through a theoretical sampling strategy [39]. First, we screened the telemedicine services implemented in Italy between 2008 and 2010. This screening was done by accessing a database created by the Italian Ministry of Health. Specifically, the database contained information about services activated for patient affected by Chronic Obstructive Pulmonary Diseases (COPD), which is a disease with worldwide critical levels of incidence and prevalence [42]. The aim of the database was to collect information on services for patients affected by this specific disease, to identify an effective service model and eventually to transfer it to services for patients affected by different chronic diseases.