Chapter 11
Scaling Up Telemedicine Initiatives:
Requirements for a New Telemedicine Maturity Model

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ABSTRACT

Telemedicine maturity models aim to support telemedicine scaling up. Even though a diversity of telemedicine maturity models, and further support tools, exist, they are often unable to support users proactively or offer substantial guidance for the improvement of the status quo. A new maturity model is therefore needed that overcomes the shortcomings evident in existing approaches. This chapter aims to identify requirements that such a model has to fulfil based on an analysis of existing maturity models. The results guide future research and can support the scaling up of telemedicine initiatives.

INTRODUCTION

Telemedicine maturity models aim to support telemedicine scaling up (van Dyk & Schutte, 2012), i.e. the process of pilot projects reaching more people who can benefit from the larger scale of the spread of such initiatives (Simmons, Fajans, & Ghiron, 2007). As long as this scaling up process is hampered (Boonstra & van Offenbeek, 2010; van Dyk, 2014), the promised increase in access to care for patients at decreasing cost (Hjelm, 2005) cannot be reached. The need for scaled up telemedicine initiatives has also been recognised by the European Commission (EC) and the World Health Organization (WHO),

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which included the scaling up of e.g., new applications, organisations and territories (EC, 2015; Uvin, 1995) in their policy and research agendas (EC, 2015; WHO, 2009).

Even though a diversity of telemedicine maturity models, and further support tools, exist (Mauco, Scott, & Mars, 2018; Otto, Whitehouse, & Schlieter, 2019; Yusif, Hafeez-Baig, & Soar, 2017), they are often unable to support users proactively or offer substantial guidance for the improvement of the status quo. These models help in defining the status quo from different perspectives, but mainly without being holistic and easily re-usable (Otto et al., 2019). Therefore, a new telemedicine maturity model is needed, which has to overcome the shortcomings evident in existing approaches. This chapter aims to identify the requirements that such a new model has to fulfil in order to overcome the deficiencies in current models. The requirements are derived from an analysis of existing maturity models and aim to support future research in this field.

The remainder of this chapter is structured as follows. In the next section, the concepts of telemedicine and maturity are introduced before the existing analysis of telemedicine maturity models is explained in section 3. The requirements for a new maturity model are then derived from the analysis. The results are placed in the context of existing research and the limits of this research are described (section 4). To complete the chapter, conclusions – accompanied by an outlook for future work – are set out (section 5).

TELEMEDICINE AND MATURITY

Telemedicine, as part of eHealth, describes the location- and time-independent delivery of healthcare services and/or medical education by professionals through the use of information and communication technology (ICT) (Sood et al., 2007). Healthcare disparities, especially in rural or underserved areas, can be overcome by the use of telemedicine since it connects electronically patients and professionals who are geographically distributed (Zapka et al., 2013). Telemedicine initiatives are highly complex, and are influenced not only by their users, their behavioural and ethical concepts, but also by surrounding factors like legal, organisational or financial conditions (Broens et al., 2007; Ly et al., 2017). To successfully scale up telemedicine initiatives, this complexity needs consideration. Addressing telemedicine initiatives' complexity is mostly done prior to implementation by referring to "telemedicine readiness". Readiness describes the "degree to which users, healthcare organisations, and the health system itself, are prepared to participate and succeed" (The Alliance for Building Capacity, 2002, p. 2) with telemedicine implementation. Supporting tools for telemedicine scaling up should include the provision of improvement measures, by helping users understand which steps could be taken in what context and by guiding them during the implementation process. As one such support tool, a maturity model describes a path to reach an advanced stage of maturity, including the definition of the current status quo, an overview of next steps, and the provision of a common understanding for different stakeholders to work on (Katuu, 2016; Klimko & Remenyi, 2001). Being mature is hereby defined as "having reached the most advanced stage in a process" (Oxford Dictionaries, n.d.). The entity under consideration can be people, processes or objects (Klimko & Remenyi, 2001).

Maturity models typically consist of dimensions – that are described and that reflect the domain to which the model refers – and levels, including a descriptor (e.g. initial, defined, optimising) and characteristics for each level (Fraser, Moultrie, & Gregory, 2002). Depending on the model's design, three types of models have been differentiated: Capability Maturity Model (CMM)-like models, Likert-like questionnaires, and maturity grids. CMM-like models are based on a formal design: a specific number