

USING AGILE MANAGEMENT STRUCTURES IN IMPLEMENTING TELEMEDICINE PROJECTS

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The relevance of the study is due to the need to transform traditional approaches to healthcare in the context of digitalization of society (Digital Health). The implementation of telemedicine projects is not just an alternative channel of communication, but a strategic tool for improving the quality, timeliness and accessibility of medical care. This is of critical importance when overcoming the consequences of martial law, the shortage of specialized personnel in the regions and the need to optimize budget expenditures. Thus, the analysis of the effectiveness of telemedicine technologies is key to building a sustainable, patient-oriented healthcare system.

The Strategy for Digital Innovation Development of Ukraine until 2030 notes that, thanks to a strong IT sector, digital medical startups have the greatest potential to enter the global market. Among the leading and most effective Med Tech innovation projects are telemedicine startups, which are critically important for ensuring equal access to medical services, especially in wartime and for residents of remote regions [1].

The key segments of the national Health Tech market are: rehabilitation technologies and devices; telemedicine technologies; Medical AI; Mental Health; information and telecommunications systems, focused on automating the accounting of medical services and managing medical information in a medical institution and at the national level in the form of an EHR. The prospects for the development of Med Tech startups in Ukraine are characterized as very high, which is facilitated by the high IT potential and significant demand in the rehabilitation medical services market. The results of the market analysis make it possible to determine the main promising areas of development of national innovative startup projects focused on the development of telemedicine technologies to provide access to medical consultations for citizens from regions affected by the military aggression with significantly destroyed healthcare infrastructure. In the national and global Med Tech technology market, the demand for the creation of technological prostheses and applications for rehabilitation after injuries, the creation of programs for monitoring health status, prevention of chronic diseases and support for a healthy lifestyle will grow.

In our previous scientific works, we focused on the strategic planning of telemedicine projects, in particular startup projects [2-4]. In today's dynamic, uncertain and highly competitive market environment, the classic dualism between strategic management and agile methodologies (Agile) is being eliminated, transforming into a

synergistic paradigm - the concept of strategic agility (Strategic Agility). Traditionally, strategic management was associated with long-term, deterministic planning (for 3–5 years) and a rigid hierarchical structure. Instead, Agile was considered exclusively as an operational-level tool for managing projects through short cycles (sprints) and cross-functional teams [5]. However, modern scientific and practical discourse proves that the viability of an organization depends on the integration of these two approaches, where strategic management determines the vector of development (the vector of stability), and the Agile structure provides a mechanism for adapting to change (dynamic capability).

The relationship between strategic management and Agile is multi-level and is implemented through a system of complementary elements.

First, the very essence of strategic planning is changing: fixed long-term plans are replaced by adaptive roadmaps, where strategic guidelines (vision, mission) remain unchanged, and tactical steps are constantly adjusted based on empirical data.

Second, the decomposition and cascading of strategic goals is effectively carried out through integration methodologies (for example, the OKR system — Objectives and Key Results or scalable Agile frameworks such as SAFe). This allows you to transform the global strategy of the enterprise into specific, measurable tasks for autonomous Agile teams, ensuring conceptual unity (alignment) of all levels of the organization.

Third, the Agile structure acts as a powerful generator of relevant information for strategic analysis due to the reduction of the feedback loop. Creating minimum viable products (MVP) in a short time allows management to instantly assess market response, verify strategic hypotheses and, if necessary, carry out timely reformatting of the business model (pivot) [6].

Thus, strategic management sets a target focus on creating value for stakeholders, while the Agile structure optimizes internal business processes, minimizes bureaucracy and ensures high speed of delivery of this value to the market. As a result, the connection between them forms a qualitatively new organizational culture, where strategic vision legitimizes the right to experiment, and flexible structures turn the experience of local mistakes into valuable information assets for adjusting the overall course of the company [7].

The essence of the Agile structure is to abandon a rigid hierarchy in favor of a flexible network of self-organized cross-functional teams that work in short cycles to quickly adapt to changes and maximize value for the client. Unlike classic bureaucratic models, where decisions are made "top down", in Agile organizations, authority is delegated directly to the executors.

Key components of the Agile management structure:

- Cross-functionality - forming a team that includes all the necessary specialists (developers, designers, analysts, marketers) to create a finished product without external dependencies.
- Self-organization - the team independently decides how to perform tasks, distribute internal roles and overcome challenges.

- Iterativeness - the team divides the work to be performed into short cycles (sprints from 1 to 4 weeks), at the end of each of which a working increment of the product is created.

- Value orientation – the management structure is oriented towards regular feedback from the end user

The Agile structure is built as a two-dimensional matrix that combines autonomous product teams (verticals) and professional communities for sharing experience (horizontal). Unlike the classic hierarchical pyramid, it resembles a dynamic network of interconnected elements.

Using an Agile framework when implementing telemedicine projects is critically important, as this field combines high technology, strict medical protocols, and dynamic patient needs. Instead of the classic linear approach, where platform development or service launch takes years, Agile allows you to deploy working modules in just a few weeks, constantly improving the system. The key challenge when implementing a telemedicine project is to combine IT flexibility with the unalternative requirement of life safety (Medical Compliance).

Cross-functional team structure:

In Agile telemedicine, standard departments (separately doctors, separately programmers, separately lawyers) are disbanded. Autonomous teams (squads) are created that are responsible for a specific client experience.

The composition of a typical telemedicine squad:

- Product Owner - a person who determines the priorities of the platform functionality.

- Medical Expert/Practitioner – a medical specialist who is responsible for monitoring compliance with medical standards and clinical protocols.

- Developers (Frontend/Backend) – specialists responsible for creating a video communication interface and server storage for patient records.

- Cybersecurity Specialist (DevSecOps) – a specialist responsible for protecting patients' personal and medical data in real time.

- UX/UI Designer – a specialist responsible for adapting the interface, which should be simple for elderly patients and for doctors.

Iterative Development (Sprints and MVP):

Instead of launching the entire comprehensive hospital complex at once, the team creates an MVP (minimum viable product). Real-world experience in deploying outpatient telemedicine proves that using the Scrum methodology, a basic workflow can be launched in just 8 weeks.

- Sprint 1–2: Launch of a secure chat for doctor-patient text consultations.

- Sprint 3–4: Integration of a video call module.

- Sprint 5–6: Connection of an electronic prescription and integration with pharmacy networks.

- Sprint 7–8: Integration of monitoring from gadgets worn by volunteer patients (heart rate monitors, blood pressure monitors, etc.).

Specifics of Agile roles in medicine

The role of the Product Owner is most often performed by an experienced physician-administrator who deeply understands the needs of the patient and the logistics of the clinic.

The Medical Board as a stakeholder approves the medical aspects of using the telemedicine product. However, they do not have the right to slow down technical releases if they do not concern the clinical risk area. The Scrum Master adapts the medical staff to IT terminology. He teaches doctors to work with Kanban boards and not to be afraid of short daily meetings (Daily Standups).

Telemedicine project implementation is characterized by a high level of systemic uncertainty, dynamic technological transformations, strict legal regulations (including HIPAA, GDPR, Med DRA standards) and the critical importance of patient safety. Traditional linear management methodologies (Waterfall) often demonstrate inefficiency in this area due to the high cost of making changes at the late stages of development and the lack of prompt feedback from clinical specialists. In contrast, the use of Agile structures acts as a strategic tool for de-escalating risks and optimizing capital investments. The main mechanism of Agile effectiveness lies in the iterative development and decomposition of complex telemedicine systems into autonomous, functional modules (the MVP concept - minimum viable product). This allows for the validation of technical solutions (for example, AI diagnostics algorithms or remote monitoring systems) in safe pilot environments, minimizing clinical risks. Short development cycles (sprints) provide continuous integration control by legal experts and cybersecurity specialists (DevSecOps approach), which guarantees the architectural compliance of the platform with the requirements for the protection of personal medical data at each stage of creation. An important scientific and practical aspect of Agile is the formation of cross-functional teams that eliminate the cognitive gap between IT engineers, data scientists and practicing physicians. Involving medical personnel in evaluating the results of each sprint (Sprint Review) ensures high user-centricity of interfaces and increases the level of adaptation of technology by end users, overcoming traditional resistance to changes in healthcare. In addition, the flexible structure provides high architectural elasticity of the system, allowing for the prompt integration of new biometric IoT sensors, APIs of third-party laboratories or updated treatment protocols without destroying the overall digital contour of the project. Thus, Agile structures transform the process of developing telemedicine solutions from a rigid engineering design into an adaptive ecosystem. This scientifically justifies the reduction of product time-to-market, reduces financial losses from irrelevant decisions, and directly correlates with increasing the accessibility, safety, and quality of remote medical care.

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