O-24: Maturity of health care testbeds – A survey from Nordic countries

Emilia Kielo-Viljamaa[1], RN, Ph.D., Senior Lecturer; Eva Collanus[2] Ph.D. Candidate; Janne Lahtiranta[2,3] Ph.D., Professor of Practice, Antti Tuomisto[2] Ph. Lic. Lecturer
[1]*Novia University of Applied Sciences, Finland*
[2]*University of Turku, School of Economics, Finland*
[3]*Turku Science Park, Finland*

Introduction: Testbed activities in health care have become a more and more important part of hospitals' and higher education institutions' day to day operations. However, the knowledge related to the maturity of the health care testbeds is limited. This survey aimed to describe testbed activities in Finland and other Nordic countries and assess the maturity of these testbeds as part of the Health Campus Turku (HCT2.0) project.

Material and Methods: The data were collected in spring 2021 from seven university hospitals, four universities of applied sciences and one primary care organization. Five out of the seven university hospitals were from Finland, one in Sweden and one in Norway. All universities of applied sciences were from Finland, as well as the primary care organization. The data were collected using semi-structured remote access interviews. The data were analyzed based on the following maturity factors: resources, facilities, marketing and communications, repeatability, contract models, time at the market area.

Results: *Resources:* The testbed activities in the participating organizations mainly were funded from various projects. However, testbed activities as a business activity were becoming more and more common. The testbed activities were coordinated by testbed managers, coordinators or project leaders. Other professionals, like nurses and physicians from the hospitals and teachers from the universities of applied sciences, participated in the testbed activities on occasion. In universities of applied sciences, students were also often involved in the testbed operations and could do their practical training periods or write theses related to the testbed activities.
Facilities: In most university hospitals, the whole hospital itself was a testbed environment, but there were also laboratories and simulation facilities for the testbed activities. In the primary health care organization, the testbed environments were also real-life facilities, for example, patients' homes and out-patient clinics. In the universities of applied sciences, the testbed environments instead were laboratory and simulation facilities at the campus.
Marketing and communications: Testbeds in the participating organizations were advertised using web pages, social media, networks and events. A regional testbed network coordinated the testbed operations in most of the organizations. The network often consisted of the hospital district and higher education institutions. National and international co-operation was also common.
Repeatability: Assessment of the effectiveness of the tested products or services was not very common in the participating organizations. Instead, the testing was mostly usability testing of the products and services, and the assessment mainly was conducted using qualitative assessment and cost estimates.
Contract models: In most organizations, there were existing process descriptions and contract models, which could be tailored case-by-case. In some of the organizations, the testbed processes and contract models were under development.
Market area: The testbed activities were either user or company oriented. Co-creation of the products and services between the organization and company, especially in the universities of applied sciences, was expected as it was part of their Research, Development and Innovation (RDI) operations. In addition, a continuous discussion with companies and other stakeholders was an essential part of the testbed operations.

Discussion: The testbed activities in the health care and higher education organizations are merging with the daily operations in Nordic countries. Specialization within the organizations was also seen, for example, robotics, rehabilitation or medical devices. The regional, national and international co-operation was seen as essential and the systematic and coordinated processes. The challenges were related to insufficient resources and bureaucracy.