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Strategic Intelligence Monitor on Personal Health Systems Phase 3 (SIMPHS3)

Oulu Self-Care (Finland)
Case Study Report

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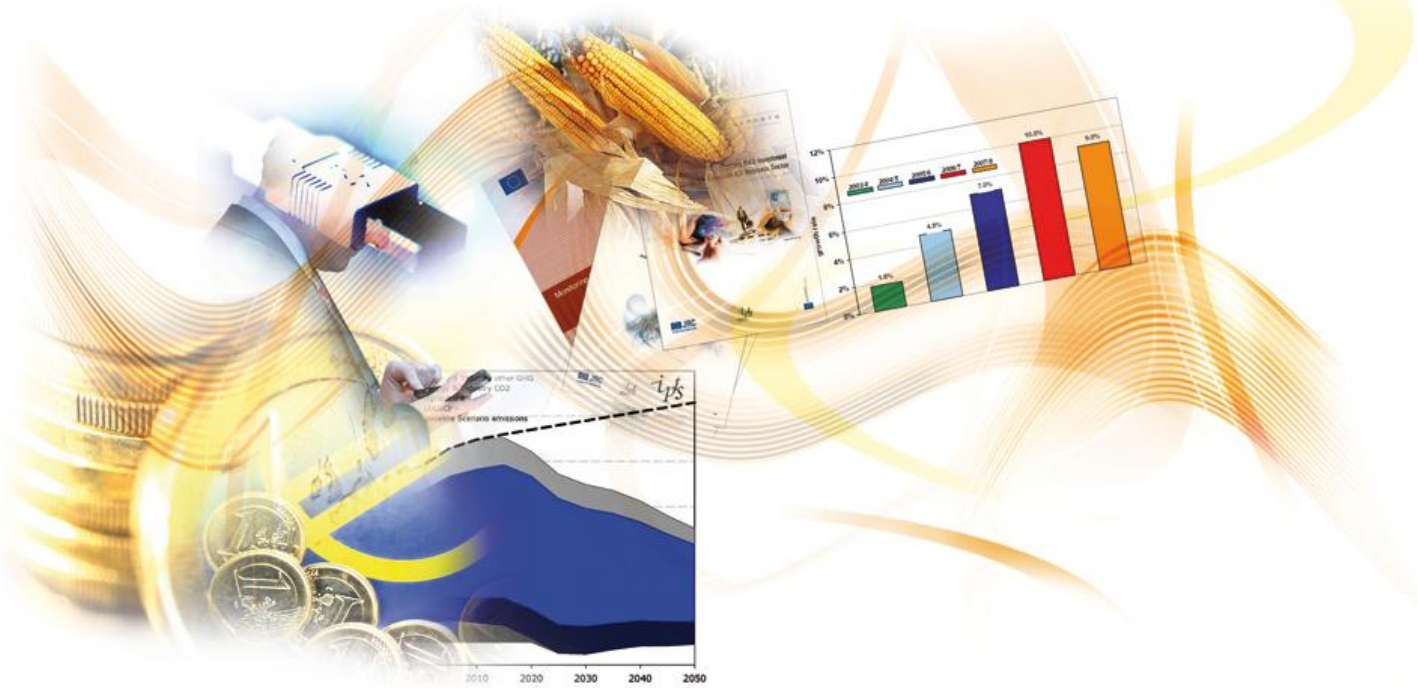

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Abstract

In 2003 Oulu was already a technology city and had set a target of becoming a pioneer in the development of technological well-being products and services. One of the most successful services is the Oulu Self-Care, which was planned, implemented and piloted in the Kasio Project (2007-2009). The aims of the project were to develop self-care services along with an environment for new product and service testing with the participation of citizens and professionals.
The Self-Care platform was opened to all citizens in 2010 as an internet-based portal. It focuses on life style and disease prevention. It also includes self-care services for chronically ill patients, which implement the Chronic Care Model developed in another project called PISARA with the cooperation of other municipalities in Finland.

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Preface

The Strategic Intelligence Monitor on Personal Health Systems (SIMPHS) research started in 2009 with the analysis of the market for Remote Patient Monitoring and Treatment (RMT) within Personal Health Systems (PHS). This approach was complemented in a second phase (SIMPHS2) with the analysis of the demand side, focusing on needs, demands and experiences made with PHS by healthcare producing units (e.g. hospitals, primary care centres), healthcare professionals, healthcare authorities and patients amongst others.

Building on the lessons learnt from SIMPHS2 as well as on the European Innovation Partnership on Active and Healthy Ageing initiative, SIMPHS3 aims to explore the factors that lead to successful deployment of integrated care and independent living, and define best operational practices and guidelines for further deployment in Europe. This case study report is one of a series of case studies developed to achieve these objectives.

The outcomes of SIMPHS2 are presented in a series of public reports discussing the role of governance, innovation and impact assessment in enabling integrated care deployment. In addition, through the qualitative analysis of 27 Telehealth, Telecare and Integrated Care projects implemented across 20 regions in eight European countries investigated in SIMPHS2, eight facilitators have been identified, based on Suter's ten key principles for successful health systems integration.

The eight main facilitators identified among these as necessary for successful deployment and adoption of telehealth, telecare and integrated care in European regions are:

- Reorganisation of services
- Patient focus
- Governance mechanisms
- Interoperable information systems
- Policy commitment,
- Engaged professionals
- National investments and funding programmes, and
- Incentives and financing.

These eight facilitators have guided the analysis of the cases studied in SIMPHS3 and a graphical representation with arrows whose length represents the relative importance of each facilitator is presented in each case study.

In addition to the above facilitators analysed in each case report, a specific section is dedicated to the analysis of care integration. It should be noted that the definition of vertical and horizontal integration used in this research is taken from the scientific literature in the field of integrated care[1] and differs from the one mentioned in the European Innovation Partnership on Active and Healthy Ageing Strategic Implementation Plan[2]. We define horizontal integration as the situation where similar organisations/units at the same level join together (e.g. two hospitals) and vertical integration as the combination of different organizations/units at different level (e.g. hospital, primary care and social care).

[1] Kodner, D. (2009). All together now: A conceptual Exploration of Integrated Care.

[2] http://ec.europa.eu/research/innovation-union/pdf/active-healthy-ageing/steering-group/operational_plan.pdf (page 27)

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Case outlook

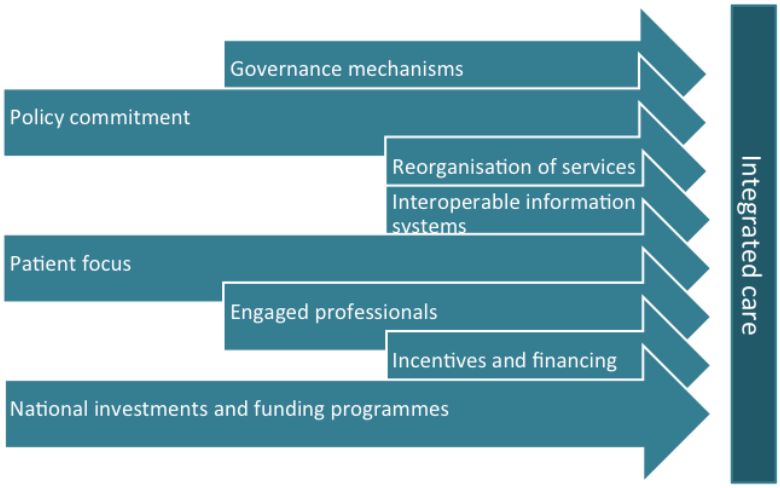
In 2003, Oulu was already a technology city and had set a target of becoming a pioneer in the development of technological well-being products and services. One of the most successful services is Oulu Self-Care, which was planned, implemented and piloted in the Kasio Project (2007-2009). The aims of the project were to develop self-care services along with an environment for new product and service testing with the participation of citizens and professionals.

The Self-Care platform was opened to all citizens in 2010 as an internet-based portal which focuses on life style and disease prevention. It also includes self-care services for chronically ill patients, which implement the Chronic Care Model developed in another project called PISARA with the cooperation of other municipalities in Finland.

The integration in Oulu Self-Care takes place across parts of the same unit, the city's service for primary health and social care. There is a very small degree of integration with Social Care Services since it is possible to find instructions for filling up social care documents in Oulu Self-Care but the integration is not operational. Oulu Self-Care is mainly envisaged as a communication and support tool for patients and professionals. About 50,000 citizens are registered users (2014) out of a population of almost 200,000 citizens in Oulu.

The expected impact was estimated in a pilot and feedback from the users (citizens and professionals) was collected in 2009. The feedback was generally positive: about 80% of citizens were satisfied and 100% of the professionals saw digital services as part of the Health Care services. A full evaluation of the impact is still underway (2014).

Oulu Self-Care has been the basis for the system used in two other municipalities in Finland (Oulunkaari and Raahe). Due to new laws and the imminent integration of Health and Social Care, Oulu Self-Care will become part of a wider range of digital welfare services that will cover larger areas and bigger populations.

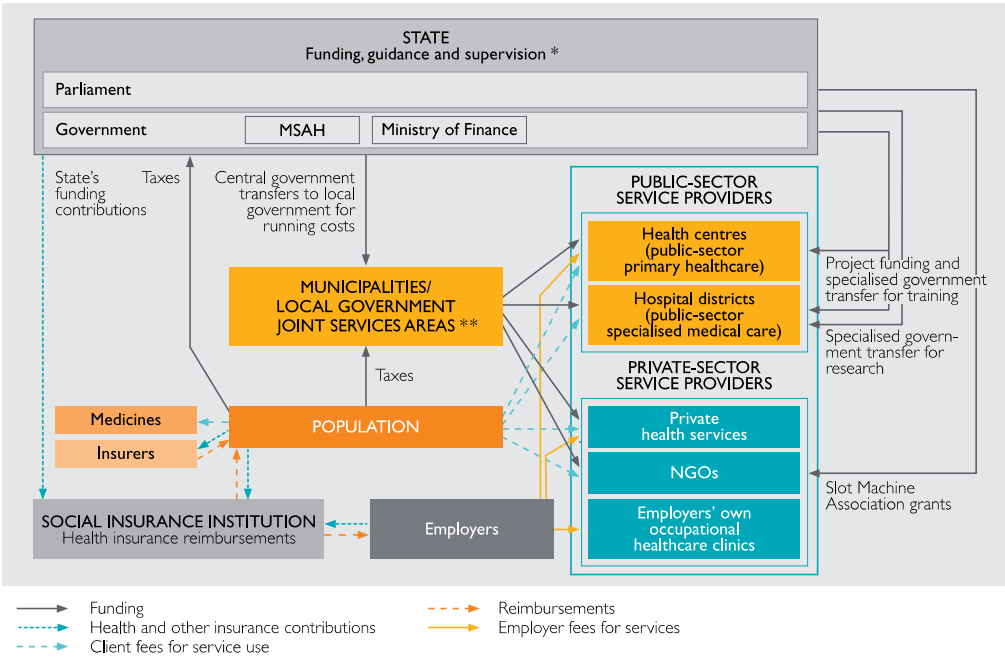


1 Background

1.1 Finish Social welfare and health care services overview

The Finnish welfare state gives citizens a universal right to health care services and social care. The Finnish Constitution stipulates that public authorities should promote the welfare of the population and ensure that citizens have equal access to adequate social, medical, and health services. Accordingly, the healthcare system in Finland is based on government-subsidised municipal social welfare and healthcare services. However, private businesses and non-governmental organisations also engage in the provision of services. The figure below depicts key aspects of the organisation, funding, provision and supervision of health care services:

Figure 1: The characteristics of Finish social welfare and health care



Source: Ministry of Social Affairs and Health (2013) Health Care in Finland. Ministry of Social Affairs and Health, Finland

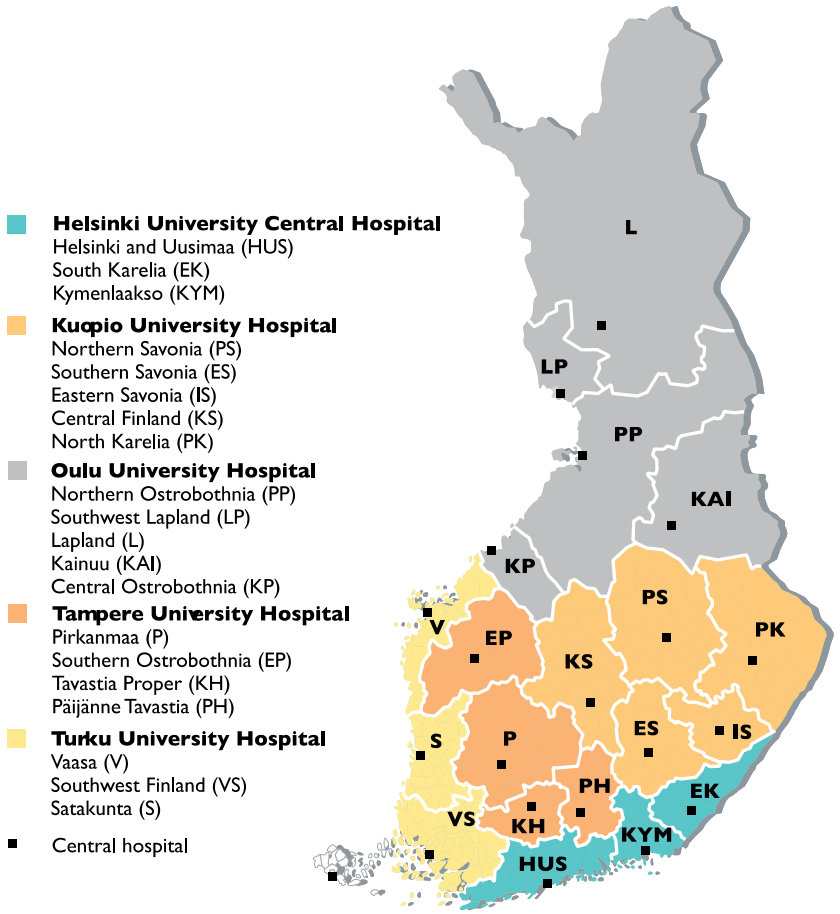
The Finnish health system is primarily funded through taxation. There are two main public financing mechanisms for health care services: (i) municipal financing based on taxes, state subsidies and user-fees and (ii) National Health Insurance (NHI) financing based on compulsory insurance. A considerable change in the financing of health care has been undertaken through the shift from the state to municipalities. The Ministry of Social Affairs and Health retains the responsibility for guidance on social welfare and health care and provides guidance on its implementation. It is in charge of preparing legislation and proposing laws to be discussed with the Parliament, and decides on general national priorities. It is also involved in the definition of general social and health policy, in the preparation of major reforms and proposals for legislation, in monitoring implementation, and in helping the Government to make decisions.

The provision of healthcare is supervised by the Regional State Administrative Agencies, the National Supervisory Authority for Welfare and Health (Valvira) and the Finnish Medicines Agency (Fimea). Guidance on information, on the other hand, is provided by the National

Institute for Health and Welfare (THL), the Finnish Institute of Occupational Health (TTL) and STUK - Radiation and Nuclear Safety Authority. The 320 municipalities throughout the country are in charge of organising the health services according to the needs of the population. Primary care is arranged in the municipalities or local government joint service areas. The threshold for the provision of primary healthcare is a minimum of around 20,000 inhabitants.

Secondary and Tertiary healthcare (specialised medical care - hospitals) is also organised by each municipality, with the condition that it belongs to a hospital district. The municipalities are structured in hospital districts that are responsible for specialised medical care provision. These hospital districts are in charge of the planning and development of specialised care and are responsible for ensuring that primary health care and specialised medical care services are complementary. Furthermore, local authorities are able to outsource certain services to other local authorities, non-governmental organisations or private service providers to ensure adequate service levels.

Figure 2: Specialised medical care, hospital district and central hospitals

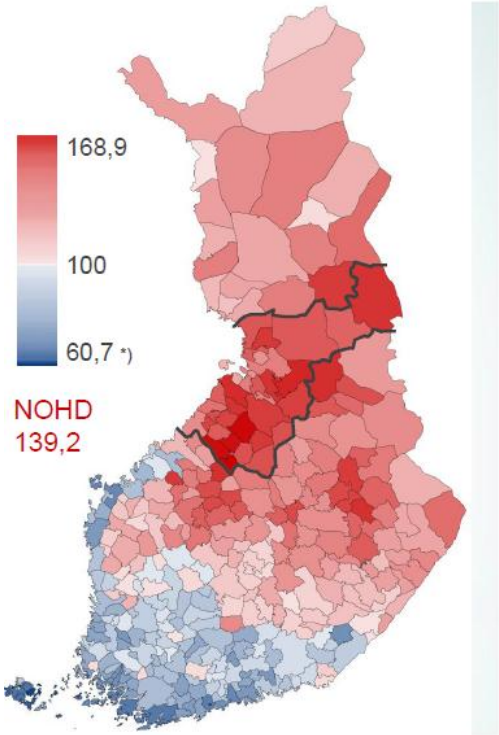


Source: Ministry of Social Affairs and Health (2013) Health Care in Finland. Ministry of Social Affairs and Health, Finland

1.2 Region of Oulu

There are 194,000 inhabitants in Oulu. The average age is 36.6 years, but the fastest growing group is made up of people who are 85 or older. 57% of these people receive home care services or live in nursing homes. About 92% of those aged 75 or older live at home.

Figure 3: Summary index of prevalent diseases (2010)*



Source: Presentation by the director of the Oulu University Hospital Hannu Leskinen (*including Hypertension, Coronary Disease, Asthma, Diabetes, Rheumatoid Arthritis, Cardiac Insufficiency, Psychosis)

In 2013, 1,800 citizens received regular home care and 850 occasional home care. Of the municipalities in Northern Finland and more particularly, the region of Northern Ostrobothnia, Oulu has the most advanced social and health services with 14 health centres, 15 child care centres and 19 dental care centres, as well as 13 social service centres. The services for the elderly are provided mainly in care institutions. Since 2012, Finnish law states that citizens can choose where they would like to be treated. However, in order to implement this service provision, Oulu needs far-reaching reforms, as health and especially social services are rather widely spread. Secondary and specialised care is provided by the Northern Ostrobothnia Hospital District, which includes three hospitals, the Oulu University Hospital, the Oulaskangas Hospital and the Visala Hospital. The Oulu University Hospital's various departments and wards employ a total staff of more than 4,500 highly-trained professionals, including world-class surgeons and experts. The facilities provide around 900 beds, and some services are outsourced to the private sector.

An important transition is underway. Oulu's City Council has already approved a new plan for the construction of four Well-being Centres, which will provide the main bulk of health and social services, while smaller Well-being Points of Care and Moving Services will complete the service provision. The main aim is to encourage citizens to take care of themselves and take responsibility for their own health, with the help of technology. These

changes are expected to occur by 2020. However, the Oulu University Hospital has already made reform plans, which aim to change and renovate not only the facilities, but also processes and technology under the "Future Hospital 2035" programme. Implementation of this programme has already started with the renovation and completion of the Women's and Children's Hospital. The reform plans are expected to cost around €1 billion. In addition to the local changes, the national law about social and health services is currently under discussion as well. It is foreseen that the new law will bring about true integration of health (primary and secondary) and social services.

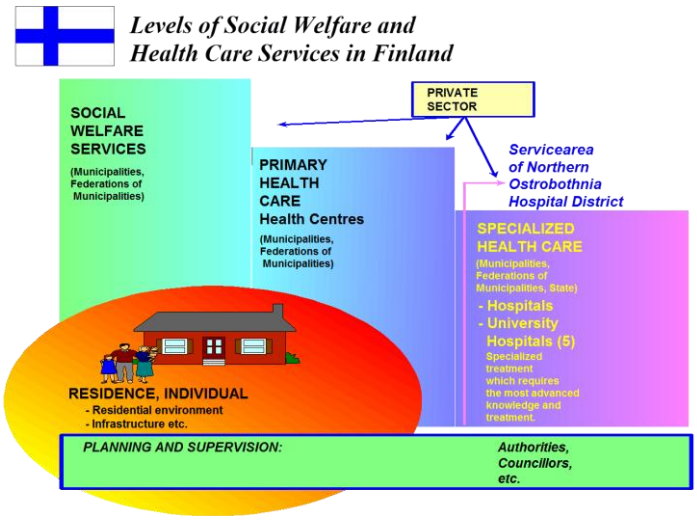
Table 1: General information about the Oulu Region

Geographical coverage km²	61,582
Inhabitants per km²	7.7
Number of inhabitants	446,000
Life expectancy at birth, years	75.1 males – 81.8 females
Regional GDP (2012), billion €	15.2
Regional GDP per inhabitant (2012) €/inhabitants	34,074
General Practitioners /1.000 inhabitants (2010)	0.72
Specialists /1.000 inhabitants (2010)	2.17
Regional Budget for Health services management (2013), billion €	1.35
Health care professionals / 100.000 inhabitants	289
Regional health care budget € per inhabitants (2013)	3,032
Hospital beds (2012)	2,840
Hospital beds/1.000 habitants (2012)	6.3
Chronic diseases: The mortality rate due to chronic disease is as follow: 48% cancer disease; 48% cardiovascular disease; 4% COPD	

Source: Oulu regional statistics

Figure 4 depicts the organisation of the Healthcare and Social Services. Municipalities are responsible for primary care, care of the elderly and social services, while the Hospital districts are responsible for secondary and specialised care.

Figure 4: The characteristics of the regional health and social system



Source: Dr. Juha Korpelainen, Northern Ostrobothnia Hospital District, 2012.

1.3 Oulu Self-Care Services

Since the 1980's, Oulu has become one of the most advanced technological cities in the world. The rapid growth in telecommunications, network and mobile technologies has had a clear impact on the mentality of officials in the city, shedding a positive light on the use of technology for producing and providing services. This provided the grounds for Public Private Partnerships. In 2003, Oulu set itself the strategic target to become a pioneer in the development and use of citizen-centred technological well-being products (Decision SOTE 5310/2003). In 2004 a consortium of companies approached the head of the Social and Care Services of the city of Oulu and proposed a citizens' portal. Following this, **Oulu Self-Care** was planned, implemented and piloted through the Kasio project[3] (2007-2009). It aimed to:

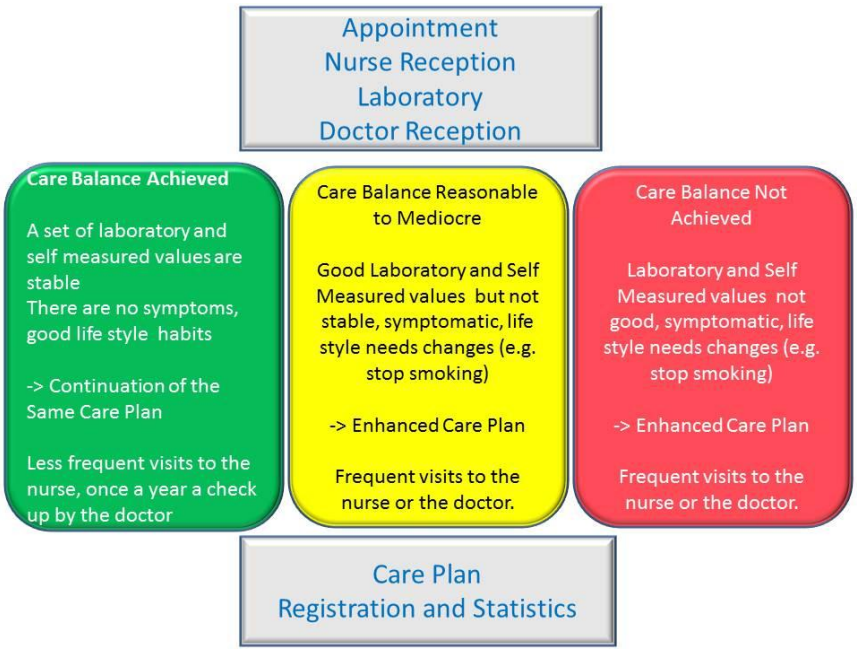
1) Develop self-care services in co-operation with companies introducing new functionalities such as booking, payment procedures, approval, integration of a Health Library (Duodecim) to other services, check-in practices and laboratory test results.
2) Implement product and user testing of new products on selected professional and/or client groups.
3) Encourage health care professionals to adopt work practices complying with the self-care approach (with a focus on process-oriented working methods). In the first phase, the change of approach focused on preventive work and organisation of chronic illness management, shifting from an organisation-oriented approach to a client-oriented one, and support for controlled change in task division.
4) Provide access to the client: definition of available tools and methods to guide and support self-care in order to enhance client-activity in promoting health and wellbeing.
5) Build a functional physical test environment in the Technology Health Centre, Kaakkuri (investments and equipment purchases).
6) Participate in national co-operation through co-ordination and actively influence legislation.
7) Improve the internal and external communication of self-care services.

The Self-Care Service Platform was opened to all citizens in 2010. It functions as a cloud service providing eHealth tools (see Section 2.5 for more details) to citizens, social and health care professionals. Currently, there are about 50,000 citizen-users, 15% of which are active users (out of a total population of 200,000 people in Oulu). The most active users are people aged 65+ years. About 1,400 professionals also actively use the service (out of around 4,000 professionals in total).

It is worth mentioning that Oulu Self-Care did not start as an integrated care platform, but rather as a technology-driven project. However, in parallel to this project, the city of Oulu has developed its own Chronic Care Model, and the Self-Care platform can be regarded as a tool to support this model.

[3] Partners in the projects were: Mawell Oy, Coronaria Impact Oy, Coronaria Media Oy, ProWellness Oy, the Finnish Medical Society Duodecim Oy, the University of Oulu and the Oulu University of Applied Sciences, the National Institute for Health and Welfare THL, the Oulu Wellness Institute OWI and the city of Oulu.

Figure 5: Oulu chronic care model



Source: PISARA OUKA, Jussi Piuva and Tiina Kenttä, city of Oulu, 2013

2 Integrated care analysis

2.1 Dimensions

Today, the Oulu Self-Care platform supports the Oulu Chronic Care model and has become an enabler of integrated care that covers the entire population of the municipality, with special focus on life style and disease prevention, and chronic disease management. The functionalities available on the platform allow service delivery integration, facilitate communication and information-sharing among primary care health professionals and patients, provided that patients agree to share their data, while service responsibilities and funding remain separate. Thus, the Oulu Self-Care platform enhances provider relationships within and across organisations (professional integration), acting as a back-office which facilitates support functions to primary care and to a limited extent to the social care professionals involved (functional integration).

The Oulu Chronic care model is patient-centred, since it ensures the participation of patients in care planning and processes, based on cooperation between them and health care professionals. Integrated Care within Oulu Self-Care is understood as integration of Primary Care, Home Care and Social Care. Before 2009, there were two different institutions in charge of primary care and social care. After that, all these services were combined under the responsibility of the same unit: the Department of Well-Being Services.[4] Therefore, integration has been achieved from an organisational point of view, since the same unit is responsible for the provision of both social and health services. In the case of Oulu Self-Care, integration has been achieved only partially. Social care services

[4] It is worth mentioning that since the beginning of 2014 there is a plan to move the responsibilities of these services to a new organization that would be created ad-hoc with the support of the city of Oulu and the University Hospital so as to integrate secondary care.

are limited to guidance about benefits related to health conditions, and social care delivered at home for those who have special needs.

Oulu Self-Care is integrated across parts of the same unit. The platform was envisaged as a communication and support tool for patients and professionals. Some referrals can go from the nurses to the doctors, but there is no integration between the various specialists, or between social care workers and health professionals.

2.2 Impact

The impact was estimated during the development phase. A Profit Generation Programme was produced for Self-Care Services, and the results indicate time savings, which could be directed towards care, if the service was integrated with the existing data system (information system integration). In 2009 feedback from citizens and professionals was gathered and can be summarised as follows:

- About 70% of citizens found the information provided adequate but only 50% perceived it as sufficient.
- Citizens thought that the services support their health (74%).
- Citizens believed that services should be organised like this (80%).
- Citizens found problems with receiving fast answers and good answers when a question was asked (35%).
- 80% citizens had a computer and knew how to use it, half of those over 70 years of age were technologically oriented.
- Professionals saw these digital services as a necessary part of the Health Care Services (100%).
- Slightly more than half of the professionals saw a benefit in using Self-Care to support the interventions they planned for their patients.

Information about Self-Care Services has been widely distributed through internal and external communication channels. This has enhanced both residents' and health care professionals' awareness of Self-Care Services and their competence to implement them not only in Oulu, but also at a national level. However, a full evaluation of their impact is still underway.

2.3 Drivers and Barriers

The starting point for Oulu Self-Care Services was a technological innovation proposed by a consortium of companies. The Oulu municipality embraced the project as a way to shift from an organisation-centred model to a citizen-centred environment in order to achieve better quality of service, facilitating Oulu's inhabitants' access to health services anytime, anywhere.

Therefore, the first driver of the initiative was the support given by policy leaders to innovation within the health system. This was followed by a reorganisation of the public department in charge of social and health care within the same structure - the Department of Well-Being Services - and the development of Oulu Chronic Care model. It is worth mentioning that these initiatives are not causally linked to the technological innovation, but are to some extent the result of the sensitivity of Oulu policy leaders towards enabling the care continuum. In this regard, the Oulu municipality and the national government

supported the initiative by allocating funding programmes to ensure adequate resources for sustainable change and up-front costs.

Nevertheless, the technological innovation and the reorganisation of the governmental department in charge of social and health care was not accompanied by the same level of organisational change in health and social care service provision. The re-organisation to ensure cooperation between tiers of care was not sufficient to facilitate the integration of primary care and specialist care or to ensure cooperation between health and social care. This situation is expected to change by 2017 if the Finnish Parliament finally approves the integration of the Social, Primary Health Care, Secondary Health Care and Specialised Care Services.

Another factor that held the initiative back was the difficulty experienced by health professionals in integrating these digital services into their process for changing practices. This barrier was removed by training the professionals even though it was sometimes difficult to find replacements while the professionals were at "school". This training included strategies for health professionals to estimate how technologically oriented their patients were, how motivated they were to use the services and what devices and home technologies were available.

Another barrier was the legal situation. Integrated care requires public-private partnerships and cooperation between public service providers and private companies, but the legal framework did not support this "free" cooperation. Some of the funding that the city of Oulu received had to be returned since it was not allowed to cooperate with companies without a commercial competition. The way procurement and commercial competitions are organised is also rather inflexible. Some progress has been made through pre-commercial procurement projects and changes will be made in the new law covering social and health services integration.

Lastly, the laws on privacy were also identified as a barrier to full information integration. For this reason, there are no services for informal carers at the moment. The planned development of interfaces between all information systems and the National EHR called KanTa, which will be implemented by 2020, is expected to solve this problem.

2.4 Organisation, health professional and patients

The social and primary care services are integrated under the same unit (organisational integration), namely the city of Oulu Well-being Services. The Oulu Self-Care platform was created originally as a communication channel between patients and primary care professionals (nurses and GPs) for matters such as lab results, referrals, own measurements, health questions and to allow citizens to book services, without having to call or physically go to the centre.

The platform also provides information about social care benefits and services, including the requirements to be fulfilled in order to apply for them. Thus, the platform works as an information hub with different functionalities for patients, primary care nurses and general practitioners and also, to a limited extent, for social care.

The main organisations involved in this project are the municipality which is in charge of Oulu Well-being Services and of the platform, with the technological support of the private companies Mawell, Tieto and Prowellness, which are in charge of the different functionalities available on the platform.

General primary care practitioners and nurses are the health professionals involved in the project, who use the platform as a support tool for their work, especially with chronic patients.

Lastly, patients are the main actors on the platform. Both the Oulu Self-Care Services platform and the Oulu Chronic care model are the result of a patient-centred philosophy providing patients with self-management support methods and information to facilitate their engagement in the health care process. Currently, the platform does not support formal or informal carers. Relatives cannot take care of issues on behalf of the elderly since registration for and access to the service requires personal identification. Children under 18 can use Oulu Self-Care, but only after identifying themselves via mobile codes. This situation is due to the law on identification and sharing of data.

2.5 Information and Communication Technologies

The main driver of Oulu Self-Care has been the use of technology in producing services for health. Currently, Oulu Self-Care provides the following digital services (modules):

- **Appointment booking** service to make appointments for health centre laboratories, surgeries, periodic medical examinations with a doctor or nurse, mother and baby clinics, and dental clinics.
- **Laboratory test results display service**, which forwards a patient's test results to his/her personal health file. The laboratory results can be transferred to the Hospital (secondary care) via an interface and following the HL7 standard, if the patient has given prior permission.
- **Net advice service**, through which residents can make non-urgent inquiries about health and treatment of illnesses which are answered by health care professionals.
- **Versatile information** (by Duodecim Medical Publications Ltd.) provides residents with reliable information about well-being, health and treatment of illnesses, aiming to improve prevention.
- The **mobile version** of Self-Care Services, which was introduced in early 2008, is accessible to Nokia series S60/80 mobile devices.
- The **home monitoring section** of Prowellness Self-Care includes a worksheet for anticoagulation therapy to which the patient or health care professionals may enter laboratory or home monitored INR values.[5]
- **Approaches for the treatment of long-term illnesses** and health promotion, and cooperation with third sector in-group interventions. The city of Oulu and its primary care works in close cooperation with the third sector and associations with regard to the elderly and people with special needs. Besides supporting the activities, the Oulu Self-Care environment can be used for discussions and the organisation of these activities.
- **Risk measurements and weight control support** is achieved by providing information about risks and nutrition, as well as weight and nutrition diaries that help each citizen to control their lifestyle. They can also view their progress on diets and weight control in the form of curves, which have greater impact.

[5] In June 2014 the contract with Prowelleness will end, there will be changes in this service, and the diaries will be excluded. The data will be automatically moved to the new service and it is expected that the usability will be improved.

- **Services concerning social claims and benefits** provide guidance on citizens' rights to certain benefits and also possibility to fill in the forms. When someone faces a social problem, they can approach Oulu Self-Care for support through social benefits. Users can also check how much social benefit they would be entitled to and fill in the necessary forms that will be forwarded to KELA (the National Insurance).
- **Oulu Occupational Health Services of the city of Oulu.** The city of Oulu's employees (about 8,000 people) receive primary care through Oulu Self-Care.
- **ePrescription renewal:** Finland has had an ePrescription system since 2013, and Oulu Self-Care allows professionals to renew prescriptions and the patients no longer have to visit the Health Centres for this purpose.

As well as these services, the platform offers the possibility to give permission to **transfer data** from one organisation to another. In addition, healthcare professionals have a tool for **measuring the impact** of their interventions on patients, based on the 15D instrument, which assesses the following dimensions: mobility, vision, hearing, breathing, sleeping, eating, speech, excretion, usual activities, mental function, discomfort and symptoms, depression, distress, vitality, and sexual activity.

The architecture of the system consists of different modules, developed and provided mainly by private companies. The architecture was modular by choice, as it facilitates change. For example, the contracts between the city of Oulu and the three companies involved expired in June 2014. After that, Prowelleness withdrew from the service provision, while Mawell has taken over the chronic care-related measurements at home. Specifications about the requirements for providing interfaces to the various other systems have been defined so that these systems can be integrated as soon as the new legislation enters into force. The objective is to have a common platform and portal for all citizens of the ERVA region (Erityisvastuualuet, Specialised Responsibility Areas) and for the changes to take place smoothly, so that end users do not notice any difference.

It is worth mentioning that Finland was an early adopter of Electronic Health Records. In Finland, most patient records are established in electronic format and stored in locally acquired electronic health record (EHR) systems. Because of the geographical organisation of the Finnish healthcare system, EHR systems typically contain comprehensive patient records. However, EHR systems are based on different software products and implemented by various system integrators depending on the regions. Consequently, they are currently semantically incompatible and provide poor integrability, which is why cooperation between healthcare providers to date has rarely been based on EHR exchange. To find a solution to this problem, Finland's Ministry of Social Affairs and Health initiated and implemented a centralised national health information archive, KanTa (see also section 2.3). KanTa is being developed gradually and by 2017, it will contain most of the detailed EHRs. It is available to all citizens. Professionals can have access to patient data after receiving their consent, and a new law will simplify this. Oulu Self-Care is not interoperable with the hospital platforms (EHRs), but in its new form (by 2020), it will be interoperable with KanTa.

In addition, a Personal Health Record called TALTIONI has been developed under the leadership of SITRA, the Finnish Innovation Fund. This will provide an online account where citizens can save their personal health information. Taltioni will give people tangible personal tools which support the maintenance of their own health and well-being as it will allow people to save, collect, produce, use and share information on their own health and

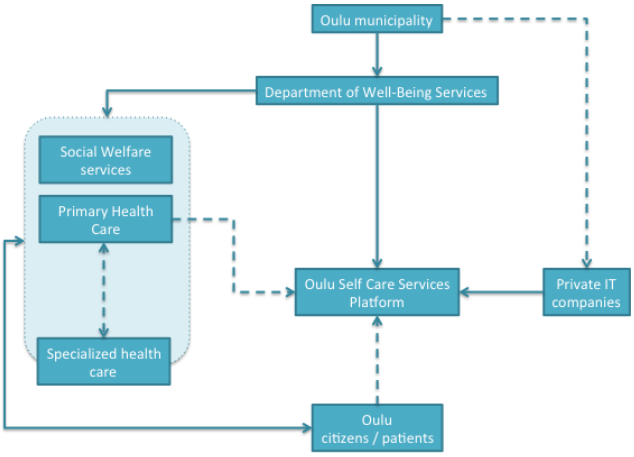
well-being. Health and related information can be shared and used independently of time and location, while the data is safe and secure. Examples demonstrating how the Taltioni service could be used include the treatment of chronic diseases, health and exercise journals, health coaching and delivery of laboratory results. In addition, Taltioni allows public and private operators to create new services for users. The objective is to create an open ecosystem in which large and small operators can develop services. A cooperative will be established for Taltioni, which will help members to develop services for the ecosystem. Members may include, for example, public and private health care operators, well-being service providers, IT companies, employers, patient organisations, sponsors and equipment manufacturers. It is expected that by 2020, Oulu Self-Care in its new form will provide interfaces to both KanTa and Taltioni.

2.6 Governance

No specific governance model was developed for the deployment of the Oulu Self-Care Services Platform. However, the organisational context of this initiative has shaped the its diffusion among the health care actors.

The Department of Well-Being Services developed the platform as a technological innovation with the support of the local private IT companies. This initiative is aligned with the Oulu municipality strategy and its efforts to foster healthcare innovation and technology as one of the economic drivers of the city.[6] The Oulu Self-Care Platform is the responsibility of this department, which plays a major role in the ecosystem displayed in the following figure:

Figure 6: Oulu Self-Care services governance



Source: Authors elaboration

The Department of Well-Being Services has outsourced the development of the platform as a technological innovation to the local private IT companies. They were also in charge of developing the different functionalities and providing maintenance of the system although the Department keeps full control of the platform.

[6] The Oulu municipality through the Department of Well-Being Services provides social and health care services, including health promotion and prevention. Secondary and tertiary healthcare (specialised medical care - hospitals) is also organised by each municipality, with the condition that it belongs to a hospital district (the Northern Ostrobothnia Hospital District). This will change when the new Social and Health Services Law which will come into force (2015).

Furthermore, the Department has also promoted its use among patients and primary care professionals on a voluntary basis. The diffusion and adoption of the platform among primary care professionals and patients has been wider than it is among the specialists and social care professionals, where it is still very limited. To some extent, this reflects the fact that secondary and tertiary care do not fall completely under the responsibility of the municipality and also the fact that within the Department, health and social care still function as silos.

Lastly, it is worth mentioning that even though the Department of Well-Being Services has pushed the diffusion of the platform among health professionals and patients, its use is not compulsory. Moreover, health professionals are the ones who decide whether to recommend the use of the platform to their patients, based on their assessment of patients' capabilities and needs.

2.7 Organisational processes

The Oulu Self-Care Services platform is available to all citizens and primary care professionals of the municipality. The platform has three basic user interfaces: a citizen interface, a professional interface and a maintenance interface.[7] The Login interface is the channel to all Oulu Self-Care services. The look and feel of the interfaces is designed according to the graphic guidance given by the city of Oulu, which want Oulu Self-Care to fit in with the general image of the city. Thus, users can clearly see that Oulu Self-Care is part of the services of the city.

The citizen interface has a general knowledge part that is accessible to anyone, and a personal health directory part that can be accessed after an identification process. Through the portal, the citizen can get the latest information on the well-being services, and information about health matters. They can also participate in surveys and discussions. Parts of the services are also provided in specific format for people with disabilities.

The personal directory contains health data and information about the individual, some space for saving files and a channel for direct and safe communication with professionals. Citizens can also set their profile. Access to these services is only given after identification, which happens either by using bank credentials or mobile codes. The bank credentials method is based on user name and password credentials that the citizens receive from their banks, along with a code key card. Citizens' credentials and personal information are saved in a database, supported by a Customer Data Access Control system.

The professional interface is the tool for the guidance of the patients. Using this tool, the professionals have access to the medical history and (primary care) data of a patient. Furthermore, through their own interface, they can provide guidance and feedback to citizens. Professionals receive user names and password credentials.

The maintenance interface is used to manage access by professional end users, e.g. to create new accounts or change previous accounts. It is also possible to add news items and information for citizens, change the look of the pages, add forms and useful links, and manage forums.

[7] In the new integrated Health System foreseen in 2015, Oulu Self-Care will be only a small part of the offered digital services. The aim is, however, for the citizen to have only one interface through which he or she can access all digital services, which is why the above-described structure will most likely change. The objective is for this to happen in the easiest and smoothest possible way, so that the citizens will only perceive minimal novelty in the new system.

The engagement of the patients in the platform is closely related to the Oulu Chronic Care model. After initial assessment of a patient's condition, and the planning of care with his/her active participation, the patient becomes active on the Oulu Self-Care platform and can use all its functionalities.

The platform enables interaction between patients, primary care nurses and general practitioners, and includes the possibility to arrange follow up and regular face-to-face visits depending on patients' needs. Furthermore, the platform offers guidelines and care pathways to health professionals for their patients based on simple decision support tools which make use of clinical data and laboratory results and other information inserted into Oulu Self-Care by the patient. In addition, professionals can inform social care services when patients need that type of care. Part of these checks is done by extracting information on lifestyle and on the mental state of the patient. The third sector (e.g. patient association) can be involved, if needed.

Nurses and doctors have access to a dedicated professional area. Nurses can check measurement data taken by patients at home or laboratory results, and can send them for referral to the doctors. Doctors in turn can fill in the data during their consultations with patients and can check if the treatment works.

Professionals had to learn how to use the technology effectively, but they also had to estimate the ability of their respective patients to use technology, which required special training.

2.8 Reimbursement model and economic flow

The project was funded by the Ministry of Social Affairs and Health (62.5%) and the city of Oulu (38.5%). The services were developed and piloted by the Oulu Social and Health Services in co-operation with IT Administration Services. Both organisations launched a competitive tendering process for Self-Care IT Services in the fourth quarter of 2009. Three companies (Mawell, Prowellness and Tieto) were selected to deploy the services. The following table summarises the main financing figures of the project.

Table 2: Financing of the project

Financing	2007	2008	2009	Total
Ministry of Social Affairs and Health	€104,391	€264,476	€355,943	€724,811
City of Oulu	€62,634	€158,685	€213,566	€434,866
Total	€167,026	€423,161	€569,509	€1,159,688

Source: Final Report of the KASIO project

The social and health care services existing reimbursement model has not been modified, but extra funding was provided for IT development. The municipalities are responsible for purchasing health care services for the citizens. The financing is based on taxes, and government and citizens´ contributions for the services. Kela – the Social Insurance Institution of Finland, looks after basic social security for everybody resident in Finland. The terms and conditions of the benefits provided by Kela are defined by legislation, whereas most public services are provided free of charge. Some very small fees may be paid for visits to the Health Centre and for obtaining certification. Citizens pay taxes to the municipality in which they reside, and the municipality defines taxes as a percentage of people's incomes. The city tax of the city of Oulu is 19.25% of income. Every year, the city of Oulu plans the budget for the next year's services, including the well-being services, which cover both social and primary care services. These costs include wages for the

professionals, the cost of running the facilities such as health care centres and special care establishments for rehabilitation and maintenance of the technical infrastructure, and the necessary consumables. Development and new services will be funded through national and international projects. Citizens who use the social and health services pay a small fee according to the service and their income.

However, integrated care is now being pushed forward by changes in the law and care processes, which are currently under discussion in the Finnish Parliament. It has been decided that by 2017, Social, Primary Health Care, Secondary Health Care and Specialised Care Services will be integrated. They will be organised and delivered in larger areas (called ERVA regions – Erityisvastuualuet, Specialised Responsibility Areas), which are covered by the University Hospitals in Finland (there is one in Oulu). The digital Health and Wellbeing Services will be delivered through the eTray of Services (Palvelutarjoitin) to all citizens of the ERVA region. This service aims to guide the citizen to the right services – public, private, or self-management services – and give directions as to how to receive professional help. The aim is to create a truly citizen-centred environment of services, unleash as many resources as possible and support the efficient delivery of services.

3 Transferability

The main concept behind Oulu Self-Care is comparable to many other service portals provided to citizens in other cities or regions. In 2014, Oulu Self-Care was transferred to the Oulunkaari and Raahe municipalities with the appropriate modifications. The latest version in Raahe (NettiRassi) is technologically superior to Oulu Self-Care. Furthermore, as mentioned before, by 2017, Social, Primary Health Care, Secondary Health Care and Specialised Care Services will be integrated, so further deployment can be anticipated, even though the actual impact has not been estimated yet.

In terms of transferability to other EU countries, transferring the IT platform is not seen as a problem. The main barrier relates to the organisation of the health system, which also relates to how the services could be funded and reimbursed and how the health professionals in primary care centres and hospitals reorganise their practice. Thus, technological innovation should be aligned with the organisation of health care provision to ensure the transferability of the platform. However, the impact of both technological and organisational innovation should be measured, so as to facilitate transferability.

Lastly, patient self-care and empowerment are also considered as a key factor for transferability to third countries where the systems do not facilitate patient-centred approaches. It is estimated that the Nordic Countries, most of which follow similar Social and Health strategies and have similar infrastructure and population characteristics (web use, technologically-experienced users even in older age groups) would be good candidates for adopting such a service.

4 Conclusions

The Oulu Self-Care Platform is the result of the Oulu municipality's strategic plan to become a pioneer in the development and use of citizen-centred technological well-being products. It reflects the experience the city and the region of Oulu already have in this area. The Platform was built by a joint initiative between local entrepreneurs and the public

sector, which had foreseen the need and saw an opportunity for new digital citizen-centred services. The aim was to create a tool that would support citizens in getting and maintaining a healthy life style and thus preventing diseases. Prevention in the Oulu case builds upon availability of information about various conditions, and the possibility to measure risks and follow up basic measurements that can indicate possible conditions. The key to citizen empowerment was seen as availability of information and self-monitoring.

The platform, available to all Oulu citizens since 2010, was well received. Today there are 50,000 registered users, representing approximately 25% of the Oulu population. Of the registered users, 16% are active. An initial survey of users revealed that about 80% of them were satisfied with the services provided in Oulu Self-Care. Based on these preliminary results, the initial objectives of Oulu Self-Care with regard to citizens and quality demands seem to be fulfilled. A detailed impact analysis is still pending.

One issue that could not be addressed was that informal carers and family members could not participate in Oulu Self-Care due to Finnish laws on privacy and data protection. The planned changes to existing laws that will take place in autumn 2014 may solve this problem.

The platform was also created originally as a communication channel between patients and primary care professionals (nurses and GPs) about matters such as lab results, referrals, own measurements, and health questions. It also allowed people to book services without having to call or physically go to the centre. At the same time as the KASIO project (under which Oulu Self-Care was developed), a Technology Health Centre evolved out of the brand new health centre that was built in the area of Kaakkuri. The aim was to have a physical environment for testing health services and products, some of which were Oulu Self-Care services. 1,400 primary care professionals use the platform today.

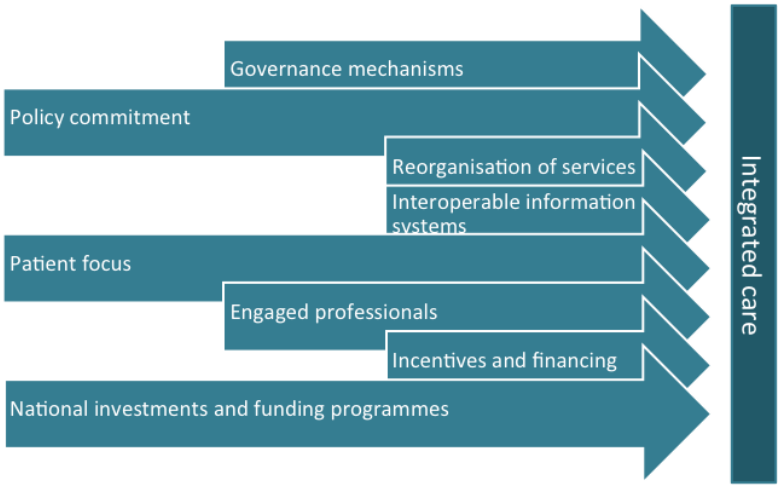
At the same time, a national initiative and project in which the city of Oulu participated produced a Chronic Care Model and the Oulu Self-Care platform was seen as the basis for deploying this model digitally. Thus, it also evolved as a tool to support the Oulu Chronic Care Model. In the Technology Health Centre Kaakkuri, professionals participated in the development of Oulu Self-Care to ensure that quality standards were fulfilled. They also realised that technology was essential for them to carry out their work more efficiently and in turn make the health system more efficient. These views were expressed in the initial feedback collected from the professionals: 100% of them recognised the need to organise services in this way. The detailed analysis currently underway will give better insights into the actual savings in time and work, and improvement in the quality of the services.

Today, Oulu Self-Care integrates primary care health services (prevention and chronic care), occupational health services (for the employees of the city of Oulu), social services (benefits) and the users' own health data (e.g. diabetes risk measurements, partial personal health record). The decision to develop the platform was taken in order to further to some extent the integration of the services provided by the unit of Social and Wellbeing Affairs of the city of Oulu. However, the governance mechanisms of the initiative and the reorganisation of the services provision have not been fully implemented. As a result professional engagement is not optimal, especially as specialists and social care professionals are not included in the initiative. Moreover the integration between primary care on the one hand and, secondary and specialised care on the other was not even considered, since secondary and specialised care is provided by the University Hospital and its district. Professionals only interacted through Oulu Self-Care via messages.

Incentives and financing aspects were not considered either during the implementation of the initiative. These issues will be fully addressed in the new laws for Social and Healthcare Services that will be passed in autumn 2014. Some elements are already clear, and it is now known that social and all healthcare services (including primary, secondary, specialised care and elderly services, rehabilitation and home monitoring) will be integrated from an organisational perspective and provided over larger areas, currently covered by the Hospital districts. Which organisation will be in charge is still unknown. Based on the experiences gained through Oulu Self-Care (using the results of the ongoing impact analysis) and other well-being digital services in Finland, a new digital environment, initially called eTray of Services will be developed to include Oulu Self-Care. This environment will have interfaces with the national EHR called KanTa and the national Personal Health Record Taltioni. It is expected that by 2020, there will be organisational and operational integration in Social and Healthcare Services in Oulu, fully supported by technology.

To sum up, the following figure sketches the main facilitators of the Oulu Self-Care Platform. It is important to emphasise that although complete interoperability has not been achieved, this initiative has been driven by a technological innovation which fosters digital health services in order to develop a patient-centred health system. Thus, patient focus could be considered as the main facilitator, pushing technological innovation.

Figure 7: Oulu Self-Care Platform facilitators



Source: Authors elaboration

This innovation would not have been achieved without the policy commitment of the Oulu municipality and the national authorities, which funded the initiative, developed training courses and to some extent put in place the governance mechanisms to engage health professionals. Nevertheless, the reorganisation of the services has not been ensured. The lack of organisational innovation has limited the deployment of the initiative. In addition, the lack of incentives and financing schemes together with the insufficient level of interoperability with the existing health IT infrastructure have limited the implementation of integrated care. Nevertheless, it is worth pointing out that the Finnish Health and Social care system is currently in transition and its goal is to achieve fully integrated care at national level.

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