

#75012 THE ROLE OF ICT ON NORDIC WELFARE SYSTEM ESTABLISHING A NORDIC E-WELFARE OBSERVATORY (NEWO)

APPLICATION INFORMATION

Application ID	75012
Submitted by	Pirkko Nykänen
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Call	Funding for Nordic research projects on the distribution of health and welfare

APPLICANT INFORMATION

Project Leader

First name	Pirkko
Last name	Nykänen
Gender	Female
Nationality	Finland
Position	Professor
Academic degree	PhD
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Institution (free text)	School of Information Sciences
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E-mail address	Pirkko.Nykanen@uta.fi

Project Manager

Institution	University of Turku
Institution (free text)	
Faculty	Turku School of economics
Department	Information Systems Science
Institution address	Rehtorinpellonkatu
Postal code	20014
City	Turun yliopisto
Country	Finland

GENERAL PROJECT INFO

Project period

From date	01.02.2015
To date	31.12.2019

PLANNED PARTICIPANTS

Composition of research teams

	Team leaders		Participating researchers		Other participants		Country total		
	M	F	M	F	M	F	Male	Female	Total
Aaland Islands	0	0	0	0	0	0	0	0	0
Denmark	1	0	1	1	0	0	2	1	3
Faroe Islands	0	0	0	0	0	0	0	0	0
Finland	1	1	1	1	0	0	2	2	4
Greenland	0	0	0	0	0	0	0	0	0
Iceland	0	1	1	0	0	0	1	1	2
Norway	1	0	1	1	0	0	2	1	3
Sweden	0	1	1	1	0	0	1	2	3
Total	3	3	5	4	0	0	8	7	15

Team leaders

Provide a list of the individual team leaders.

Position	Full name	Dept./ Institution	E-mail
Prof	Pirkko Nykänen	University of Tampere	Pirkko.Nykanen@uta.fi
Prof	Reima Suomi	University of Turku	Reima.Suomi@utu.fi
Prof	Vivian Vimarlund	Linköping University	Vivian.Vimarlund@liu.se
Prof	Jesper Simonsen	Roskilde University	Simonsen@ruc.dk
Prof	Gunnar Ellingsen	Tromsø University	Gunnar.Ellingsen@uit.no
Prof	Agusta Palsdottir	Iceland university	Agustap@hi.is

RESEARCH PROJECT

Research plan

Provide a research plan containing the following information:

1) Background

- Significance of the proposed research
- Previous research (others and own) pertaining to the topic (in brief), and how the research plan is linked to this

2) Objectives

- The aim of the proposed research project, its objectives and hypotheses
- Justification for the proposed research in relation to the call

3) Research strategy

- Research methods and material

4) Progress plan

- Time frame including milestones and deliverables

5) Gender

- Description of gender aspects of the proposed research

6) Key literature, bibliography or other relevant references

[Nordforsk_RESEARCH PLAN_16102014.pdf](#)

Expected results and impact

Description of expected results and potential impact (including long-term scientific, societal, and economic impact) of the proposed research in an international perspective, including potential impact beyond the grant period.

This research will search for answers for the research questions:

- 1) Does the Nordic welfare model perform well, is it sustainable for the future?
- 2) What are the effects and impacts of ICT on the Nordic welfare model, especially on health care services provision and delivery?
- 3) How the positive effects and impacts could be optimised to result in better quality, more efficiency and economy in welfare services production and delivery?

The results of this study are analysis of the ICT effects and impacts on the Nordic welfare model, identification of the threats and challenges for future sustainability and means to monitor and optimise future development. To achieve these results we develop an extended set of indicators to measure the ICT aspects of the welfare model, and perform extensive comparative studies in the four Nordic countries, and finally, develop an observatory that collects data and information on the extended indicators. The indicator-based observatory will be supported such that it develops to an established and appreciated think-tank in the welfare domain.

The analysis, assessment and the extended indicators help to build a comprehensive picture of the current state of the Nordic welfare model and to analyse the threats and challenges and to monitor and coach the future development. These results have potential for high impact in all four Nordic countries, the impacts are identified in societal and economic areas with better services quality and access, and with more cost-effective services provision and delivery. From the long-term scientific perspective this research will study the foundations of the Nordic model, analyse especially the role, effects and impacts of ICT in the model and with the extended indicators generate new knowledge to understand, monitor and guide the Nordic welfare model in the future. The self-standing observatory will be functioning after the funding period, it will be a shared Nordic think-tank that will help to highlight and market the best sides of the Nordic welfare model globally.

This research will have impacts at the Nordic level: We know better what is the status and effects and impacts of ICT, we know better how to improve the utilisation of ICT, we know better what are the correct measures, indicators, and how to measure the ICT-based welfare system and its qualities.

At global level this research provides information on how the Nordic welfare system and the global approaches differ, especially in ICT use and effects, what are the best challenges of both, and how we could apply the Nordic models best parts globally.

Nordic added value

Justification for the proposed Nordic collaboration, including expected Nordic added value and impact.

This research is a shared effort by the Nordic countries: Finland, Sweden, Norway, Iceland and Denmark. We five countries share the history and present of the Nordic welfare model. There are differences between the countries, some are doing better with welfare services than the other, some are more efficient, some more cost-effective etc. In this research we analyse and compare, with the same extended indicator set, all five implementations and current status of the Nordic model. The extended indicators set is derived from individual country-based sets, it also includes factors from EU-research and from international indicator-based research. With this, from local-Nordic to global and back to local-Nordic, approach we aim at covering all necessary aspects that need to be covered while analysing the Nordic welfare model, and especially the ICT effects and impacts.

The specific Nordic add-on value comes from the following facts:

- All Nordic countries apply the Nordic welfare model, though with some deviations and differences,
- All Nordic countries are leading countries in applying ICT in the social and health care services,
- The ICT investments during the last decades in these countries have been enormous,
- There is not yet explicit research results on what are the effects and impacts of ICT on the Nordic welfare model,
- The current economical state of the Nordic countries asks for improvements and savings in welfare services provision and delivery,
- There is need to collect evidence on the role of ICT in improving the service system and in providing savings and quality improvements.

Contribution to open science

Open access and data management plan, including details of how publications, data (both raw data and results from analysis), software and educational material produced within the proposed project will be made openly accessible outside the project as well. If contribution to open science is not intended, a detailed description of data management and publication policy must be included.

All publications from this research will be made Open Access. We will build a project website and publish materials and publications there. However, the private and confidential materials will be protected from un-authorised access. They will be saved in the research institutions following the ethical rules of raw data storage and access in each country.

The publications reporting our results will be published in Open Access journals. As a consortium we organise open workshops and thematic meetings in specific project phases and invite experts and large audiences to attend, depending on the focus of the event.

All software developed for the indicator and analysis studies will be Open Source and be made accessible for scientific community and interested parties. The observatory that will be developed during the project will be a think-tank, a source to highlight and market the Nordic welfare model. It will be made accessible in the Internet for all interested parties. The eGovernance model of the observatory will be published and the future maintenance and running of the observatory will be based on that.

Dissemination

Dissemination and/or communication plan for the project, including a description of how the results will be implemented in international research communities, and how awareness will be raised among potential end-users, the scientific community and the general public. If relevant, provide plans for market orientation.

The major focus of the dissemination and communication plan is to ensure that the project activities and outcomes are widely spread among the appropriate target communities, at appropriate times, via appropriate methods, as well as to identify potential contributors to the development, evaluation, uptake and exploitation of the project outcomes, encouraging their participation on a systematic and regular basis.

The project dissemination channels described below are linked to the exploitation of the project results, the efficient publicity and the wide exposure of the project activities and/or results to targeted stakeholders and media facilitate the use of these results beyond the projects lifetime and thus, increases the project impact.

A high visibility of the project and promotion of an active interaction with key stakeholders are elements of accountability that help justify it is worth to invest public money to support this research. It is important to guarantee the project greatest impact on stakeholders outside the project partnership to ensure that: a) Project outputs can be fully exploited and be used in the most effective manner, i.e. the scaling-up of the demonstrated solutions is facilitated; b) The knowledge gained through the project, and more generally the information generated by the project, can be made available to all interested organizations, c) Elements of excellence of the project can be reused and replicated in other projects, becoming a reference point triggering further developments in the field and beyond, d) The project reaches decision-makers to contribute improving future policies, e) The benefits that project outcomes will bring to society are well pointed out.

The following project information will be communicated to the relevant audience: a) Vision (objectives, strategic relevance) and key facts: messages will follow an evolution from the start of the project to the aftermath and therefore, they will be reviewed periodically in the course of the project, b) News (achievements and results): These illustrate the impact of the project and will give a human dimension that can catalyse acceptance, c) Events promotion and events results.

The following project outputs will be disseminated as widely as possible:

- Ready for use solutions (comparative analysis results, extended indicator set, observatory)
- Models, information and lessons-learned and recommendations (indicators analysis, eGovernance model, effects and impacts analysis).

Moreover, emphasis will be given on the good selection of the information provided for dissemination, on a clear and obvious presentation and on the protection of specific know-how of the project partners so as not to endanger the exploitation of results. In concluding the dissemination strategy to be followed

in this research is:

- Year 1 : Create awareness about the this research, disseminate in scientific networks of the participants, publication of support material, brochures and the web site, attendance in seminars and congresses, submitting papers for relevant workshops and seminars, web site further development.
- Year 2: Solicit first scientific interest in the project to potential users of the this research results, aligning events with similar EU / Nordic / national projects, preparation of pre-commercial brochures, promotion in scientific periodicals, interviews of future users of the research results.
- Year 3-5: Promote the exploitation of the extended indicator set, start publishing models and other achieved results, web site enrichment and web publishing of project results, preparation of a observatory eGovernance and brochure, newsletter to potential industrial and scientific users.

Ethical and legal aspects

Description of the relevant ethical and legal frameworks and procedures needed to perform the research.

The research will take into account any ethical (e.g. privacy) issues that may arise from the research situation, collected data or information. In such case, the necessary approvals by the ethical committees and/or security measures according to existing legislation will be taken into account. For all data collection and interviews ethical committees permissions will be collected before the actions are taken. In all research activities and publications the national and EU-based data protection laws and normative rules re followed and fulfilled.

RESEARCH ENVIRONMENT

International collaboration

Strategy for international collaboration, including a description of existing and potential partners, type of cooperation, and potential benefits for the proposed Nordic project.

The research is lead by the Finnish team: professor Reima Suomi, University of Turku, School of Economics, and professor Pirkko Nykänen, University of Tampere, School of Information Sciences.

The existing research partners come from the Nordic countries:

- Sweden: professor Vivian Vimarlund, Linköping university, Department of Computer and Information Sciences,
- Norway: Professor Gunnar Ellingsen, Tromsø university, Department of Clinical Medicine, Telemedicine and eHealth,
- Denmark: Professor Jesper Simonsen, Roskilde university, Strategic initiative,
- Iceland: Professor Augusta Palsdottir, University of Iceland, Faculty of Social and Human Sciences.

This team from the five Nordic countries builds up the core research team. THE CV's of professors Nykänen, Suomi, Vimarlund, Ellingsen, Palsdottir and Simonsen are attached to this application. They have been shortened to 1-page by the project leader.

Additional research collaboration will be established during the project with national health and welfare ministerial bodies and national research institutes, researchers both from Nordic and EU research initiatives, research projects and programmes. some potential are mentioned here:

- Tony Fahey, The Economic and Social Research Institute, Ireland,
- Michael Rigby, Keele University, School of Public Policy and Professional Practice, UK
- Christian Nöhr, Aalborg University, Denmark,
- Morten Herzum, Copenhagen University, Denmark
- Tobias Mettler, University of St Gallen,
- Stefan Klein, University of Munster,
- Ministeries for Social Welfare and Health in the Nordic countries
- National health and welfare institutions in the Nordic countries.

With the open workshops and seminars more research collaboration will be established.

Researcher mobility

Description of expected cross-border mobility within and outside the Nordic region.

The research mobility is organised as follows:

From each participating research institution a researcher exchange visits, from 2 to 6 months, will be organised to other participating institutions. This exchange will help the younger researchers to familiarise with the status of the Nordic welfare system in various countries. Funding is reserved for this researcher exchange, it is seen as a very important part of reserach work. For each project year 100 000 NOK is reserved for mobility, these are allocated to cover the costs of travel and accommodations during 1 long visit and/or 1-2 short visits in a year.

Research infrastructure

Outline the use of/need for research infrastructure within the project including need for training related to the research infrastructure.

All participating universities will provide their research infrastructure for use in the project. This covers the computing environments, secretary and adminitrative staff and other facilities needed to carry the research.

COMPETENCE

Project Leader

Provide the Project Leader's CV, including a short list of maximum 10 publications from the last five years (in PDF format, max 3 pages).

1 vedlegg

[CV_PirkkoNykänen_2014.pdf](#)

Team leaders

Provide a brief CV for each of the team leaders, and the most relevant project participants (in PDF format, max 1 page per CV).

5 vedlegg

[Curriculum Vitae_AgustaP.pdf](#)

[Gunnar Ellingsen.pdf](#)

[Jesper Simonsen CV-Nordforsk.pdf](#)

[REIMA VESA SUOMI.pdf](#)

[VivianVimarlund.pdf](#)

Research teams

Participating research teams (in PDF format)

1 vedlegg

[Participating research teams - Health and welfare_16102014.pdf](#)

PUBLIC SUMMARY

Public summary

NordForsk reserves the right to use part of or all of the text for information purposes.

This research is focused on the Nordic Welfare System (NWS) and study and develop means and measures to assess the effects and impacts of Information and Communication Technology (ICT) on the welfare system and services provided by it. The typical features of the NWS are covered in this research: The extensiveness and inclusiveness of the system meaning e.g. high investment on human capital and provision of safety nets for Nordic citizens from birth to grave. The NWS has resulted in many achievements which are valuable, e.g. high living standards, low income inequality, high social mobility, good family policies, and strong role of women in society, collective safety nets and openness to globalization.

At the core of our thinking is the concept of Observatory. With this concept we underline following goals:

sustainable system for collecting, analyzing and disseminating information, both technically and financially

professional and established procedures for data collection, analysis and dissemination on best available (evidence-based) practices.

flexibility over time the focus of the Observatory may change, even though some basic trend data must of course be constantly sustained. open data for everyone interested.

bottom-up development of issues to observe, heavily depending on citizen activity.

With the data available from the Observatory, different stakeholders (citizen politicians, business, government, third sector) can develop their actions towards a sustainable and best possible NWS, and at the same time the Observatory functions as a platform for knowledge exchange, in and out from the Nordic countries, and on good as well as less successful aspects of the NWS. The Observatory should establish itself as a key tool to nourish Nordic human capital and organizational knowledge resources at the surface between NWS and ICT. We will publish results on the Internet, in scientific journals, conferences and in open access sources. Materials are produced for the political decision makers, but also in a form suitable for business and the citizens. Over time, the observatory will be able to produce trend data. The goal is to establish the observatory as a self-sufficient service organization with sustainable services and business model.

MANAGEMENT AND ORGANISATION

Management and organisation

Scientific and administrative organisation and management of the project.

The research is led by the two Finnish universities: University of Tampere and university of Turku. Professor Reima Suomi from Turku University will be the project manager and professor Pirko Nykänen the responsible for the research. In Sweden prof Vivian Vimarlund is the leader, In Denmark prof Jesper Simonsen and in Norway, prof Gunnar Ellingsen.

The project will have a management board where the above mentioned team leaders are invited. The management board makes decisions on the managerial and scientific issues on the project and takes care of risk management, mitigation strategies and conflict resolution.

When the project starts, we establish an external Advisory Board for the project to provide advice and support concerning the strategy and progress of the project and to ensure that the project is always heading in the right direction. The board will have an advisory role and it will specifically take into account the ethical and legal issues relevant to the domain, such as governmental representatives, regional and local welfare system representatives, scientific research representatives. The Advisory board will review the key project results and reports and will provide feedback and comments. The Advisory board will be nominated at the project start.

Gender aspects

Description of gender aspects of the project organisation.

Gender aspects are well balanced in the project. Three of six team leaders are female, and for researcher good gender balance is sought.

Approvals or commitments

Please upload the following approvals or commitments:

Provide a Letter of Intent from each of the participating partners, that demonstrates their institutional commitment to the project (in PDF format, max 1 page per letter).

5 vedlegg

[Letter of Intent_Tampere.pdf](#)

[Letter of intent-Sweden.pdf](#)

[Letter of intent_Iceland.pdf](#)

[Letter of intent_turku university.pdf](#)

[Letter-of-intent_Norway.pdf](#)

BUDGET

Funding sought from NordForsk

Budget guidelines

1) All salaries should be calculated in gross (person-months) and include social security costs, etc.

2) NordForsk does not apply any fixed rate or model for calculating indirect costs for research projects.

Indirect costs should be determined by the applicant institution according to its own rules and models. The feasibility of the budgets will be assessed by NordForsk. Applicants are advised to consult their respective institutions for further guidelines.

3) All budgets should be calculated in Norwegian kroner (NOK).

4) The maximum amount that may be sought is NOK 30 million.

Funding sought from NordForsk

Salaries	2015	2016	2017	2018	2019	Period total
Salaries (incl.social security costs etc.)	3100000	3300000	3600000	3700000	3000000	16700000
Indirect costs on salaries (Overhead)	1550000	1650000	1800000	1850000	1500000	8350000
Section total	4650000	4950000	5400000	5550000	4500000	25050000
<hr/>						
Project costs	2015	2016	2017	2018	2019	Period total
Mobility and networking	100000	100000	100000	100000	100000	500000
Data incl. costs for access, analysis, and collection	40000	40000	40000	40000	40000	200000
Travel and meeting costs	400000	400000	400000	400000	400000	2000000
Dissemination and publication	100000	100000	100000	100000	100000	500000
Other project costs (please specify in Detailed budget section)	30000	30000	30000	30000	30000	150000
Indirect costs (administration etc.)	0	0	0	0	0	0
Section total	670000	670000	670000	670000	670000	3350000
<hr/>						
Total	5320000	5620000	6070000	6220000	5170000	28400000

Detailed budget

Specification of the expenses applied for in the above budget ("Funding sought from NordForsk").

Please specify all salaries in person-months, monthly rates and social security costs. All other major budget items should also be specified.

The salaries have been calculated on the following basis:

- for professors the salary is 54000 NOK/month, the professors allocate 9-11 manmonths/year for this research, free of their other duties, altogether 55 manmonths during 5 years.
- for researchers, the average salary is 29000 NOK/month, the researcher resources are 45-55 manmonths /year, altogether researcher manmonths during 5 years 270 manmonths for five Nordic countries.

The social security costs are included in the salary costs in the table, the percentage for social security varies between participants (from 50% to 60%), the calculations have been done with the average percentage, 55%.

The indirect costs on salaries (overhead costs) vary also between the participants (from 60% to 70%), the average being 65%. The calculations for the budget have been done percentage, 50%. The rest, 15% of the indirect costs are subvention by the participating institutions.

Mobility and networking costs have been explained in the specific section Researcher mobility.

Data access costs cover the data collections costs, software and tools for data analysis.

Travel and meeting costs cover the consortium meetings which will be held regularly following the management plan. Meeting costs cover also cost for scientific conferences and other scientific and relevant events.

Dissemination and publication costs cover the website set up and maintenance, newsletters, open access publication fees, seminars and workshops organised by the consortium for various stakeholders and interested parties.

Other cost cover potential other equipment and software needed, laptops and comparative analysis tools.

Administration costs are covered completely by the participating universities, they are part of the provided research infrastructure. They are estimated to be 100 000 NOK per year, total subvention by the universities to the research is 500 000 NOK for 5 years.

Budget distribution

Provide a budget demonstrating how the sought funding from NordForsk will be distributed among the participating partners. Use the same budget structure and currency as above (upload in PDF format).

1 vedlegg

[Nordforsk_Distribution of resources_16102014.pdf](#)

Total budget

Total budget (in PDF format):

1 vedlegg

[Total budget - Health and welfare_16102014.pdf](#)

THE ROLE OF ICT ON NORDIC WELFARE SYSTEM – ESTABLISHING A NORDIC E-WELFARE OBSERVATOR

Background

In this research we focus on the Nordic Welfare System (NWS) and study and develop means and measures to assess the effects and impacts of Information and Communication Technology (ICT) on the welfare system and services provided by it. The typical features of the NWS are covered in this research: The extensiveness and inclusiveness of the system meaning e.g. high investment on human capital and provision of safety nets for Nordic citizens from birth to grave. The NWS has resulted in many achievements which are valuable, e.g. high living standards, low income inequality, high social mobility, good family policies, and strong role of women in society, collective safety nets and openness to globalization. However, the current economic turbulence has also challenged NWS and we can ask what the challenges for future development are, how the Nordic model sustains in health and social care and how we could maintain and develop it further? Further, how we will develop innovative business models that support NWS and at the same time stimulate cost-effectiveness.

With this research we study and define indicators at the surface between ICT and NWS for assessment and with those indicators develop an observatory that provides information and knowledge to analyze the current situation and trends that led to it, and to offer a basis for re-allocation of resources or a basis for efficient use of scarce resources and organizational knowledge.

At the core of our thinking is the concept of Observatory with which we underline the following goals:

- Sustainable system for collecting, analyzing and disseminating information, both technically and financially.
- Professional and established procedures for data collection, analysis and dissemination on best available evidence-based practices.
- Flexibility – over time the focus of the Observatory may change, even though some basic trend data must of course be constantly sustained.
- Open data for everyone interested.
- Bottom-up development of issues to observe, heavily depending on citizen activity.

With the data available from the Observatory, different stakeholders (citizen politicians, business, government, third sector) can develop their actions towards a sustainable and best possible NWS, and at the same time the Observatory functions as a platform for knowledge exchange, in and out from the Nordic countries, and on good as well as less successful aspects of the NWS. The Observatory should establish itself as a key tool to nourish Nordic human capital and organizational knowledge resources at the surface between NWS and ICT.

The Nordic Welfare System is seriously challenged today by three megatrends: digital revolution, globalisation and ageing. Two factors make the NWS particularly vulnerable: First, the extensive public welfare promise deeply part of the Nordic societies and of the publicly produced welfare services. Because of this, pressures for additional public expenditure to maintain and keep

the social welfare are strong. Second, as relatively small and open economies the Nordic countries are very dependent on the highly specialized export.

To sustain the Nordic model, reforms are needed, in different ways and degrees in different Nordic countries. Fortunately, Nordic countries have also demonstrated a significant capacity for reforms and adjustment and develop of innovative alternatives that stimulate an increasing involvement and empowerment of the citizens. Their starting points are also in many respects strong (Alestalo et al, 2009; ETLA, 2014). In the Nordic welfare system the continuous growth of public health and long-term expenditure and the principles of social responsibility partly reflect the preferences of the citizens and enhance the use of technology-based innovations to improve and maintain welfare. However, the rapidly increasing unit costs together with an increasing number of customers due to population ageing, as well as the need to allocate resources between other areas also of importance for the social welfare i.e. education limits to the capacity of public sectors to fulfil the expectations. Therefore prioritization, efficiency in public provision, possibly also structural changes and cost sharing in the financing of the services may be needed. To do this, evidence-based data and information is needed on the current status and future trends..

Significance of the proposed research

This research is highly-qualified, comparative, Nordic research collaboration between Denmark, Finland, Island, Norway and Sweden, with the purpose to study and develop measurable indicators and knowledgebase, an Observatory, to describe the status, and future development possibilities and sustainability challenges of the NWS, especially from the viewpoint of using ICT in health, social and welfare services. With the indicator and Observatory development we aim at exploring and assessing the impacts of ICT on the health and welfare system and services.

The Nordic societies are based on a common set of values, though with varying implementations, the similarities between the countries implement the Nordic welfare model. Nordic research co-operation enables sharing of experiences and contributes to the Nordic innovations and their implementations locally. Currently the Nordic welfare system faces new global challenges which include among other the need for better care for the elderly and maintaining the quality of welfare services. This research is focused on use of ICT, what has been achieved with ICT, how to monitor and follow the implementations and achievements, how to optimize the use of ICT in order to support the sustainability of our Nordic welfare system in the future.

Previous research

There are research results on evaluating the health ICT in a variety of health settings, some studies have focused on standardization processes, on safety and security aspects and on user satisfaction and on ease of system use issues (Castillo et al., 2010; Boonstra et al., 2010; McGinn et al., 2011; Lau et al, 2012). Some studies demonstrate improvements in health care quality such as increased adherence to guideline-based care, enhanced surveillance, monitoring and decreased medication errors and effects and impacts on patient care (Chaudhry et al., 2006; Ammenwerth et

al., 2012). The research has, however, not yet provided many results on the impacts of health information technologies or IT-based innovations, i.e. services and systems on patients or on the cost-effectiveness and cost- efficiency of health care (Black et al., 2011). In general, the empirical research evidence to support the benefits of health information technology is rather weak, there are reports both on positive (e.g. Buntin et al., 2011; Goldzweig et al., 2009) and on negative (e.g. Black et al., 2011) effects. A systematic review by Buntin et al (2011) studied positive and negative effects of health information technology (IT). They found that 92% of the studied articles showed positive benefits of health information technologies on IT use, efficiency and effectiveness, quality of care, decreased patient mortality and nurse staffing, resulting fewer complications in care and lower costs. They also found negative effects: patients and staff were less satisfied, there was unsatisfactory technology support, negative implications on workflows e.g. on staff interaction and on provider-patient communication. Goldzweig (2009) identified that health IT altered the staff responsibilities and had negative effects on patient safety, but also that the number of exacerbations and hospitalizations was decreased and this means that the care was improved and costs diminished. ICT has also impacts on education of both patients and medical staff. More research is still needed to collect evidence on how health information technologies effect on health care to achieve most benefits and best possible results.

Most of what is known about implementation of ICT-based innovations has been sampled, after analyzing the apparent failure of a program (Leviss, 2010). Thus, evaluations of newly implemented ICT-based innovations may result in poor results, not because the program of an implementation is ineffective, but because the results of the implementation process were assessed before the program was completely implemented and fully operational. A major constraint in implementation of ICT-based innovations studies in complex organizations is that they do not discuss the whole implementation process or the issues related to each of the steps of the process. Furthermore, several studies report that after a decision is made to begin implementing an ICT-based innovation, normally organizations confront with the challenge that the resources have being consumed in active preparation for actually doing things differently.

Welfare indicator research has been much focused on quality of life approaches that aim to integrate objective and subjective indicators (Hagerty et al. 2001; Veenhoven 2002). Indicators of subjective well-being have gained only limited acceptance as tools for the social-scientific analysis of human welfare, mainly because they seem insensitive to variations in the socio-economic context. A study by Fahey and Smyth (2010) identified linkages between subjective well-being and socio-economic conditions which are both strong and suggestive of important insights about national and cross-national relativities in human welfare. Their findings suggest that analysis of inequalities and relativities in welfare in purely national terms is insufficient, but greater weight needs to be given to cross-national relativities. With this study we study and develop indicators that will be applied in five Nordic countries and adjusted and harmonized to present cross-national differences as well as national situations. Vimarlund and Koch (2013) developed a tool with the title "Identifying Where the Values Come from IT-Innovations in Health and Social Care". The tool consists on a series of Indicators that express effects and outputs at the micro, inter and intra organizational level as well as at the social network environment and is used to identify the organizational outcomes and its correspondent financial value, allowing stakeholders to evaluate the potential of services and systems or its contributions to the sector.

National health and welfare indicators are applied in Nordic countries, e.g. in Finland the WelfareCompass (<http://www.hyvinvointikompassi.fi/en/>) is a collection of around 100 key indicators which are presented at national level, at hospital special responsibility area level, at hospital-district level, at regional level and at municipal level. In Sweden similar data can be found at Welfare – Statistics, Sweden's periodical on working life, demography and welfare, in Denmark with the title Welfare indicators and in Norway under the title Statistics on the Norwegian Labour and Welfare Administration (NAV).

The national welfare indicator systems are mostly planned to give an overview of the development of health, welfare, and social and health services. They enable administrators and citizens to compare the municipality, hospital district, or region with the region of his/her choice, to select information for the municipality's welfare report. The shortcoming of these statistics, that we try to overcome, is that they give no support to understand the role of ICT in the NWS system.

Also, there exist already several observatories for health and welfare, e.g. European Observatory on Health Systems and Policies (<http://www.euro.who.int/en/about-us/partners/observatory>), which supports and promotes evidence-based health policy-making through comprehensive and rigorous analysis of the dynamics of health care systems in Europe. A well-received service has been that of OECD Better Life Index (<http://www.oecdbetterlifeindex.org/>), which interactivity and perfect visual setting will act as an example for our Observatory also.

The WHO Global Health Observatory (<http://www.who.int/gho/database/en/>) is a data repository which contains an extensive list of indicators. It is the World Health Organization's main health statistics repository. WHO has also established in 2005 the Global Observatory for eHealth (<http://www.who.int/goe/en/>), an initiative dedicated to the study of eHealth, its evolution and impact on health in countries. The Observatory model combines WHO coordination regionally and at headquarters to monitor the development of eHealth worldwide, with an emphasis on individual countries. Even this WHO eHealth Index fails to go very deep into the role of ICT in health, social and welfare systems. Recognizing that the field of eHealth is rapidly transforming the delivery of health services and systems around the world, WHO is playing a central role in shaping and monitoring its future, especially in low- and middle-income countries. The WHO's Observatory's mission is to improve health by providing Member States with strategic information and guidance on effective practices and standards in eHealth.

We will study all these existing observatories and utilize their data and indicator data bases in our research. Our results will add on to these existing data sets and observatories.

Observatory-kind of thinking is trendy even in other areas than Health. Good examples are the observatories of entrepreneurship (<http://www.gemconsortium.org/>), the Observatory of Global Change (<http://observatory.ew.eea.europa.eu/>), Environmental Virtual Observatory (<http://www.evo-uk.org/>) or Labour Market Observatory (<http://www.eesc.europa.eu/?i=portal.en.lmo-observatory>). These few examples clearly show that there is huge demand for open, quality and focused information on different aspects of life that observatory-kind of systems can provide.

The key factors for sustained success of ICT in health care are a culture with aligned goals and values, and coordinated team care that especially engages with physicians and patients. In the short term there seems to be need to enhance the awareness of the practical opportunities to

improve, including the expansion of proven community-based disease management programs that communicate knowledge, competencies and clinical measurements among professional and patient partners leading to reduced care gaps and improved clinical and economic outcomes (Montague, 2009). Longer-term success may require at least two additional steps: Formal inter-professional training to provide the polyvalent human resource skills and foster the culture of working with others to improve the care of whole populations, and second, adoption of reliable information systems, including electronic health records, to allow useful and timely measurement and effective communication of clinical information in real-world settings. Our research will analyze and assess how the support by ICT systems could be optimized to serve the health care system.

Our research takes the existing national and global indicators and observatories as a starting point. Our focus must be on not duplicating existing indicators, but rather to develop new indicators illuminating the interactions between ICT and welfare, especially in the setting of the NWS. Our hypothesis is that the existing indicators need to be complemented with aspects and characteristics derived from research and from health professionals' and citizens' perspective, and the coverage and expressiveness of them on ICT issues needs to be extended. We will derive extended indicators, apply and test them in five Nordic countries, and compare and assess their coverage and expressiveness and build an observatory utilizing these indicators. Finally we study the possibilities for generalization and harmonization of them at the Nordic countries level. Thus, we build on and continue from the earlier work and drill deeper to the topics central and relevant to the Nordic welfare system.

The research team has comprehensive background in the domain and their earlier research links well with this research proposal. Prof Nykänen has been involved e.g. in many national evaluation studies^{1, 2, 3} and evaluation approaches development⁴. Prof Suomi has touched upon a wide variety of topics on healthcare IS, including eHealth-applications⁵, use of social media in healthcare⁶ and patient education⁷. Prof Vimarlund is today the scientific leader of the national network of e-health researches in Sweden, she is also the scientific leader of three international projects that aim to develop innovative business models for e-health⁸, to develop a tools to evaluate the impact of IT-based innovation in the e-health area⁹ and to implement IT-based innovations in a cost- effective manner. Prof Simonsen is an expert in participative system design¹⁰, prof Ellingsen

¹ Hyppönen H, Doupi P, Hämäläinen P, Komulainen J, Nykänen P and Suomi R, Planning for national health information systems evaluation. In: Adlassnig K.-P. et al. (Eds.): Medical Informatics in a United and Healthy Europe. Proceedings of MIE 2009. Stud Health Techn Inform 2009;150: 972-976

² Moen A, Hackl WO, Hofdijk J, Van Gemert-Pijnen L, Ammenwerth E, Nykänen P, Hoerbst A, eHealth in Europe – Status and challenges. European Journal of Biomedical Informatics 8(1), 2012, 2-7.

³ Nykänen P, Kaipio J and Kuusisto A, Evaluation of the Finnish nursing classification system and four nursing documentation systems in Finland – lessons learned and directions or the future. Int J med Inform 81(8), 2012, 505-520

⁴ Nykänen P, Brender J, Talmon J, deKeizer N, Rigby M, Beuscart-Zephir MC, Ammenwerth E, Guideline for good evaluation practice in health informatics. Int J Medical Informatics 2011; 80: 815-827

⁵ Suomi, Reima – Serkkola, Ari - Mikkonen, Markku (2007). GSM-based SMS Time Reservation System for Dental Care. International Journal of Technology and Human Interaction Vol. 3 No. 3, 54-68.

⁶ Suomi, Reima – Mäntymäki, Matti – Söderlund, Sari (2014) Promoting Health in Virtual Worlds: Lessons from Second Life. Journal of Medical Internet Research Vol 16, No. 10), e229

⁷ Heikkinen, Katja – Salanterä, Sanna – Suomi, Reima – Lindholm, Annika – Leino-Kilpi, Helena (2011) Ambulatory orthopedic surgery patients' education and costs of care. Orthopaedic Nursing, Vol. 30 No.1, 20-28. ISSN 0744-6020.

⁸ Mettler, T., & Vimarlund, V. (2009). Understanding business intelligence in the context of healthcare. *Health informatics journal*, 15(3), 254-264.

⁹ Rahimi, B., & Vimarlund, V. (2007). Methods to evaluate health information systems in healthcare settings: a literature review. *Journal of medical systems*, 31(5), 397-432.

¹⁰ Bødker, K., Kensing, F., & Simonsen, J. (2004). *Participatory IT design: designing for business and workplace realities*: MIT press.

in Electronic Medical Records¹¹, and prof Pálsdóttir in the health behavior of citizen¹² and citizen information seeking in health issues¹³.

Objectives

With the research and Observatory we are seeking answers to questions: Does the Nordic socio-economic model perform well and is it sustainable and what are the challenges involved? What effects and impacts has ICT resulted in the welfare system? How the positive effects and impacts could be optimized to result better quality, more efficiency and economy in welfare service production and delivery? We are also interested, if the Nordic model includes aspects that other countries, especially in EU, could learn from us, or could we learn from EU-perspective?

The detailed research questions are:

- 1) Does the Nordic welfare model perform well, is it sustainable for the future?
- 2) What are the effects and impacts of ICT on the Nordic welfare model, especially on health care services provision and delivery?
- 3) How the positive effects and impacts could be optimised to result in better quality, more efficiency and economy in welfare services production and delivery?

To find answers to these questions this research has the following objectives:

- To study and assess the existing national and global indicators: similarities and differences between them, their coverage and ability to express all required characteristics of the situation. Our focus is on indicators that can measure and express the ICT effects and impacts and to capture where the values come from.
- To study how the existing indicators need to be complemented with aspects and characteristics derived from research and from health professionals' and citizens' perspective, and derive extended indicators that can measure and capture human capital, economic efficiency and social motivation.
- To apply and test these extended indicators in three Nordic countries (Finland, Sweden, Denmark) to evaluate the effects and impacts of ICT on health care system and welfare services.
- To compare and assess the coverage and expressiveness of these indicators and study the possibilities for generalization and harmonization at the Nordic countries level.
- To define and develop an observatory for continuous storage of indicators and for monitoring of future Nordic welfare system development from the ICT-effects and impacts perspective.

ICT is in two roles in this research: First, we study and analyze the impacts of ICT on health, social and welfare service systems with the goal of understanding how ICT supports the Nordic Welfare system and services production and delivery. Second, ICT activities in the relevant

¹¹ Lærum, H., Ellingsen, G., & Faxvaag, A. (2001). Doctors' use of electronic medical records systems in hospitals: cross sectional survey. *Bmj*, 323(7325), 1344-1348. Ellingsen, G., & Monteiro, E. (2003). Big is beautiful: electronic patient records in large Norwegian hospitals 1980s-2001. *Methods of information in medicine*, 42(4), 366-370.

¹² Pálsdóttir, Á. (2008). Information behaviour, health self-efficacy beliefs and health behaviour in Icelanders' everyday life. *Information Research*, 13(1), 4.

¹³ Pálsdóttir, Á. (2010). The connection between purposive information seeking and information encountering: A study of Icelanders' health and lifestyle information seeking. *Journal of Documentation*, 66(2), 224-244.

service systems is being measured and analyzed with the aim of identifying investment possibilities and options for performance and societal improvement.

The results of this study are analysis of the ICT effects and impacts on the Nordic welfare model, identification of the treats and challenges for future sustainability and means to monitor and optimise future development. To achieve these results we develop an extended set of indicators to measure the ICT aspects of the welfare model, and perform extensive comparative studies in the four Nordic countries, and finally, develop an Observatory that collects data and information on the extended indicators. The indicator-based Observatory will be supported such that it develops to an established and appreciated think-tank in the welfare domain.

The analysis, assessment and the extended indicators help to build a comprehensive picture of the current state of the Nordic welfare model and to analyse the threats and challenges and to monitor and coach the future development. These results have potential for high impact in all Nordic countries, the impacts are identified in societal and economic areas with better services quality and access, and with more cost-effective services provision and delivery. From the long-term scientific perspective this research will study the foundations of the Nordic model, analyse especially the role, effects and impacts of ICT in the model and with the extended indicators generate new knowledge to understand, monitor and guide the Nordic welfare model in the future. The self-standing Observatory will be functioning after the funding period, it will be a shared Nordic think-tank that will help to highlight and market the best sides of the Nordic welfare model globally.

This research will have impacts at the Nordic level: We know better what is the status and effects and impacts of ICT, we know better how to improve the utilisation of ICT, we know better which are the correct measures, indicators, and how to measure the ICT-based welfare system and its qualities.

At global level this research provides information on how the Nordic welfare system and the global approaches differ, especially in ICT use and effects, what are the best challenges of both, and how we could apply the Nordic models best parts globally.

Justification for the proposed research in relation to the call

The Nordforsk calls for ‘Nordic research projects on the distribution of health and welfare’ calls for research that is focused on the welfare systems in the Nordic countries, comparative research within and between countries that will contribute to a deeper understanding of mechanisms underlying health distribution and the role of welfare systems in reducing differences in health distribution, and produce basic knowledge about the mechanisms underlying the distribution of health and the role of welfare systems in improving health and well-being. To achieve this objective, projects should employ a multidisciplinary and comparative approach (<https://funding.nordforsk.org/nordforsk/call/call.jsp?cid=424>).

Our research is focused on assessment of the capabilities of the national indicators, to study and assess the effects and impacts of ICT-based on health and welfare system and services. The research results in extended indicators that produce knowledge capital about health care system and the role and power of ICT in the Nordic welfare model. We apply a multidisciplinary approach (covering information systems science, business intelligence, organisational theories, indicator

development, evaluation research) and comparative approach (inside each participating country, between the Nordic countries and in relation to EU). Our special focus on the deeper understanding of mechanisms underlying health distribution is on ICT: it is well known that Digital Divide is well represented in health-related issues also (Wyatt et al., 2005).

Research strategy

Our work packages are the following 12 ones:

- 1) Analysis of indicators:
 - Collection and analysis of materials on the existing national and global indicators and observatories
 - Interviews of ministerial and health policy makers using indicators,
 - Comparative studies on similarities and differences between indicator sets, inside a nation and between the nations,
 - Analysis of the indicator coverage and their ability to express all required characteristics of the situation with the focus ICT effects and impacts
- 2) Gap-analysis and SWOT-analysis of the indicator sets:
 - Identifying the gaps, strengths and weaknesses
- 3) Systematic literature review of eHealth Indicators types, development and use
 - Aspects and characteristics of indicators in the literature
- 4) Citizens' / health and welfare professionals' information needs.
 - Collection of the information needs and requirements from all relevant stakeholders
- 5) Extension of indicators:
 - A complemented set of indicators is derived, based on analysis, interviews and literature review
- 6) Application and testing the extended indicators in the Nordic countries to test and evaluate the indicators
- 7) Refinement based on testing feedback:
 - Analysis of testing results
 - Redefinition of indicators
- 8) Validation of the extended indicators
 - Walk-through and validation analysis of the indicators in virtual workshops organized with all involved countries with sufficient numbers of stakeholders represented
- 9) Application on the Nordic countries data sets to produce reports, scientific publications and other material for wide-scale distribution
- 10) Analysis of results:
 - Comparison and assessment the coverage and expressiveness of these indicators, as well as aspects of human capital, social innovation and implementation value
 - Study of the possibilities for generalization and harmonization at the Nordic countries level.
- 11) Definition and development of an Observatory:
 - Observatory is needed for sustainable management of indicators and for monitoring of future Nordic welfare system development from the ICT-effects and impacts perspective.
- 12) eGovernance planning for the Observatory organization and maintenance:

- During this research the planning of the organization and eGovernance of the Observatory will be done to support the Observatory to develop itself to an established and appreciated think-tank in the field of eWelfare, with the mission of highlighting and marketing the best sides of the Nordic welfare state globally.

Progress plan

The research starts 1st of February 2015, and ends 31st of December 2019, totaling a duration of 5 years.

The progress plan follows the research strategy outline:

<i>Phase</i>	<i>Timing</i>	<i>Milestone</i>	<i>Deliverable</i>
Analysis of indicator sets	1.2.2015 – 31.12.2015	MS1: Analysis	Report on Nordic indicator sets, with chapters on national indicators and a summarizing analysis at Nordic level
Gap- SWOT-analysis	1.6.2015 – 30.11.2015		
Systematic literature review	1.9.2015 – 28.2.2016		Literature review publication – open access
Citizens' / professionals' needs	1.1.2016 – 30.6.2016		Report on the needs
Extension of indicators	1.3.2016 – 30.11.2016	MS 2: Extended indicator set	Report: Extended indicator set with justifications from literature, analysis and interviews
Testing of the indicators with Nordic data set	1.12.2016 – 30.10.2017		Testing results report
Validation workshops, refinement of indicators	1.10.2017 – 31.3.2018	MS3: Refined indicators	Report on Validation workshops, refined indicators
Application on the Nordic data sets (FI, DK, SE, NO, IS), with new data collection	1.4.2018 – 31.1.2019		
Analysis of application results, coverage and expressiveness assessment	1.1.2019 – 30.6.2019	MS4: Analysis results	Report on comparative studies, coverage and expressiveness of results
Definition and development of an Observatory	1.12.2018 – 31.8.2019		Observatory preliminary plans
eGovernance planning for an observatory	1.8.2019 -31.12.2019	MS5: Observatory	Report on indicators, observatory and its organization and governance
Dissemination	1.2.2015 – 31.12.2019		Publication of results, open access, presentations in seminars, workshops, conferences, for public audience

We will publish results on the Internet, in scientific journals, conferences and in open access sources. Materials are produced for the political decision makers, but also in a form suitable for business and the citizens. Over time, the observatory will be able to produce trend data. The goal is to establish the observatory as a self-sufficient service organization with sustainable services and business model.

Gender

The research consortium is well-balanced with the gender equality, three of the six team leaders are representing each gender and in all other staff both genders will be as equally as possible represented, subject to availability of researchers.

Key literature, bibliography or other relevant references

- Alestalo M, Hort SEO, Kuhnle S, The Nordic Model: conditions, origins, outcomes, lessons. Hertie School of Governance , Working papers 41, 2009, <http://edoc.vifapoi.de/opus/volltexte/2013/4255/pdf/41.pdf>
- Ammenwerth E, Schnell-Inderst P, Hoerbst A, The Impact of Electronic Patient Portals on Patient Care: A Systematic Review of Controlled Trials. *J Med Internet Res* 2012;14(6):e162)
- Black AD, Car J, Pagliari C, Anandan C, Cresswell K, Bokun T, McKinsty B, Procter R, Majeed A, Sheikh A, The Impact of eHealth on the Quality and Safety of Health Care: A Systematic Overview. *PLoS Medicine*, 2011, Jan;8(1), e1000387
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- Castillo et al., 2010, A knowledge –based taxonomy of critical factors of adopting electronic health record systems by physicians: A systematic review. *BMC Medical informatics and decision making*, 2010, 10:160
- Chaudhry B, Wang J, Wu S, Maglione M , Mojica W, Roth E, Morton SC, Shekelle PG, Systematic review: Impact of health information technology on quality, efficiency and costs of medical care. *Annals of Internal Medicine*, 2006, 144: 742-752.
- ETLA, The Nordic model – challenged but capable of reform. Tarmo Valkonen and Vesa Vihriälä (eds.). ETLA Report B262, Nordic Council of Ministers, 2014
- Fahey, Tony, Smyth Emer (2010) Do subjective indicators measure welfare? Evidence from 33 European societies, *European Societies*, 6:1, 5-27
- Lau et al, 2012, A review of systematic reviews of health information system studies, *J Am Med Inform Assoc* 17(6), 2010, 637-645
- C. L. Goldzweig, A. Towfigh, M. Maglione and P. G. Shekelle, “Costs and Benefits of Health Information Technology: New Trends From The Literature,” *Health Affairs*, Vol. 28, No. 2, 2009, pp. 282-293
- Hagerty MR, Cummins RA, Ferriss AL, Land K, Michalos AC, Peterson M, Sharpe A, Sirgy J, Vogel J, Quality of Life Indexes for National Policy: Review and Agenda for Research. *Social Indicators Research*, July 2001, 55(1): 1-96
- McGinn et al., 2011 McGinn et al., Comparison of user groups’ perspectives of barriers and facilitators to implementing EHRs: A systematic review. *BMC Medicine*, 2011, 9:46
- Montague 2009, Next-generation healthcare: a strategic appraisal. *Healthc Pap.* 2009; 9(2):39-44
- Veenhoven R, Why Social Policy Needs Subjective Indicators. *Social Indicators Research Series* 11, 2002:33-45
- Vimarlund V and Koch S, Identifying where the values come from IT-innovations in health and social care. *Intell Inform Manag* 2012, 4, 296-308.
- Wyatt, S., Henwood, F., Hart, A., & Smith, J. (2005). The digital divide, health information and everyday life. *New Media & Society*, 7(2), 199-218.

CURRICULUM VITAE

Pirkko Nykänen

Name, date of birth, citizenship Pirkko Nykänen, 28.01.1950, Finnish

Professor (50%) Health informatics; Research director (50%); School of Information Sciences, University of Tampere

Education and degrees awarded

- PhD, University of Tampere, Department of Computer Sciences, 2000
- Lic.Phil, University of Tampere, Department of Computer Sciences, 1991
- MSc, University of Tampere, Department of Computer Sciences, 1990
- Docent, Information systems and health informatics, University of Tampere, 2002

Most important previous positions

- Development manager, National Institute for Health and Welfare, 2001-2003
- Senior Researcher, VTT Technical Research Centre of Finland, Medical Engineering/Information Technology, 1975-2001

Most important research projects / grants acquired

- Finnish Academy, Trusted eHealth and eWelfare Space, 2009-2012 approx 260 000€
- Ministry for Social Affairs and Health, Work Research Fund, Evaluation and assessment of the Finnish nursing classification and nursing documentation systems, 2010, approx.. 100 000€
- The Finnish Innovation Fund SITRA, Integration alternatives of the electronic patient record systems with the national health IT infrastructure, 2009-2010, approx. 100 000€
- The Finnish Funding Agency for Innovation TEKES, MyWellbeing-citizen-centered health services, 2008-2010, approx. 140 000€
- The Finnish Funding Agency for Innovation TEKES, eHealth Partners Finland, China-Finland eHealth partnership, 2007-2009, approx. 200 000€
- The Finnish Funding Agency for Innovation TEKES, Medication management, 2008-2009, approx. 100 000€

Doctoral supervision and acting as opponent of a doctoral dissertation

- Supervisor 5: Jaana Junntila 2012-2015; Antto Seppälä 2009-2014; Kristiina Häyrynen, University of Eastern Finland, 2008-2011; Maritta Koivisto, Turku University, 2008-2010; Timo Valli 2006-2016
- Opponent 1: Reetta Raitoharju, Turku University, 2007
- Reviewer 6: Maija Valta, University of Eastern Finland, 2013; Nicole Mostert-Pipps, Nelson Mandela Metropolitan University, South-Africa, 2012; Kaisu Juntunen, University of Oulu, 2012; Lyn Hanmer, University of Cape Town, South-Africa, 2009; Samuli Niiranen, Tampere University of Technology, 2006; Kati Viikki, University of Tampere, 2002.

Awards, prizes and honours

- Best paper awards: 1) The 2nd International Conference on the Digital Society, ICDS 2008, 2) Int Conference on eHealth, Telemedicine and Social Medicine, IEEE Computer Society, 2009.

Research visits abroad

- Lecturer, Fudan university, Medical Faculty, Key Lab for Health Technology Assessment, PR China, 2008 (2 weeks)

- Senior researcher, Pennsylvania State University (PennState), School of Information Sciences and Technology, USA, 2000-2001 (12 months)
- Researcher, Universite de Lille, Centre d'Etudes et de Recherche en Informatique Medicale, France, 1994 (2 months).

Other academic merits

- Evaluation of docentships: Ilkka Kalli, Kuopio University, 2004; Ari Serkkola, Turku School of Economics, 2008.
- Chair, editorial board, Finnish Journal for eHealth and eWelfare, 2013-2015
- Reviewer: South-African Computer Journal, International Journal of Medical Informatics, BMC Medical Informatics and decision making, IEEE Transactions of on Information Technology in BioMedicine, Nursing Informatics, Methods of Information in Medicine
- Co-editor, International Journal Artificial Intelligence in Medicine, 2013 Special issue
- Co-chair, scientific program committee, EFMI Special topic conference on Data for decision support, Prague, April 2013
- Member, Programme Committee. 25th International Symposium on computer-based medical systems (CBMS2012)
- Member, Scientific Program Committee MIE2009, Scientific Programme Committee, IEEE CBMS 2009
- Member, Review Board, World of Health IT, 2006-2008
- Co-chair, China-Finland Health IT Summit Forum, March 2006, Beijing
- Associate editor, IEEE Transactions on Information Technology in BioMedicine, 2005-2006
- Chairman, Scientific Review Board, Nordic Conference on eHealth and Telemedicine 2006
- Member, International Advisory Committee, EMBEC 05 Congress, Czech Republic, November 2005, Scientific Programme Committee MIE2004 STC; Munich, June 2004
- Chair, Finnish Society for social and health care informatics, 2003-2006

Publications

- total number of refereed articles in international/national journals: 35/2
- total number of refereed chapters in books by international/national publishers: 11/1
- total number of refereed articles in conference proceedings: 47/8
- total number of other publications, 50.

Expert positions in society and other merits related to the societal impact research

- EU expert, ICT for Health
- Expert IMIA eHealth Summit, 2012-2013
- Chair, Working group, National Institute for Welfare and Health, Development of guidelines and principles for adoption of the Finnish nursing classification in the nursing documentation systems, 2010-2011
- Coordinator, Review of IT projects in the National Health Project, Ministry for Social Affairs and Health, 2005-2010
- Chair, Editorial Board, Finnish Journal for eHealth and eWelfare, 2013-2015
- Chair, Finnish Society for Social and Healthcare Informatics, 2003-2006; Board Member, 2007-
- Co-chair, Scientific program committee, EFMI Special Topic Conference on Data for Decision Support, Prague, 2013
- Member, Scientific advisory board, Finnish office for health technology assessment, 2008-2012
- Member, review board, World of Health IT, 2006-2008
- Co-chair, European Federation for Medical Informatics, WG HISEVAL Evaluation of Health Information Systems and Technology, 2006 –

**SELECTED PUBLICATIONS AND CITATION STATISTICS,
H-INDEX (if relevant to the field)**

Viittausindeksit (google scholar)

	Kaikki 2009 lähtien	
Sitaatit	1259	860
h-indeksi	13	10
i10-indeksi	20	11

- 1) Definition, structure, content, use and impacts of electronic health records: a review of the research literature, K Häyrinen, K Saranto, P Nykänen, International journal of medical informatics 77 (5), 291-304 2008
- 2) Visions and strategies to improve evaluation of health information systems: Reflections and lessons based on the HIS-EVAL workshop in Innsbruck, E Ammenwerth, J Brender, P Nykänen, HU Prokosch, M Rigby, J Talmon, International journal of medical informatics 73 (6), 479-491 2004
- 3) STARE-HI—Statement on reporting of evaluation studies in Health Informatics, J Talmon, E Ammenwerth, J Brender, N de Keizer, P Nykänen, M Rigby, International journal of medical informatics 78 (1), 1-9 2009
- 4) Factors influencing success and failure of health informatics systems - A Pilot Delphi Study, J Brender, E Ammenwerth, P Nykänen, J Talmon, Methods Inf Med 45, 125-36 2006
- 5) A study of medical and health queries to web search engines, A Spink, Y Yang, J Jansen, P Nykänen, DP Lorence, S Ozmutlu, Health Information & Libraries Journal 21 (1), 44-51 2004
- 6) Evaluation of decision support systems in medicine, P Nykänen, S Chowdhury, O Wigertz, Computer methods and programs in biomedicine 34 (2), 229-238 1991
- 7) Decision support systems from a health informatics perspective, P Nykänen, Tampereen yliopisto 2000
- 8) Success and failure factors in the regional health information system design process—results from a constructive evaluation study, P Nykanen, E Karimaa, Methods of information in medicine 45 (1), 85 2006
- 9) A methodology for evaluation of knowledge-based systems in medicine, K Clarke, R O'Moore, R Smeets, J Talmon, J Brender, P McNair, P Nykänen, J Grimson and B Barber, Artificial intelligence in medicine 6 (2), 107-121 1994
- 10) Guideline for good evaluation practice in health informatics (GEP-HI), P Nykänen, J Brender, J Talmon, N de Keizer, M Rigby, Beuscart-Zephir MC, Ammenwerth E, International journal of medical informatics 80 (12), 815-827 2011

Curriculum Vitae

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Education

Doctoral degree at the Department of Information Studies, Åbo Akademi University, since 2005. M.A. degree at the Department of Library and Information Sciences at the University of Iceland, since 1997. B.A. degree at the Department of Library and Information Sciences at the University of Iceland, since 1995.

Professional experience

2010 - Professor at Department of Information Science IS (former Library and Information Science (LIS)), University of Iceland (UoI).

2010, Nov. Responsible for organising and teaching at a workshop for PhD students, Theories in Information Studies, by NORSLIS (Nordic Research School in Library and Information Science), at the University of Riga, Letland.

2009, Nov. Responsible for organising and teaching at a workshop for PhD students, Theories, Methodologies and Research Methods in Information Studies, by NORSLIS, at the University of Tallinn, Estonia.

2006-2010 Associate Professor at Department of LIS, UoI.

2007, June. Responsible for organising and teaching at a workshop for PhD students, Health and Information Mastering, by NORSLIS, at Åbo Akademi University, Finland.

2006, August. Visiting lecturer at the Department of Information Studies, Åbo Akademi University, Finland. Supported by NORSLIS.

1998-2007 Assistant professor at the Department. of LIS, (UoI).

1997-1998 Lecturer at the Department of LIS, (UoI).

Has supervised over 40 masters students at the Dept. of IS/LIS and other departments at UoI. Is currently supervising three PhD students. Has organized and taught courses for PhD students at Åbo Akademi University, University of Tallinn and University of Riga.

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Work experience

Professor Turku School of Economics September 1998 –

Part-time professor Huazhong Normal University,

Wuhan, Hubei, China January 2010 -

Senior researcher Academy of Finland August 2001 – July 2002

Associate professor Turku School of Economics February 1994 - August 1998

Vollamtlicher Dozent Universität St. Gallen Juni 1992- December 1993

Senior Assistant Turku School of Economics January 1991 – May 1992

Assistant Turku School of Economics August 1986 – July 1989

Sampo Group System development consultant August 1987-December 1990

Lecturer Turku School of Economics August 1983-July 1987

Veho Ltd System developer June 1982-July 1983

Education and training

1984 Master of economics Turku School of Economics, Finland

1987 Licenciate

Gunnar Ellingsen is professor in telemedicine and e-health at the Arctic University of Norway, Department of Clinical Medicine. He is also leader of the research group for Telemedicine and eHealth. He has a 20 % position as special advisor at Helse Nord IKT. He holds a MSc. in Computer Science from the University of Tromsø and a Ph.D in Computer and Information Science from Norwegian University of Science and Technology (NTNU). Gunnar has since the late 1990s studied the implementation and use of Electronic Patient Records in Norwegian hospitals. Since 2006, he has been a sub-project leader at "Tromsø Telemedicine Laboratory" (TTL), which is part of the Centre for Research-based Innovation (SFI) programme initiated by the Research Council of Norway.

Curriculum Vitae: Vivian Vimarlund

Linköping University

International Business School at Jönköping

Associated Dean of Research

Phone + 46 72 586 6 180

Vivian.Vimarlund@jibs.hj.se or vivian.vimarlund@ida.liu.se

Current academic positions:

☑ Professor in Health Informatics, Associated Dean of Research at the International Business School at Jönköping, since 1 Jan 2010

☑ Professor in Informatics at Linköping University, Department of Computer Science, since 1999

☑ Director of the Research Center Cenit/IS at JIBS

Education and Academic degrees:

Ph.D. in Informatics, Linköpings universitet, Sweden, 1999-10-07.

M.Sc. in Economics, Linköpings universitet, Sweden, 1995.

Management & Leadership

Professor Vimarlund has a wide experience on management and leadership. Academic leadership is practiced as Associated Dean of Research, Director of the Research Center (CENIT/IS) at Jönköping International School (JIBS), as a Member of the American Medical Informatics (AMIA) Mentorship Programme, and as the scientific leader of a series of research projects. She is the co-director of the master programme Software Engineering and Management at LiU, the coordinator of the national eHealth network and scientific secretary at SFMI.

Research

Professor Vimarlund has since 1989 conducted research within the area of Informatics with special focus on issues such as: a) Methods and models to evaluate the impact of the implementation and use of IT-based innovations in healthcare. b) Business models for Public Information Systems and Electronic Markets c) E-health governance and innovation

PhD-student supervision

As main supervisor

Bahlol Rahimi (PhD 2009) Jörgen Skågeby (PhD 2008)

Charlotte Stolz (Lic 2007) Fidel Vascos Palacios (Lic 2006)

CV Jesper Simonsen



Professor ved Institut for Kommunikation, Virksomhed og Informationsteknologier, Roskilde Universitet. Leder af Roskilde Universitets satsningsområde i Designing Human Technologies.

Internationalt førende ekspert i Participatory Design (brugerdrevet it-innovation). 22 års erfaring med forskningsledelse og samarbejde med eksterne partnere. 10 års erfaring med implementering af it-systemer og effektmålinger af disse i sundhedssektoren i Danmark. Har siden 2005 kontinuert haft forskningssamarbejde med sundhedssektoren i Danmark, senest ifm. projekterne 'Klinisk overblik' og 'Klinisk kommunikation' som med succes har udviklet, indført og evalueret elektroniske overblikstavler i Region Sjælland. Forskningen har omfattet udvikling af en effekt- og brugerdrevet metode til optimering af kliniske arbejdsgange. En række projekter har udviklet den effektdrevne metode som del af pilotimplementering af elektroniske patientjournaler og implementering af elektroniske overblikstavler. I disse år er samarbejdet fokuseret på lokal kompetenceopbygning med personale fra Nykøbing Falster Sygehus i effektdrevet optimering: <http://dht.ruc.dk/cc/>

Kontaktoplysninger

Jesper Simonsen, Professor, Ph.D., Director at Designing Human Technologies
Department of Communication, Business and Information Technologies
Roskilde University, University Street 1, Building 43-2
DK-4000 Roskilde, Denmark
URL: <http://jespersimonsen.dk>, <http://designinghumantechnologies.dk>,
<http://www.ruc.dk/en/dht>
Phone: +45 20440338
E-mail: simonsen@ruc.dk

Udvalgte forskningspublikationer. Komplet liste: <http://jespersimonsen.dk>

- 2014: Simonsen, J. . Svabo, S. Strandvad, K. Samson, M. Hertzum, and O. Hansen, (Eds.) *Situated Design Methods*. Boston: MIT Press.
- 2014: Hertzum, M., and J. Simonsen: "Effects of electronic emergency-department whiteboards on clinicians' time distribution and mental workload," *Health Informatics Journal*, To appear in Health Informatics Journal.
- 2013: Hertzum, M., and J. Simonsen: "Work-Practice Changes Associated with an Electronic Emergency-Department Whiteboard," *Health Informatics Journal*, Vol. 19, No. 1, pp. 46-60.
- 2012: Simonsen, J. and T. Robertson (Eds.), *International handbook of Participatory Design*, Routledge.
- 2012: Hertzum, M., J. Bansler, E. Havn, and J. Simonsen: "Pilot Implementation: Learning from Field Tests in IS Development," *Communications of the Association for Information Systems*, Vol. 30, No. 1, Article 20, pp. 313-328.
- 2011: Hertzum, M., and J. Simonsen: "Effects-Driven IT Development: Specifying and Measuring Usage Effects", *Scandinavian Journal of Information Systems*, Vol. 23 , No. 1, pp. 1-26.
- 2010: Simonsen, J., J.O Bærenholdt, M. Büscher, and J.D. Scheuer (Eds.): *Design Research: Synergies from Interdisciplinary Perspectives*, Routledge.
- 2009: Simonsen, J.: "The Role of Ethnography in the Design and Implementation of IT Systems", *Design Principles and Practices, an International Journal*, Vol. 3, No. 3, pp. 251-264.
- 2008: Hertzum, M. and J. Simonsen: "Positive effects of electronic patient records on three clinical activities", *International Journal of Medical Informatics*, Vol. 77, No. 12, pp. 809-817
- 2008: Bødker, K., F. Kensing og J. Simonsen: *Professionel it-forundersøgelse: - grundlag for brugerdrevet innovation* (2 udg.). Samfundslitteratur. [1. udg. udgivet på MIT Press i 2004]

Participating research teams

Call title:	Nordic research projects on the distribution of health and welfare
Application id:	75012
Application title:	The role of ICT on Nordic welfare system – establishing a Nordic welfare observatory

Research team 1

Partner (institution, organisation or other legal entity)

Name University of Iceland

Postal address

Team leader (person responsible for the partner)

Full name Agusta Paldottir

Gender female

Position Professor

Academic degree PhD

Expertise

Telephone (work)

Mobile

E-mail address

Team description, including a description of how the team/ partner will contribute to the Project as a whole (Max 5000 characters)

The team members will be nominated later. The team leader has a good group of researchers available for this research. The team will contribute to the research with the study and analysis of social issues and citizen's perspectives, and to the Iceland situation analysis and comparative studies. Additionally the team will contribute by studying the citizens' health behavior issues in the Nordic welfare context and citizens' health information needs.

Team members

Full name	Position	Role in project	E-mail



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Research team 2

Partner (institution, organisation or other legal entity)

Name Linköping University

Postal address

Team leader (person responsible for the partner)

Full name Vivian Vimarlund

Gender female

Position professor

Academic degree PhD

Expertise

Telephone (work)

Mobile

E-mail address

Team description, including a description of how the team/ partner will contribute to the Project as a whole

The team members will be nominated later. The team leader has a good group of experienced researchers and junior researchers available for this research. The team will contribute to the research with studying and analysing the business models and ICT-innovation aspects and methods and models to evaluate the impacts of the implementation and use of IT-based innovations in healthcare. They have special expertise in studies to implement ehealth innovations in a cost-effective way. Additionally the team will contribute to E-health governance and innovation issues and lead the comparative studies in Sweden.

Team members

Full name	Position	Role in project	E-mail

Research team 3

Partner (institution, organisation or other legal entity)

Name Tromsø university

Postal address

Team leader (person responsible for the partner)

Full name Gunnar Ellingsen

Gender Male

Position Professor

Academic degree PhD

Expertise

Telephone (work)

Mobile

E-mail address

Team description, including a description of how the team/ partner will contribute to the Project as a whole (Max 5000 characters)

The team members will be nominated later. The team leader has a good group of experienced researchers and junior researchers available for this research. The team will contribute to studying the aspects of the users as designers of information infrastructures, integration of various perspectives and to analysis and evaluation activities and comparative studies in Norway.

Team members

Full name	Position	Role in project	E-mail

Research team 4

Partner (institution, organisation or other legal entity)

Name University of Turku

Postal address

Team leader (person responsible for the partner)

Full name Reima Suomi

Gender Male

Position Professor

Academic degree PhD

Expertise

Telephone (work)

Mobile

E-mail address

Team description, including a description of how the team/ partner will contribute to the Project as a whole (Max 5000 characters)

The team members will be nominated later. The team leader has a good group of experienced researchers and junior researchers as well as MSc- and PhD-students available for this research. The team will contribute to the project with many aspects of ehealth and welfare information, especially they contribute to the observatory development and eGovernance models for the observatory. Also the Turku team will participate in the welfare models analysis.

Team members

Full name	Position	Role in project	E-mail

Research team 5

Partner (institution, organisation or other legal entity)

Name Roskilde university

Postal address

Team leader (person responsible for the partner)

Full name Jesper Simonsen

Gender Male

Position Professor

Academic degree PhD

Expertise

Telephone (work)

Mobile

E-mail address

Team description, including a description of how the team/ partner will contribute to the Project as a whole (Max 5000 characters)

The team members will be nominated later. The team leader has a good group of researchers available for this research. The team will contribute to the research with their expertise in participatory design methods, those methods will be applied in the project as research methodology. Additionally they contribute by the Danish analysis and evaluation and comparative studies and with experience and knowledge on citizens' needs and experiences in a welfare society.

Team members

Full name	Position	Role in project	E-mail



norden

NordForsk



Nordforsk

Letter of intent

We have established cooperation in research to study and assess the effects and impacts of ICT on the Nordic welfare model. We are committed to the funding application to Nordforsk on this research and will fulfil our tasks and responsibilities. We also plan to realise researcher exchanges during this research in the next 5 years time.

Reykjavík 15.10.2014

A handwritten signature in black ink, reading 'Helgi Gunnlaugsson'.

Professor Helgi Gunnlaugsson
Head of Faculty of Social and Human Sciences, University of Iceland.



Turun yliopisto
University of Turku

Nordforsk

Letter of intent

We have established cooperation in research to study and assess the effects and impacts of ICT on the Nordic welfare model. We are committed to the funding application to Nordforsk on this research and will fulfil our tasks and responsibilities. We also plan to realise researcher exchanges during this research in the next 5 years time.

Turku 15.10.2014

Professor Hannu Salmela
Vice Dean of Turku School of Economics, University of Turku



To whom it may concern

Letter of Intent

We have established a research consortium with the aim of studying and assess the effects and impacts of ICT on the Nordic welfare model. On this application, we are committed to Nordforsk and will fulfil our tasks and responsibilities. We also plan to realise researcher exchanges during the research period, which extends 5 years.


Arvid Inge Paulsen
Administrative Head

—
arvid.paulsen@uit.no
77 62 08 94





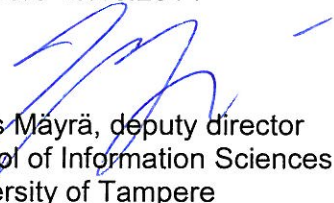
Date 16.10.2014

D

Letter of intent

We have established cooperation in research to study and assess the effects and impacts of ICT on the Nordic welfare model. We are committed to the funding application to Nordforsk on this research and will fulfil our tasks and responsibilities. We also plan to realise researcher exchanges during this research in the next 5 years time.

Tampere 16.10.2014

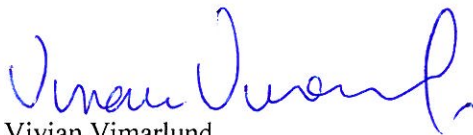


Frans Mäyrä, deputy director
School of Information Sciences
University of Tampere

Letter of intent

Linköping, 2014-10-15

We have established cooperation in research to study and assess the effects and impacts of ICT on the Nordic welfare model. We are committed to the funding application to Nordforsk on this research and will fulfil our tasks and responsibilities. We also plan to realise researcher exchanges during this research in the next 5 years time.



Vivian Vimarlund
Associate Dean of Research
Professor in Informatics
Linköping University , and
International Business School at Jönköping

Nordfors distribution of budget between participants 2015-2019

<u>Country</u>	<u>senior/prof months</u>	<u>Junior res months</u>	<u>personmo in 2015-20</u>
FINLAND	17	74	91
SWEDEN	11	59	70
DENMARK	11	58	69
NORWAY	11	59	70
ICELAND	5	20	25
	55	270	325

PERSONMONTHS COSTS PER COUNTRY 2015-2019

	<u>FINLAND</u>	<u>SWEDEN</u>	<u>DENMARK</u>
Sen/prof	918000	594000	594000
Jun res	2146000	1711000	1682000
sal total	3064000	2305000	2276000
soc sec	1675300	1267750	1251800
55 %			
sal total	4739300	3572750	3527800
overhead	2369650	1786375	1763900
50 %			
TOTAL	7108950	5359125	5291700

DISTRIBUTION OF FUNDING (NORDFORSK) BETWEEN PARTICIPATING COUN

Country	person costs	mobility	data acc	travel	disseminat
FINLAND	7108950	100000	40000	500000	100000
SWEDEN	5359125	100000	40000	400000	100000
DENMARK	5291700	100000	40000	400000	100000
NORWAY	5359125	100000	40000	400000	100000
ICELAND	1976250	100000	40000	300000	100000
Total	25095150	500000	200000	2000000	500000

nths in total

19

<u>NORWAY</u>	<u>ICELAND</u>	
594000	270000	
1711000	580000	
2305000	850000	10800000
1267750	467500	5930100
3572750	1317500	16730100
1786375	658750	8365050
5359125	1976250	25095150

COUNTRIES PER COST ITEM

<u>other cost</u>	<u>total</u>
30000	7878950
30000	6029125
30000	5961700
30000	6029125
30000	2546250 28445150
150000	28445150

Total budget in Norwegian kroner (NOK) - specified by source of funding

Salaries	2015	2016	2017	2018	2019	Period total
Salaries (incl. social security costs, etc.)						
<i>NordForsk funding</i>	3100000	3300000	3600000	3700000	3000000	16700000
<i>Other external funding</i>						0
<i>Own resources (cash and in-kind)</i>						0
Total	3100000	3300000	3600000	3700000	3000000	16700000
Indirect costs on salaries (Overhead)						
<i>NordForsk funding</i>	1550000	1650000	1800000	1850000	1500000	8350000
<i>Other external funding</i>						0
<i>Own resources (cash and in-kind)</i>	465000	495000	540000	555000	450000	2505000
Total	2015000	2145000	2340000	2405000	1950000	10855000
Section total	5115000	5445000	5940000	6105000	4950000	27555000
Project costs	2015	2016	2017	2018	2019	Period total
Mobility and Networking						
<i>NordForsk funding</i>	100000	100000	100000	100000	100000	500000
<i>Other external funding</i>						0
<i>Own resources (cash and in-kind)</i>						0
Total	100000	100000	100000	100000	100000	500000
Data including costs for access, analysis and collection						
<i>NordForsk funding</i>	40000	40000	40000	40000	40000	200000
<i>Other external funding</i>						0
<i>Own resources (cash and in-kind)</i>						0
Total	40000	40000	40000	40000	40000	200000
Travel and meeting Costs						

<i>NordForsk funding</i>	400000	400000	400000	400000	400000	2000000
<i>Other external funding</i>						0
<i>Own resources (cash and in-kind)</i>						0
Total	400000	400000	400000	400000	400000	2000000
Dissemination and publication						
<i>NordForsk funding</i>	100000	100000	100000	100000	100000	500000
<i>Other external funding</i>						0
<i>Own resources (cash and in-kind)</i>						0
Total	100000	100000	100000	100000	100000	500000
Other project costs (please specify in Detailed budget section)						
<i>NordForsk funding</i>	30000	30000	30000	30000	30000	150000
<i>Other external funding</i>						0
<i>Own resources (cash and in-kind)</i>						0
Total	30000	30000	30000	30000	30000	150000
Indirect costs (administration etc.)						
<i>NordForsk funding</i>	0	0	0	0	0	0
<i>Other external funding</i>						0
<i>Own resources (cash and in-kind)</i>	100000	100000	100000	100000	100000	500000
Total	100000	100000	100000	100000	100000	500000
Section total	770000	770000	770000	770000	770000	3850000
Total budget	5885000	6215000	6710000	6875000	5720000	31405000

						Period total
Total requested NordForsk funding						28400000
Total other funding						0
Total own resources (cash and in-kind)						3005000