

**BUSINESS  
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# PROGRAMMES CONTRIBUTING TO HEALTH AND WELLBEING

EVALUATION OF FINNWELL,  
PHARMA, INNOVATIONS IN  
SOCIAL AND HEALTHCARE,  
FINLAND CARE, DIGITAL  
HOSPITALS AND TEAM FINLAND  
HEALTH PROGRAMMES

## EVALUATION REPORT

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# FOREWORD

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Finland has been one of the forerunner countries in health and wellness as solid research and development base, extensive healthcare system covering the entire population and possibilities related to data and digitalization have provided advantage requiring collaboration. Consequently, Tekes has put considerable effort in developing the area by running multiple programmes over the years, providing funding and helping to build up business, expertise, partnerships and platforms for collaboration. In 2018, Tekes and Finpro merged forming the current Business Finland.

From these perspectives, six health and wellness related programmes of former Tekes and Finpro were evaluated. FinnWell programme (2004–2009) had been one of the largest Tekes-programmes of its time, aiming to improve quality and productivity of national healthcare through technology and new practices. Innovations in social and healthcare services programme (2008–2015) was a co-operative programme between Tekes and the Ministry of Social Affairs and Health for developing and implementing solutions for effective and customer-oriented health and social services. Phar-

ma programme (2008–2011) focused on the development of processes and methods aiming to strengthen the operations and networking within pharma sector. FinlandCare (2013–2017) was a Finpro programme for growth of Finnish healthcare solutions in international markets. Digital Hospitals programme (2015–2017) of Finpro was identifying and utilising business opportunities arising from hospital construction and renovation works especially in the Nordic area. Team Finland Health (2015–2017) was a programme to raise the profile of Finland as an attractive investment and business environment in health and wellbeing.

The objective of this evaluation was to produce a review of results, impacts and relevance of the evaluated programmes and to produce forward-looking recommendations for further development. Emphasis was put into understanding what changes the programmes had initiated in their areas.

As a result, the evaluation produced solid findings and forward-looking recommendations for future Business Finland programmes and activities. Observations and recommendations from this evaluation include that the

programmes were relevant, timely and successful at the project level whereas for system level impact, alignment with other stakeholders' actions could be developed.

This impact study was carried out by 4Front as the lead consultancy, together with The Evidence Network and NHG Consultancy. Tekes wishes to thank the evaluators for their thorough and systematic approach and ex-

presses its gratitude to steering group and all the others that have contributed to the evaluation.

Helsinki, June 2019

Business Finland

# ACRONYMS AND ABBREVIATIONS

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BF	Business Finland
CIHR	Canadian Institutes of Health Research
DH	Digital Hospitals programme
Duodecim	Finnish Medical Society
EFPIA	European Federation of Pharmaceutical Industries and Associations
FIFTA	Finnish Health Tech Industry Association
GDPR	General Data Protection Regulation
HIMMS	Healthcare Information and Management Systems Society
INKA	Innovative Cities Programme
KELA	National Health Insurance Institution
MCE/OKM	Ministry of Culture and Education
MNE	(Global) Multinational Enterprise
MSAH/STM	Ministry of Social Affairs and Health
NGO	Non-governmental organisation
Pharma	Competitive Advantage from New Practices programme
PPP	Public-Private-Partnership
MEAE/TEM	Ministry of Economic Affairs and Employment
RDI	Research, Development and Innovation
SITRA	The Finnish Innovation Fund Sitra
SHOK	Strategic Centres for Science, Technology and Innovation
SME	Small and Medium-sized Enterprise
SOTE	Innovations in Social Services and Healthcare System
TFH	Team Finland Health Growth Programme

# EXECUTIVE SUMMARY

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The health sector has significantly increased as an industrial and innovation policy priority in recent years. Over the years, there have been several consecutive programmes related to health and well-being both for Research, Development and Innovation (RDI) funding and exports promotion. This evaluation focuses on the following six programmes, three of which are implemented by Tekes, and the latter three by Finpro:

- FinnWell (2004–2009)
- Pharma (2008–2011)
- Innovation in social and healthcare services (SOTE-programme, 2008–2015)
- Finland Care (2013–2017)
- Digital Hospitals (2015–2017)
- Team Finland Health Growth programme (2016–2017)

The objective of this evaluation is to analyse the results, relevance, efficiency, effectiveness, and impacts of the six health and wellness-related programmes. An overarching theme of the evaluation is the question what changes these programmes have initiated in their fo-

cus areas. Another arching theme is what was the role and added value of various services offered by the programmes towards the beneficiaries and the change of practices in general.

## **THE PROGRAMMES HAVE BEEN SUCCESSFUL AT THE PROJECT LEVEL, BUT THE SYSTEMIC IMPACT COULD BE FURTHER DEVELOPED**

In general, according to the evidence, the programmes have been timely and relevant. Generally, programmes have been effective and efficient in achieving their goals at the project level. On average the majority of the participants have:

- Introduced new products and services
- Created new partnerships and networks
- Improved their technical and business capabilities
- Improved sales and productivity
- Improved international competitiveness as showed by increase in exports
- developed new practices internally and have impacted practices of their customers

At the level of the programmes, the beneficiaries/participants on average have exhibited healthy growth of turnover, and in the case of Finpro participants also growth in the value of exports. The programmes contributed directly and indirectly to internationalisation. In more nuanced view, particularly the RDI subsidies gave financial security to non-mature enterprises, which enabled them to be bolder and to develop future visions. The interviewed start-ups particularly saw subsidies as crucial not only for product development, but for the existence of the whole company. PPP-efforts and consortium projects were perceived as beneficial for most organisations based on the responses in the survey. However, the added value was most clear when the interests of the partners were well-aligned. Looking at the financial figures, the programme participants in both Tekes and Finpro programmes have exhibited healthy growth through the financial crisis and ensuing economic stagnation. However, the applicants' own expectations have not been fulfilled.

On the balance of evidence, all the programmes were successful in making advancements towards their goals, especially the Finpro export programmes were effective regarding the goal of increasing exports and have played a role in the shift towards more diverse forms of collaboration in the healthcare sector in Finland. The Achilles heel of impact and change of practices are in the larger scale, at the level of the system, particularly in the in-

terface with the public healthcare system and its stakeholders, that is to a large extent out of Tekes/Business Finland (BF) control.

## **EFFECTIVE PROGRAMME ADMINISTRATION AND SERVICES ARE KNOWLEDGE-INTENSIVE**

Programme services have generally been relevant and effective. There is evidence that those who are more engaged in programmes also have better outcomes and impact. In a more detailed look, the value of specific services to a specific beneficiary depends on their maturity as an enterprise and the phase of development of technology, product or service. Based on the data, stereotypically younger and less-networked enterprises benefit from a broader spectrum of services, including mentoring, coaching and general networking opportunities, whereas for more mature organisations the largest value propositions are tailored advice and networking opportunities. At the level of system, cross-pollination and network building between sectors to reinforce and breed new PPPs carries additional added value.

The common denominator of value creation to the beneficiaries are expertise and insight offered by the coordinators and programme managers, and networking opportunities. In general, the more involved the organisations were in the planning of these activities, the more targeted they were, and the better the result.

## **THE MAIN CHALLENGES RELATE TO SYSTEMIC IMPACT AND WIDER CHANGE OF PRACTICES**

The programmes as such have been relevant and timely from the standpoint of innovation and the (global) marketplace. The challenge for the ultimate impact has been the dynamics between domestic stakeholders. The incentives and interest between government agencies, healthcare actors and Tekes/Finpro beneficiaries have not been aligned well, and that has proven to be a bottle neck for the impact of the programmes regarding the healthcare system. While the Tekes and Finpro programmes are viewed as well-executed as such, stakeholders call for policy makers and regulatory authorities' closer involvement both in framing future programmes and participants in projects for example in the form of an advisory board.

## **IN THE FUTURE, ONE OF THE KEY RECOMMENDATIONS IS TO DEVELOP STAKEHOLDER COLLABORATION**

One of the key messages for the future was that the beneficiaries and stakeholders have and continue to value Tekes as an independent expert organisation and thus

the expectation for the knowledgeability of the programme administration is high. The stakeholders rated the use of expert coordinators and per-programme steering groups as good practices that also ensure there is sufficient expertise to evaluate and steer the projects. Also, from the other way around, programme services were mostly criticised in cases if the respondents felt the programme staffs' expertise did not surpass their own.

To maximise the impact of interventions, there should be a whole-of-government approach with joint inter-ministry programming. According to the recent mid-term review, the Growth Strategy for Health and Wellbeing has already built up the collaboration between the Ministry of Social Affairs and Health and the Ministry of Economic Affairs and Employment, and the Growth Strategy could be exactly the platform that is needed to build common programming.

The gap for BF specifically in this setting seems to be, that BF is recognised as a neutral party and is in a position to provide a platform for interested parties to build collaborations. With more stakeholder involvement and recognition of the nature of the field and stakeholder interests, as well as more careful coaching of the applicants and project selection BF can provide more added value at the system level as well as the project level.

# 1 BACKGROUND AND OBJECTIVES

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The health sector has significantly increased as an industrial and innovation policy priority in recent years. Global mega-trends within the healthcare sector such as digitalisation, personalised healthcare, participatory healthcare, and value-based healthcare, as well as attempted reforms within the Finnish social and healthcare sector, have led to pronounced evolution in the sector. Over the years, there have been several consecutive programmes related to health and wellbeing both for Research, Development and Innovation (RDI) funding and exports promotion. This evaluation focuses on the following six programmes:

- FinnWell (2004–2009)
- Pharma (2008–2011)
- Innovation in social and healthcare services (SOTE-programme, 2008–2015)
- Finland Care (2013–2017)
- Digital Hospitals (2015–2017)
- Team Finland Health Growth programme (2016–2017)

Overall the Finnish social and healthcare sector can be seen to have “opened up” in recent years. Examples of Public-Private-Partnership (PPP) efforts include development of AI and predictive healthcare, as well as increased provision of digital services (e.g., apps, chats, and electronic recipes) in collaboration between public service providers and ICT companies. Furthermore, structural collaborative efforts have been seen, for example, by developing testing and piloting facilities and national testbed network that serve as platforms for innovation and development of healthcare technology and services. Also, data collected in national registries, newly established biobanks, and ever-increasing amounts of genome data have brought attention to the value of data for research and innovation purposes. There has been national level as well as local initiatives to exploit this valuable data to its full potential – all the while ensuring security and safety of this sensitive personal data. The culmination of these initiatives was the passing of the act for secondary use of health and social data in

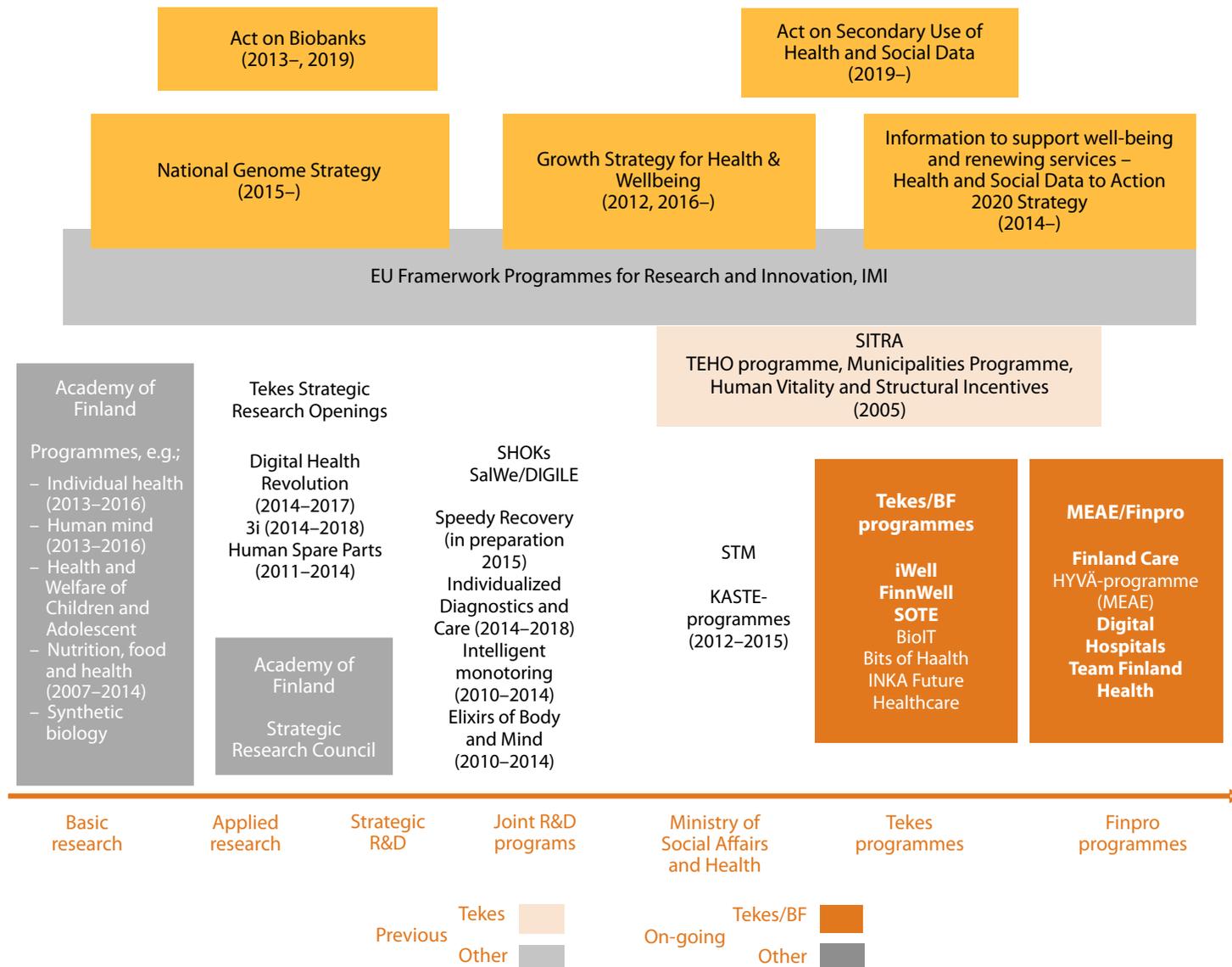
the Finnish parliament March 2019. The aspiration to increase the utilisation of data has brought the data owners (municipalities and hospital districts) in closer cooperation with the users of the data (universities, pharmaceutical industry and other companies).

A trend in the social and healthcare sector as well as the Business Finland (BF) programmes can be seen as a shift from silo-based innovation and development, towards a focus on innovation and development between partners, in networks and ecosystems, thus striving to support the adoption of innovation across the sector as a whole. The main action was the launch of a Growth Strategy for the health sector in 2012 by the Ministry of Economic Affairs and Employment (MEAE). It was updated and relaunched in 2016 with a roadmap for the period 2016–2018. MEAE and BF are key partners in the implementation of the Growth Strategy together with the Ministry of Social Affairs and Health (MSAH), and the Ministry of Culture and Education (MCE). Present BF activities are based on this strategy formulation and roadmap. The role of BF in implementation of the Growth Strategy is to offer support for individual consortia and ecosystems. What makes the strategy novel and interesting is that it has fulfilled the long-standing call for a cross-sectoral strategy that is based on the imple-

mentation of previous programmes. The following figure relates these programmes to a larger picture at the time is the following, which includes also the Health and Wellness SHOK programmes that follow the themes from FinnWell towards Bits of Health.

Digitalisation in the sector has been emphasised in several BF programmes. Most particularly, digitalisation of services has been the focus in: “Innovations in Social Services and Health Care System (SOTE)”, “Bits of Health” and “Digital Hospitals” programmes. The funding mechanisms within these programmes have emphasised cross-sectoral and multi-organisational cooperation. PPPs and particularly partnerships between, for example, organisations, research institutes, and companies have been encouraged. The BF “SOTE” programme on other hand included, for example, themes such as: efficiency and effectiveness in social and healthcare, the radical renewal of approaches in social services and healthcare and freedom of choice for the patients. Furthermore, the theme of internationalisation was emphasised in all programmes. The goal being that Finnish social and healthcare development could trigger product and service innovations that are suitable for international markets.

**FIGURE 1.** The evaluated programmes in context (source: Minna Hendolin, BF).



## 1.1 OBJECTIVES

The objective of this evaluation is to produce a forward-looking analysis that takes into account the results, relevance, efficiency, effectiveness, and impacts of the six health and wellness-related programmes. Based on the findings, recommendations for forming and running subsequent programmes in Business Finland are to be proposed. In line with the above, the evaluation will:

- Provide detailed information on the relevance, results, efficiency, and impact of the programmes
- Analyse programme administration and services, as well as
- Identify and recommend actions that would have made the programmes even more efficient and effective (create better results, more impacts).

An overarching theme of the evaluation is the question what changes these programmes have initiated in their focus areas, how they have been brought about, and what kind of impacts have they had. As a basic assumption, these programmes were changing practices in the health and wellbeing sector in terms of collaboration, partnership formation, customer-orientation, and/or public-private collaboration. Another arching theme is what was the role and added value of various services offered by the programmes towards the beneficiaries and the change of practices in general.

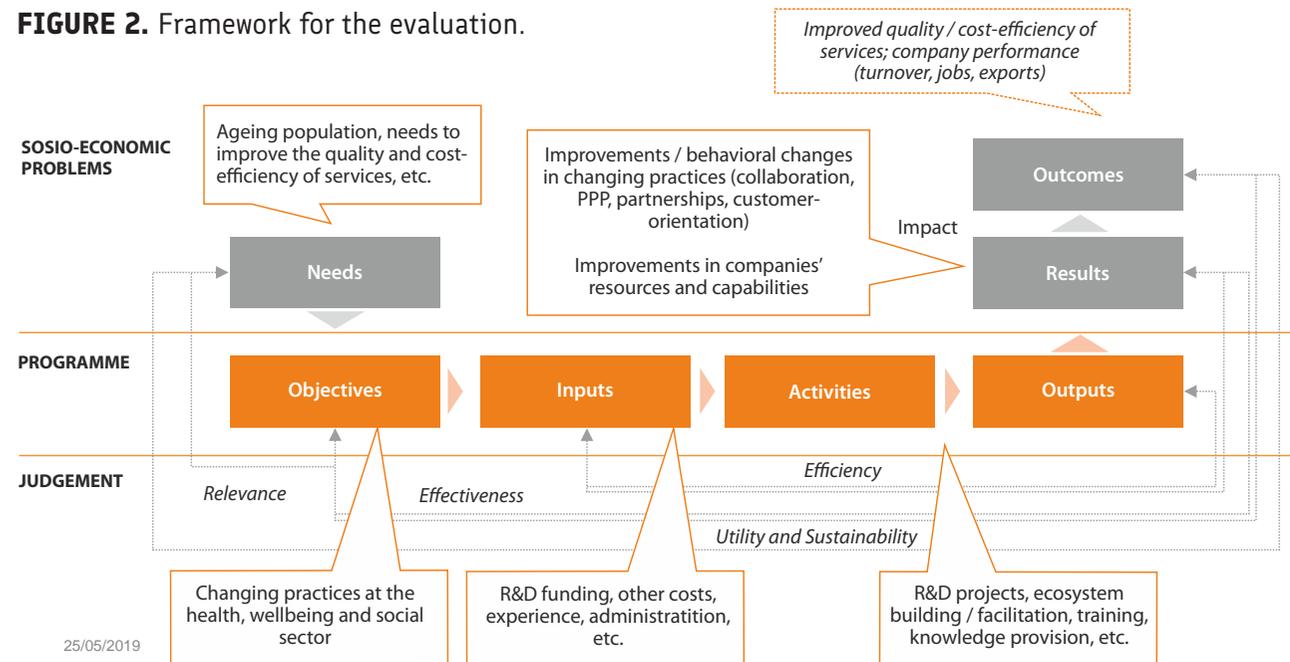
## 2 APPROACH, METHODOLOGY AND LIMITATIONS

### 2.1 APPROACH

The organizing approach and methodological framework for this evaluation is outcome harvesting<sup>1</sup>. Within this overall approach, we employ a multiple method design

that is specifically geared towards answering the questions. The following figure illustrates the types of activities, outcomes, and impacts to be identified and reported. The specific implementation of the methodology is detailed below in the work package descriptions.

**FIGURE 2.** Framework for the evaluation.



<sup>1</sup> World Bank. 2014. Cases in Outcome Harvesting : Ten Pilot Experiences Identify New Learning from Multi-Stakeholder Projects to Improve Results. Washington, DC. © World Bank. <https://openknowledge.worldbank.org/handle/10986/20015> License: CC BY 3.0 IGO.; Wilson-Grau & Britt, 2012, Outcome Harvesting, Ford Foundation

## 2.2 METHODOLOGY AND LIMITATIONS

Within the overall framework, the study combines multiple methods to analysing the contribution and added value of the programme. The evaluation progressed from analysis of documentation of the programmes and funding to background interviews, survey and case study research and quantitative analysis. The evaluation findings were presented for stakeholders for validation in a workshop, and then the report was finalized. The main methods and data sources are the following:

- **Literature study/document analysis** – programme documents, previous evaluation and other grey literature for context, institutional frameworks, RDI landscape, and policy rationale
- **Interviews** – semi-structured stakeholder interviews, for context, institutional framework, orientation, needs, objectives
- **Survey** – harvesting activities, outputs, results, outcomes from programme participants
- **Quantitative/statistical analysis** – programme data/statistics, survey, company performance data, for results, outcomes

- **Case study research** – cases to further explore the contribution of various programmes and platforms to innovation, networking, and ecosystem formation
- **Network analysis** – programme data, including funded projects and associated data for outputs, results
- **Benchmarking** – similar programmes for effectiveness and efficiency
- **Workshop** – interactive workshop for validation of findings and forward-looking analysis

The main limitations related to data concern the relatively long time between this evaluation and the programme end, particularly in the case of FinnWell. The long lag is mostly reflected on the response rate to the survey, which especially initially was low, and which limits generalisability of the results. For the financial analysis, the analysis is based on analysis of correlation, and does not imply exact causation due to various confounding variables that cannot be ruled out with the present data.

# 3 DESCRIPTION OF PROGRAMMES

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## 3.1 OVERVIEW

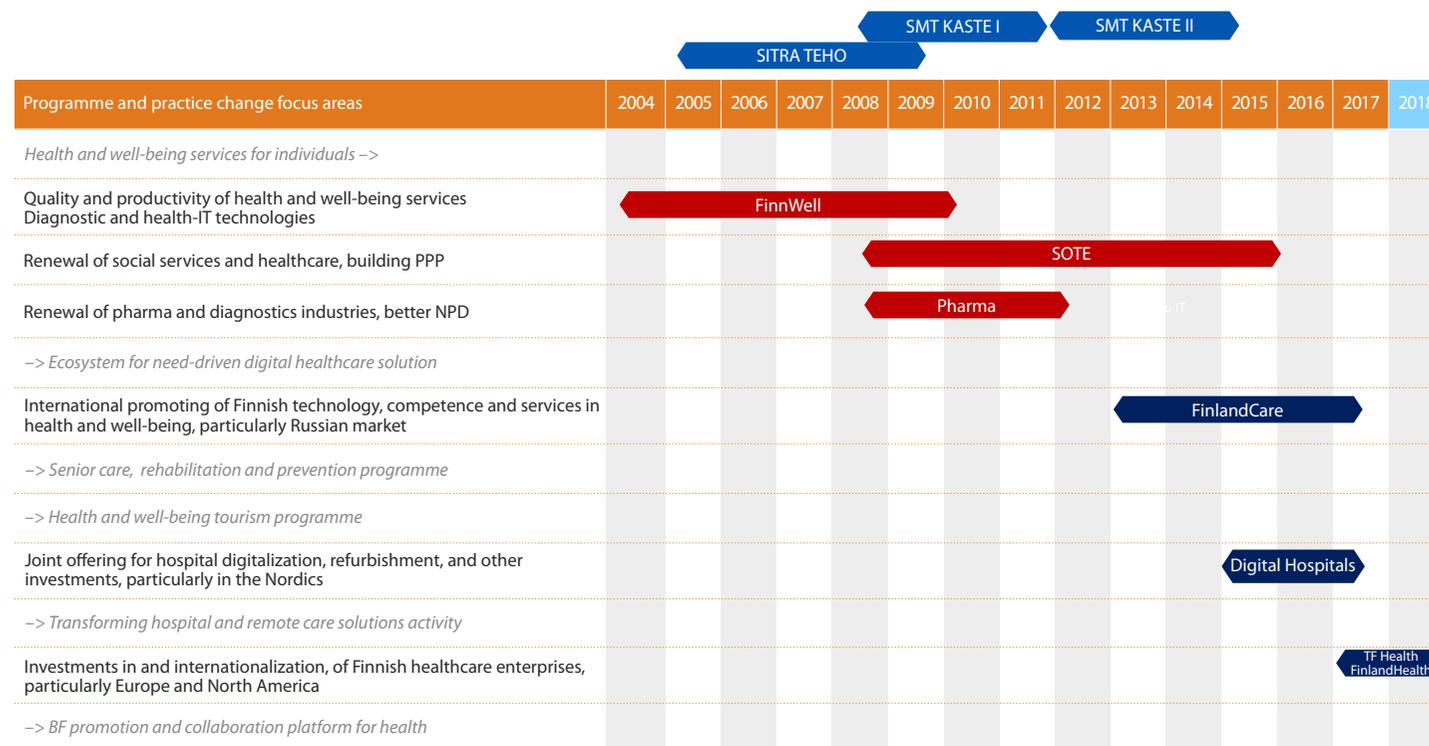
As discussed, Tekes and Finpro before BF have had a variety of programmes that relate to the focus area of health and wellbeing. Starting from the turn of the millennium Tekes funded development of medical devices and particularly diagnostics and pharmaceuticals in earlier programmes that fed first into FinnWell and in turn into Pharma and SOTE. Around the early 2000s Tekes also had programmes on biological process engineering (SymBio) with a relation to pharmaceuticals.

One of the overarching themes in particularly the Tekes the programmes has been twofold: on the one hand to develop quality and productivity of domestic (public) healthcare system by developing processes and way of working and introducing technological solutions, and on the other to give an opportunity for the enterprises to

co-develop solutions and gain a marketable reference that enables convincing foreign customers. This theme has had variable weight in the programmes either as an outspoken objective or a thought in the background of implementation, it has been the strongest in FinnWell and SOTE. The Finpro Growth Programmes have been more opportunity driven where a marked need is recognised, and the programme has been set up to create an offering for those needs.

It is also of note that Tekes and Finpro have not been alone in the field of Healthcare, The Finnish Innovation Fund Sitra (SITRA) and Ministry of Social Affairs and Healthcare (STM) have implemented their own programmes to some extent in parallel, with various level of coordination. In the following sub-sections, each programme is described in more detail.

**FIGURE 3.** Timeline of the evaluated programmes in the portfolio of Tekes and Finpro Health and Wellbeing activities.



### 3.1.1 FINNWELL

FinnWell was conceived as a continuation from the earlier iWell programme (2000–2003), with the ethos of moving from development of medical devices to systemic development of health and wellness. During iWell, it was thought that the structures and actors in healthcare sector were not yet ready to participate in co-development of new processes, but it was also viewed as a bottleneck for

achieving the intended impact. Consequently, FinnWell adopted a different approach and specifically enveloped healthcare sector into the development. The overall goal of FinnWell (2004–2009) was to improve quality and productivity of national healthcare through implementation of technological solutions and new practices that effectively use technology. The vision was to create what now would be called an ecosystem of healthcare providers, research institutions and technology providers, who in turn

would create new processes and practices that are more open, customer oriented and effective than previously.

The objectives of FinnWell were in that by the end of the programme healthcare sector turnover would be over a € 1 billion with 80% exports, and the quality and productivity of healthcare would be improved. In terms of concrete objectives these were broken down to developing co-operation and experts within the sector, developing the performance and productivity of clients, healthcare organisations and enterprises in the sector, and lastly supporting the workflow of healthcare sector.

In terms of content and technology, the aim was to support the whole cycle from prevention and wellness to diagnosis and care. The specific content areas included: medical devices and *in vitro* diagnostics (IVD), hospital buildings and care facilities, and self-care and prevention. Particularly the first half of the programme was focused on internationalisation and development of diagnostics. The last call for proposals (2007) was aimed specifically for the self-care theme, as though it was seen that Finnish enterprises did not have a strong position at the time, it was an area of rising interest.

It was noted both in the interviews and the earlier evaluation that the challenge was engaging the healthcare providers in joint projects. According to the interviewees, in practice the last calls were directed mostly towards enterprises while Tekes tried to figure out how

best engage public and private care operators. This is said to have been in a way an impetus for the formation of the next SOTE programme as well.

The programme activities included programme seminars and "thematic groups" with meetings to facilitate networking and exchange around programme themes, participation in various fora around future healthcare and health tech including national event and for example Healthcare Information and Management Systems Society (HIMMS) conferences with other funders such as SITRA. Other marketing/ partnering events and trade fair/delegation visits to target markets (primarily USA) were organised in partnership with the FinnNode network<sup>2</sup> and SITRA, the main market was USA.

FinnWell was also a progenitor of early attempts at the Testbed Finland, or a national network of test and pilot sites concept. Then conceived as the whole of Finland as a testbed for healthcare innovation combining development of services and processes with technological innovation. The Testbed concept was marketed during the last year of FinnWell in collaboration between Tekes, SITRA and VTT to multinational technology enterprises, and VTT ended up co-hosting a Philips InnovationHub in Espoo campus at the Active Life Village. The concept of the InnoHub (since extinct) was a part of Philips Open Innovation strategy and was to offer a co-creation platform and services for developing ideas into commercial products and services.<sup>3</sup>

<sup>2</sup> FinNode was an innovation center in North California founded 2007 jointly by SITRA, Tekes, Finpro, VTT, and Academy of Finland, essentially a commercial representation or agency

<sup>3</sup> Kohtamäki, Saranummi, 2009. Mitä FinnWellin jälkeen – tilannearvio ja toimenpide-ehdotukset, Tutkimusraportti VTT-R-00757-09, VTT, Espoo.; VTT 2009, New Philips and VTT development centre in Finland will boost innovation, Available: <https://www.vttresearch.com/media/news/new-philips-and-vtt-development-centre-in-finland-will-boost-innovation>

### 3.1.2 INNOVATIONS IN SOCIAL SERVICES AND HEALTHCARE SYSTEM (SOTE)

Innovations in Social Services and Health Care System (Innovaatiot sosiaali- ja terveystalvvelujärjestelmässä, SOTE) was at least in part a product of learning and evolution from FinnWell. In fact, the mid-term evaluation of FinnWell resulted in refocusing the programme towards funding enterprises-led innovation projects, and the wider systemic development projects were, in effect, spun off to the SOTE programme, according to the interviews.

The ambition in SOTE was to continue the previous vein of developing more customer/patient-oriented and productive service systems for social services and healthcare particularly. The vision of the programme was that the funded RDI activities lead to renewal of social services and healthcare system and increased business opportunities. The goals were improving availability of social and healthcare services to general population, and increase in efficiency, effectiveness and quality of services. After the mid-term review conducted in 2011 the latter half of the programme focused towards customer-oriented social and healthcare services, pre-emptive care solutions, and diversifying partnership activity. What makes SOTE different from the other two programmes, is the focus explicitly on developing the national health system, at a time when Tekes pro-

grammes were already generally oriented towards innovation-led growth through exports.

In terms of programme activities, SOTE had a rather fine-tuned approach for activating various (potential) participants, including tailored meetings and negotiations, activation ‘road show’ events and seminars, thematic groups and associated events and seminars, and matchmaking with ‘Innovation Dates’. The programme services included seminars and networking events, visits and publications.

In SOTE, the fledgling interaction started in FinnWell with Ministry of Social Affairs and Healthcare (STM) was strengthened and both STM and SITRA were also present in the programme steering group. The collaboration also meant coordination with the STM-run parallel R&D programmes called KASTE (Sosiaali- ja terveydenhuollon kansallinen kehittämissohjelma, lit. National Development Programme for Social Services and Healthcare, 2008–11 and 2012–15) with the aim to develop whole service systems and patient/customer-oriented service paths<sup>4</sup>. The coordination with KASTE aimed to achieve parallel projects where Tekes would fund a project and KASTE would match calls for proposals and the funding decision would be made side-by-side, Tekes funding enterprises and research organisations and STM funding a parallel but joined project for municipalities or hospital districts, making it easier for municipalities and hospital districts to manoeuvre project funding. According

<sup>4</sup> See e.g. STM 2008, STM ja Tekes etsivät sosiaali- ja terveydenhuoltoon uusia palvelukokonaisuuksia, Available: [https://stm.fi/artikkeli/-/asset\\_publisher/stm-ja-tekes-etsivat-sosiaali-ja-terveydenhuoltoon-uuksia-palvelukokonaisuuksia](https://stm.fi/artikkeli/-/asset_publisher/stm-ja-tekes-etsivat-sosiaali-ja-terveydenhuoltoon-uuksia-palvelukokonaisuuksia)

to the interviews the coordination between SOTE and KASTE was achieved to an extent, but inter-ministry bureaucratic friction made it hard to achieve fully synchronised activities and the challenge remained throughout the programmes. The programme implementation was further coordinated with SITRA, who had parallel Municipality and Healthcare programmes (TEHO) at the same time. Similar coordination was also done with the Ministry of Finance, where the Digital Democracy and Services Acceleration Programme (Sähköisen asioinnin ja demokratian vauhdittamisohjelma, SAdE-ohjelma) was implemented in parallel with SOTE. According to the mid-term evaluation of SOTE, coordination with these latter remained loose.

The international activities had a slightly different orientation than the other programmes, as they included study and benchmarking visits, or delegations designed to learn and identify practices to import as well as exports promotion visits with Team Finland Health. Already FinnWell started the study visits by taking stakeholders out to learn about the ‘Kaiser model of care’ as in care practices in Kaiser Permanente HMO-group, e.g. the integrated chain of care between general practitioners, specialists and hospitals, and a focus on pre-emptive interventions.<sup>5</sup> Additionally, a coordinated Nordic RDI programme “Innovative Nordic Health and Welfare Solutions” was launched in cooperation with Nordic Innovation, Vinnova, Innovation Norway and Rannis.

### 3.1.3 PHARMA

Pharma – Competitive Advantage from New Practices – programme had a vision that in the future Finnish pharmaceuticals sector would be focused in its core capabilities, would be well-networked, financially sound, and a lucrative partner and interesting investment for international pharma enterprises. The general objective was to raise the competitiveness of the Finnish pharmaceuticals industry. The specific objectives were renewal and better international competitiveness of domestic pharma and diagnostics industry, accelerate development of new practices and services for pharma industry, support networking between diagnostics, pharma and clinical research, improve risk management in RDI, provide networking incentives for private and public actors, improve the national innovation environment and support business capabilities of SMEs. Under these objectives, the programme focused on the development of new tools, methods and processes in the pharma sector, and equally strongly on multi-disciplinary projects that combined IT, pharmaceutical and diagnostic development and collaboration with (public) healthcare.

The drivers behind Pharma were perceived changes in the operating environment and models of the pharmaceuticals industry, particularly the then recent development in science and technology, including mainstreaming of genetic sequencing and the proliferation

<sup>5</sup> C.f. e.g. Light & Dixon, 2004, Making the NHS more like Kaiser Permanente, *BMJ*, 328(7442), p. 763-765; Strandberg-Larsen et al. 2007, Kaiser Permanente revisited – Can European health care systems learn?, *Eurohealth*, 13(4), p. 24-26.

of genetic information and its potential in development of new therapies. Effectively Pharma was a continuation of the earlier Pharma 2000 and Diagnostics 2000 programmes, in a similar succession as between iWell and FinnWell. The programme aimed to build on the experiences and results of the earlier programmes and existing networks to support renewal of the industry and enable domestic actors to keep up with international developments. The lessons from Pharma in turn led into the Bio IT -programme that started after Pharma in 2013.

In line with FinnWell, the focus of Pharma was internationalisation of the diagnostics and pharmaceuticals industries, and as the programme proceeded, development and internationalisation of services for the pharmaceutical industry, for example clinical research organisations (CROs) and other clinical services, rose into focus. The driver behind this focus is conceivably, that making Finland an attractive environment for clinical research and development through investing in the infrastructure and framework is commonly seen among the stakeholders as an efficient and effective way to attract foreign direct investment, or at least significant windfall in the form of clinical research. Pharma is also set in a time when number of clinical research projects were in a decline in Finland, that has brought some urgency to this area.<sup>6</sup>

Like the other programmes, Pharma also implemented activation measures such as general communication, a roadshow, workshops, and seminars. The programme services took a fresh approach to programme services with mentoring and evaluation of commercial potential, which were directed particularly for research projects and start-ups. The more “traditional” services included similar to the previously described seminars and workshops in the various thematic areas of the programme. The mentoring service included tailored individual coaching for business development, marketing or both with on average two, maximum five, sessions per beneficiary. The evaluation of commercial potential was similarly done individually for the research projects. According to the evaluation of Pharma, the views of the programme steering group and the beneficiaries varied for these services; the beneficiaries viewed these generally favourably as useful and well executed, while the steering group at the time saw them in contrast as relatively inconsequential. In the interviews, in turn these two were highlighted as high added-value services.

The international activities included a joint call for proposals with Canadian Institutes of Health Research (CIHR) and activation of the participants towards the 7. EU Framework Programme and the associated IMI and EuroTransBio RDI programme calls. The programme

<sup>6</sup> Between the end of 1990s on average approximately 300 new clinical trials were registered to FIMEA per year, 2005-2008 the average had declined to 260 and further down to approximately 200 in 2009 when Pharma was ramping up. The lowest year has been 2011 with 141 application. The traditional advantage of Finland as a clinical environment has been homogeneous population, good coverage of healthcare, reliable registries and good delivery, and it was thought that Finland is and remains a prime clinical environment. Source: Lääkelaitos, Kliinisen lääketutkimuksen tilasto 2005, FIMEA, Kliinisen lääketutkimuksen tilasto 2017, FIMEA, Helsinki. Available: [https://www.fimea.fi/valvonta/kliiniset\\_laaketutkimukset/tilastotieto\\_kliinisista\\_laaketutkimuksista](https://www.fimea.fi/valvonta/kliiniset_laaketutkimukset/tilastotieto_kliinisista_laaketutkimuksista)

also organised exports promotion activities, particularly in China with four networking delegations. The evaluation of the programme expressed critique towards the export promotion activities, because they were viewed as a good platform, but the programme structure and funding did not enable investment into internationalisation. Further critique was offered towards selection of China as a target market, as the traditional pharma industry markets are North-America, the UK, and Europe, on the other side however China was seen especially at the time a green field market and also the platform offered by the then relatively new FinChi Innovation Center in Shanghai played a role.

### 3.1.4 FINLANDCARE

FinlandCare was a programme that aimed to raise the profile of Finnish knowledge, services and health technology in international markets. FinlandCare was also one of the first Finpro Growth programmes that started before the actual present Growth Programmes. FinlandCare preparations were directly led by the MEAE and the ministry was involved in the ramping up of the programme already in 2011–2012. The programme started from market engagement and marketing/country branding programme and broadened towards supporting exports of services and technology with significant service content. As such FinlandCare slightly differs from the

latter Growth Programmes, which were designed and implemented by Finpro more autonomously<sup>7</sup>. FinlandCare also differed from the other Growth Programmes in that participation in the programme required a yearly fee of € 2 500 for small enterprises, € 5 000 for medium-sized and € 10 000 for large, while the other programmes are organised as pay-as-you-go. However, according to the documentation the charge was maximum € 5 000 in practice.

The impetus for the programme was in part rather pragmatic according to the interviews, Finland has a developed healthcare system and a reputation as a safe and trustworthy environment and the opportunity was recognised that these properties could make Finnish healthcare an attractive proposition for secondary care and elective procedures in selected markets. In the start of the programme in 2012 the prime target market was Russia, and particularly after the 2014 international trade sanctions against Russia, the interest broadened towards the Gulf and South East Asian markets as well as the EU in general. These markets were especially selected for the health technologies and related services. Starting 2015, China and Sweden came into focus specifically. The target industries were healthcare, rehabilitation, technology, consulting and education in the area of healthcare, social services and general wellbeing. Within this orientation, above else the aim was to offer Finnish healthcare services to the selected markets.

<sup>7</sup> The Growth Programme concept was launched after budget negotiations in 2014 as one action to mitigate the effects of change in industry structures and particularly the slump in exports created by the international trade sanctions against Russia., see .e.g. Salminen, et al. 2016 Team Finland - Kasvuohjelmien arviointi, Valtioneuvoston selvitys- ja tutkimustoiminnan julkaisusarja 40/2016

The programme had a specific objective to raise the participants' turnover 15%, to support existing exports activities, and open new markets for the participants, at the end of the programme specifically Sweden and China. The key domestic stakeholders included MEAE, STM, Ministry of Foreign Affairs, Finnish Health Tech Industry Association FIHTA, Elderly Care Central Association, and Social Services Association.

The programme activities included particularly target market engagement and marketing, including delegation trips, visits to events and trade fairs. Additional engagement was offered in the form of hosting visits of foreign delegates to Finland, support and facilitation for business-to-business contact and attracting business and investment in Finland. Facilitated meeting with potential customers and partners for technology companies, training and consultancy and secondary health-care. Country brand building activities included Finland Care portal that presents Finnish clinics and other health and wellness services, flyers, leaflets and other marketing materials and campaigns on the target markets.

### **3.1.5 DIGITAL HOSPITALS**

Digital Hospitals was another pragmatic and opportunity driven programme, that was based on the finding that Nordic countries are planning investments into refurbishing, renovating and building hospitals and other care facilities in the period of 2015–2025 with approximately € 30 billion, out of which estimated 20% would be used in new technology. Digital Hospitals was offered

for enterprises who specialise in technologies that have applications in hospital environment. The thematic emphases of the programme were Improving patient flow in hospital processes, assisted living technologies for home care, rehabilitation, hospital logistics, technical advice for consultancy and advisory, and Infection control solutions.

The aim was to create a deal flow of at least € 100 million of new export business and 10% increase in turnover for the participants, and at least 100 new jobs over two years of operation. The main identified stakeholders were other Team Finland actors and hospitals, clinics and other care operators.

Activities included identifying important potential client organisations and buyers, and interesting hospital building or renovation projects with a good fit for the participating enterprises, and organizing fact finding missions and round table meetings with relevant contacts. Relatedly the programme offered information about tendering and buying processes, and training or coaching for tendering, as well as general internationalisation, exports business and project-based business. Additional activities included market engagement through events and fairs, delegations and market visits to target countries and facilitated meetings, and general marketing. International cooperation was intensified in building a “Nordic Task Force” collaboration with Healthcare Denmark, Innovation Norway and Swecare to find further partnering opportunities, the partnership resulted in a networking event with leading healthcare organisations, enterprises and industry associations from each of the

countries participating. Additional activities were directed to France, Spain, and Iran, and a test environment built in Denmark with nine Finnish partners.

### 3.1.6 TEAM FINLAND HEALTH

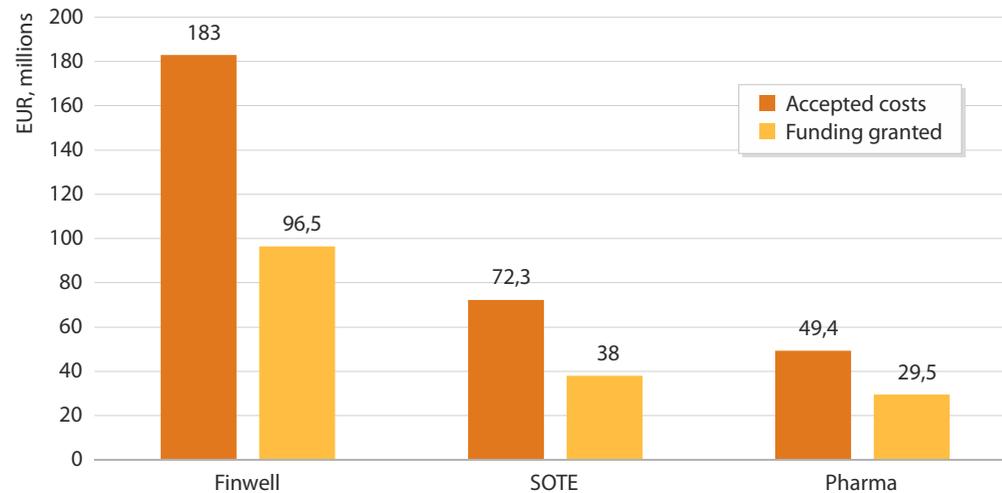
The inception of Team Finland Health was tied to the launch of the Roadmap to the Growth Strategy for Health & Wellbeing in 2016 that reinvigorated the Growth Strategy, which stems originally from 2012. The overall objective for the programme was to raise the profile of Finland as an attractive environment for RDI and business in health and wellbeing attract investments and grow the business area. The programme set out to reinforce the country brand of Finland at the forefront of health and wellbeing and attract RDI investments from global actors particularly in pharmaceuticals and digital health. The specific target industries were pharmaceuticals and medical devices and other health technology. Identified stakeholders included the industry, industry associations as mentioned in FinlandCare, research organisations, and also INKA and SHOK actors. Thematic areas in the programme included Digital/Connected Care, Rehabilitation and Preventative Care, Secondary Care and Health Tourism, and Health Tech Export together with Tekes, particularly Bits of Health. The specific objectives set for the programme was to grow the turnover in the business area by 10% a year and increase in private in-

vestment to the area by 2.5 times in the ten years between 2017 to 2027.

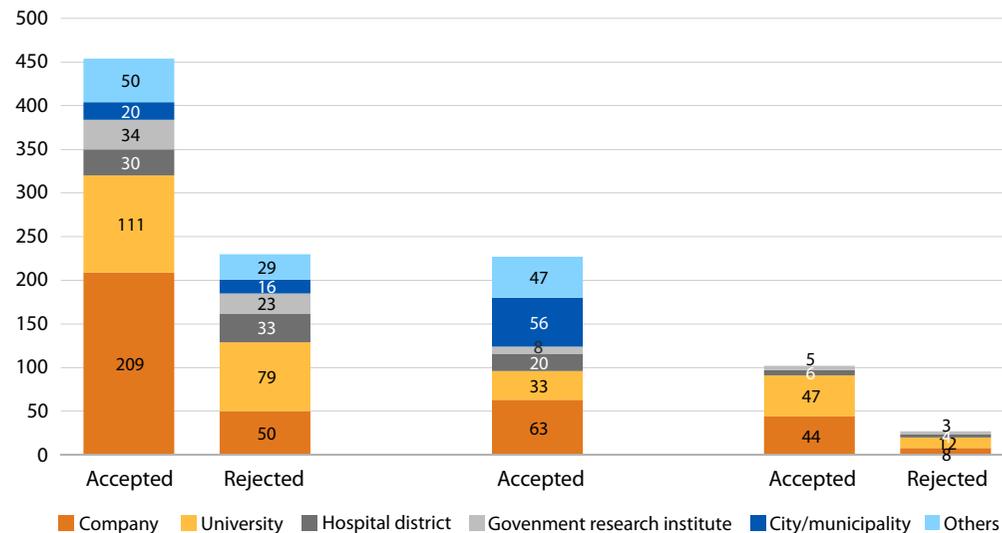
Activities include building and “digital shop window” for Finnish health and wellbeing industry together with other Team Finland (TF)<sup>8</sup> actors and gathering an open event calendar for health sector. Relatedly the activities include marketing and raising visibility in international markets, and target market engagement activities similar to Digital Hospitals and FinlandCare with the difference that TF Health put effort into bringing potential investors to visit Finland in addition to Finnish delegations visiting export markets. Also, TF Health marks a tightening of collaboration between Finpro and Tekes in anticipation of the merger as some of the export promotion activities were joint activities with Tekes programmes such as Bits of Health. According to the interviews, the core activities of TF Health that took the majority of resources were the Way Forwards Roadmap for the Health and Wellbeing area that identified concrete actions for the specific industries of business areas and building the Finland Health Portal. The other activities then complemented these actions, but different stakeholders also have differing views what actions in Finpro actually were part of the programme and funded by the specific budget and which were conveniently branded under the same banner at the time or in retrospect. This relates to the nuance that TF Health was the main action Finpro took to (signal) support the Growth Strategy relaunch in 2016.

<sup>8</sup> Team Finland encompasses the main RDI, industrial policy and exports promotion agencies, including the former Tekes and Finpro, Finnvera, regional ELY-centers and Ministry of Foreign Affairs and their consular activities.

**FIGURE 4.** Accepted cost and granted funding from each Tekes programme (in million euro).



**FIGURE 5.** Number of accepted and declined applications per group of recipients.



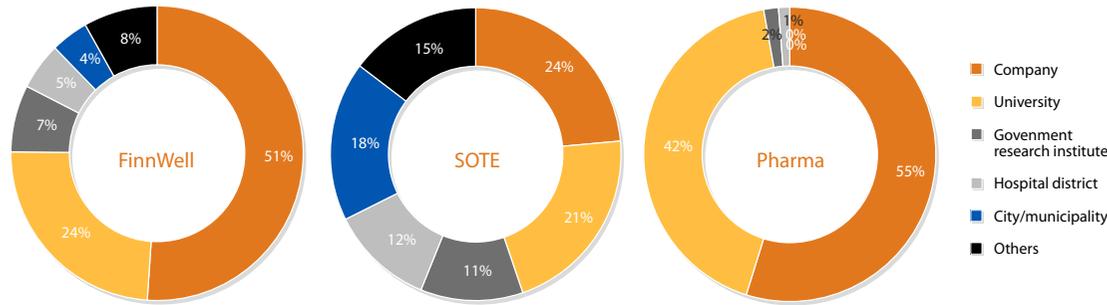
### 3.2 SUMMARY AND COMPARISON OF THE PROGRAMMES

Comparing the funding distribution between the Tekes programmes, at the time FinnWell was one of the largest Tekes programmes implemented. Tekes granted € 96.5 million for 454 ventures between 173 unique organisations. SOTE and Pharma in turn are much smaller programmes by volume, SOTE granted € 38 million between 227 ventures for 147 beneficiaries and Pharma € 29.5 million between 102 ventures for 42 recipients.

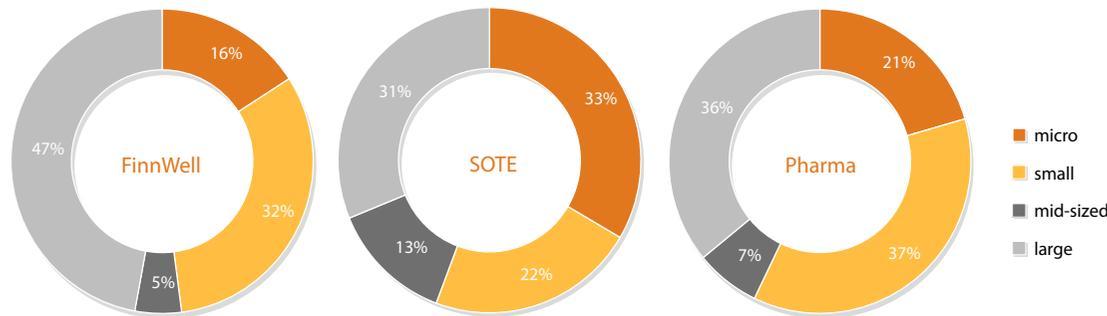
The largest share of funding in FinnWell was allocated to enterprises, followed by universities and the remaining approximate quarter was evenly distributed between research institutes, municipalities, hospital regions and other public actors. SOTE follows the similar distribution of funding with the exception that the shares are more even between the groups of beneficiaries and in comparison, enterprises and universities have gained a much smaller share. Pharma has an entirely different distribution, where 97% of the funding is split between universities and enterprises.

In further breakdown, looking at funding distribution by size of enterprise, on average small enterprises including micro-enterprises have received more than half of the funding, and large enterprises most of the remaining. In effect, medium-sized enterprises are almost missing from the distribution.

**FIGURE 6.** Finding distribution by group of recipients.



**FIGURE 7.** Funding distribution by size of enterprise.<sup>9</sup>



As such the distribution of funding does not offer surprises and the distributions are similar to other Tekes programmes. The non-typical features of the funding are the high rate of funding for public actors such as

municipalities and hospital regions in SOTE and the split between universities and enterprises in Pharma, but as such the figures conform to the goals and foci of the programmes and the general goal of supporting change of practices in (public) health care and supporting formation of Public-Private Partnerships (PPPs).

As Finpro programmes have not provisioned funding but only services, we cannot analyse the funding differences. However, in terms of the received records of organisations that have participated in the programme in some capacity, the sizes are similar and fall in line with the Tekes programmes. FinlandCare is the smallest with 45 identified participants, Digital Hospitals (DH) 117 and Team Finland Health (TFH) 120. The participation in and intensity of use of different services is analysed further below.

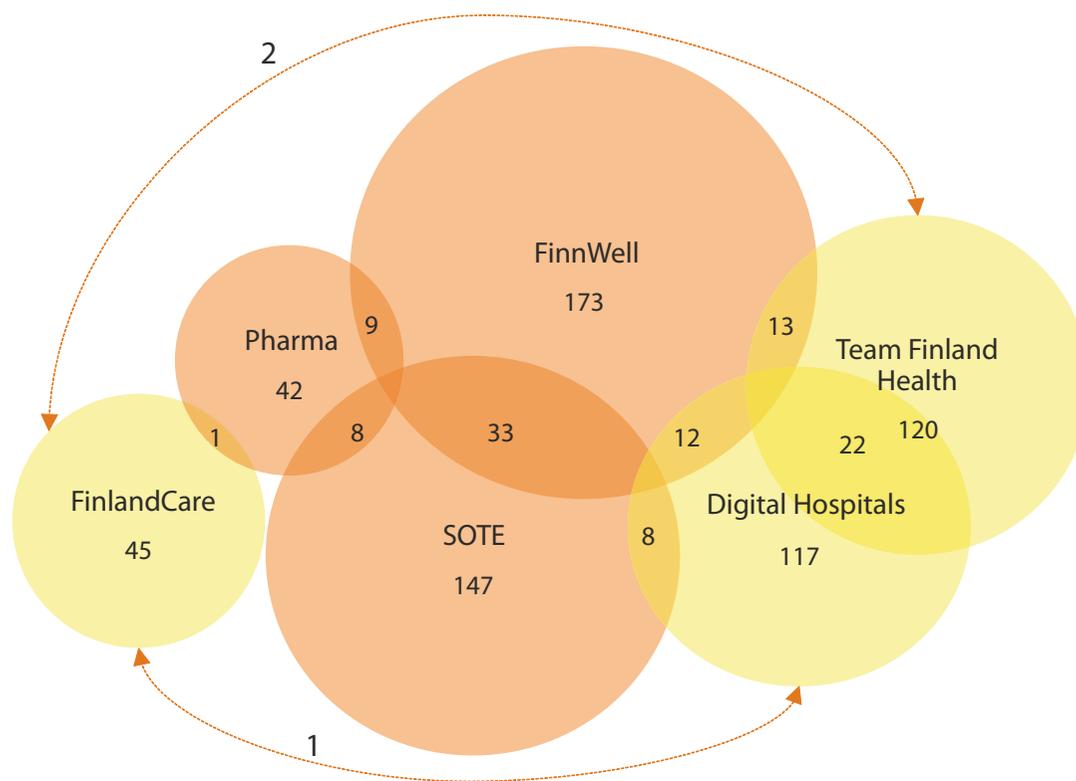
Taking the six programmes altogether, 523 individual organisations participated in either Finpro or Tekes programmes and 37 individual organisations or 7% in at least one Tekes and Finpro programme, some in several (one individual enterprise has participated in altogether 4, 2+2, programmes). The following table presents attrition rates from accepted application to those who have submitted a final report. The difference to the number of unique participants is explained through organisations participating in multiple projects even within the same programme.

<sup>9</sup> This report follows the EU convention for organisation sizes: micro is < (less than) 10 employees, small <50, mid-sized 5-250 and large >250 employees. Due to limitations in data, large organisations are not classified separately to mid-cap and large.

**TABLE 1.** Number of participations and attrition rate.

	Projects started	Final report	Attrition rate
<b>FinnWell</b>	273	199	27 %
<b>Pharma</b>	79	49	38 %
<b>SOTE</b>	221	160	28%

**FIGURE 8.** Participations per programme and programme overlaps (bubbles and intersections not in scale).



In the intersection, the participants are a mix of private and public care organisations, health tech and pharmaceutical enterprises. Looking in more detail between the programmes, the following figure presents the numbers of overlapping participations between the programmes. Between the Tekes programmes, the intersections come through universities, hospital regions and municipalities, i.e. research organisations and primary/secondary care organisations. Between FinnWell and Team Finland Health the connection is through health tech and diagnostics enterprises, and between SOTE and other (private) care providers.

The following table presents an overview of the evaluated programmes, their objectives and main activities based on received programme documentation and interviews of programme stakeholders. The largest division is between the RDI and exports promotion programmes. Three of each are included in this evaluation.

One of the major drivers and overarching themes behind the Tekes programmes has been all along the demographic development of aging population, rising cost of healthcare and worsening dependency ratio. The themes have slightly shifted over time, the evaluation of iWell and FinnWell pointed out that in iWell the focus was in preventive care and developing solutions for the general population, while over the progression of the programmes through FinnWell and SOTE the emphasis has moved more towards developing processes and practices in the healthcare system by bringing the stakeholders together in co-development projects. In this scheme, Pharma has had a narrower focus specif-

ically on the competitiveness of pharmaceuticals and diagnostics.

In comparison to the Tekes programmes where the focus has been as much developing the national health-care system as technology and business, Finpro Growth Programmes have set their goals more straightforwardly towards business objectives. However, while the stated goals are quite simply sales growth, the interviews particularly stressed that the underlying idea was to bring enterprises and other partners together, reinforce networking and provide a platform and support for developing joint product-service offerings.

The main difference is that the RDI programmes offer funding as well as other services to support attaining the goals, while the exports programmes only provide services. Consequently, there is a fundamental difference in the logic, roughly along the distinction between exploration and exploitation: the RDI programmes support investment in exploring new possibilities and developing new knowledge, capability and tangible products or services, while the exports promotion programmes lean towards supporting commercial exploitation of existing knowledge and products of services derived thereof. An associated, practical, difference is that participation in the RDI programmes has been free outside investment in the actual projects, while participation to the exports programmes is subject to a variable yearly fee that includes some of the services, such as access to market intelligence, various events and such.

Another qualitative difference is, that the RDI programmes, particularly SOTE, seem less directly geared towards promoting exports and more renewal of the economy and enterprises through investment in R&D and innovation, and particularly in the case of SOTE also renewal of the national healthcare and social service system particularly through introducing productivity improvements and use of technology.

Looking through the lens of the evaluation assignment in terms of “changing practices” as they are defined in the assignment, there also the three RDI programmes seem more directly geared towards recognition and spreading of existing best practice and developing new processes, methods, services and so forth, while the exports programmes address development of practices as well as collaborations and joint offering for export markets. Services are similar: the common denominator is target market engagement. All of the Tekes programmes had at least some level of awareness raising for international markets, 2/3 had country/delegation/trade fair visits to selected markets, organised independently or together with local Team Finland contacts. The level of engagement between Tekes and Finpro programmes has increased. For example, one of the older programmes, Pharma, organised foreign visits semi-independently with FinChi Innovation Center. In the latter programme there were on the one hand coordination between SOTE and FinlandCare to avoid overlapping activities and later Bits of Health and Team Finland Health have organised joint exports activities, e.g. market visits.

**TABLE 2.** Summary and comparison of the programmes.

	<b>FinnWell (2004–2009)</b>	<b>Pharma (2008–2011)</b>	<b>Innovation in social and healthcare services (SOTE-programme, 2008–2015)</b>	<b>Finland Care (2012–2017)</b>	<b>Digital Hospitals (2015–2017)</b>	<b>Team Finland Health Growth programme (2015–2017)</b>
<b>Type and owner</b>	<b>Tekes/ RDI</b>	<b>Tekes/ RDI</b>	<b>Tekes/ RDI</b>	<b>Finpro/export</b>	<b>Finpro/export</b>	<b>Finpro/export</b>
<b>Objectives</b>	<p>FinnWell aims to improve wellbeing and ability to function (citizen/patients), and productivity (of healthcare and enterprises), take end user need into account</p> <p>The participants of the programme create new and improved care solutions and enterprise participants will create products and services for the international markets</p>	<p>Renewal of pharmaceutical industry and int'l competitiveness of pharma and diagnostics enterprises</p> <p>Speed up development of new processes, methods, and operating models in pharmaceutical industry and associated services</p> <p>Support networking between bio-pharma, diagnostics and clinical research</p> <p>Improve risk management of NPD</p> <p>Encourage PPPs and international networking</p> <p>Improve investment environment for bio-pharma in Finland</p>	<p>Renewal of health care organisations and processes</p> <p>Development of customer relationship management and new networked service models</p> <p>Recognition and spreading best practices</p> <p>Increased quality, productivity and customer/patient-orientation</p>	<p>Promotion of Finnish healthcare technology, competence and services in international markets</p> <p>To create growth, "innovation-driven export growth"</p>	<p>Promotion programme for Finnish companies who market technologies that improve quality, productivity and impact of care</p> <p>Targets particularly Nordic markets and hospital investments</p>	<p>Reinforces the image of Finland as a favourable environment for RDI in healthcare and related areas, lures in investments and business (invest-in)</p> <p>Supports internationalisation of enterprises in the health sector and growth of exports</p> <p>Specifically attracting investments from global pharmaceutical and digital/health tech enterprises</p>

...TABLE 2.

	<b>FinnWell (2004–2009)</b>	<b>Pharma (2008–2011)</b>	<b>Innovation in social and healthcare services (SOTE-programme, 2008–2015)</b>	<b>Finland Care (2012–2017)</b>	<b>Digital Hospitals (2015–2017)</b>	<b>Team Finland Health Growth programme (2015–2017)</b>
<b>Target groups</b>	Technology providers, care providers (public and private), research organisations in the health sector  Included SMEs and large enterprises (funded approximately 50/50) and PROs as well as PPPs	Enterprises, primarily bio-pharma, CROs and other associated services, diagnostics	Municipalities, hospital regions, care groups and other enterprises	”Health and Wellbeing” industry:  Technology companies, education and training, consultancies, healthcare particularly specialised (public and private)	Health technology enterprises, particularly hospital tech	Bio-medical and health technology, pharmaceuticals
<b>Funding/ participation criteria</b>	Multidisciplinarity, innovative combinations of expertise  Participation of research organisation and end users  Clear view to commercial exploitation of the results	Multidisciplinarity, innovative combinations of expertise  International networking  Participation of research organisation and end users  Clear view to commercial exploitation of the results	Development of scalable service concepts that are user/patient oriented and based on best practices, and commitment to utilisation of results  Collaboration and Multidisciplinarity  Novelty and ambition in the development project  Contributes to productivity, service quality and renewal of existing care system  Adequately resourced	Participation open, but requires payment of a fee	Participation open, but requires payment of a fee	Participation open, but requires payment of a fee

...TABLE 2.

	<b>FinnWell (2004–2009)</b>	<b>Pharma (2008–2011)</b>	<b>Innovation in social and healthcare services (SOTE-programme, 2008–2015)</b>	<b>Finland Care (2012–2017)</b>	<b>Digital Hospitals (2015–2017)</b>	<b>Team Finland Health Growth programme (2015–2017)</b>
<b>Thematic emphases</b>	<p>Thematic emphases:</p> <ol style="list-style-type: none"> <li>1) Diagnostic and care technologies</li> <li>2) Health informatics and information systems</li> <li>3) Processes and productivity in healthcare</li> </ol>	<p>Thematic emphases:</p> <ol style="list-style-type: none"> <li>1) Tools, methods and forecast models for speeding up NPD</li> <li>2) Chemical process technologies and innovative compounds</li> <li>3) Development of a shared national model for clinical research</li> <li>4) Business networking</li> <li>5) EU funding</li> </ol> <p>Transnationality</p>	<p>Thematic emphases:</p> <ol style="list-style-type: none"> <li>1) End used/patient orientation, co-development</li> <li>2) Collaboration between industries, types of actors, PPPs</li> <li>3) Renewal of operations and processes, Technology, organisations, and infrastructure</li> <li>4) Exploitation of best practices</li> </ol>	As above	<p>Thematic emphases:</p> <ol style="list-style-type: none"> <li>1) Internet of Care</li> <li>2) Smart Hospital</li> </ol>	<p>Thematic emphases (exports promotion):</p> <ol style="list-style-type: none"> <li>1) Digital Connected Patient Care (US, US, DE, and Nordics)</li> <li>2) Care, rehab and prevention (Europe, Middle and Far East)</li> <li>3) Special medical care (Russia and Middle-East)</li> <li>4) Health tech solutions exports (with TEKES)</li> </ol> <p>Thematic emphases (invest-in):</p> <ol style="list-style-type: none"> <li>1) Knowledge/capability to utilise bio banks and other large bodies of data</li> <li>2) Investment from (int'l) health tech to Finnish start-ups</li> </ol>
<b>Programme services and activities (funding services)</b>	RDI grants and loans	RDI grants and loans	RDI grants, small De Minimis grants, value network project grants, innovative public procurement grants, and workplace development grants	No funding from the programme, some services included in the fee	No funding from the programme, some services included in the fee	No funding from the programme, some services included in the fee

...TABLE 2.

	<b>FinnWell (2004–2009)</b>	<b>Pharma (2008–2011)</b>	<b>Innovation in social and healthcare services (SOTE-programme, 2008–2015)</b>	<b>Finland Care (2012–2017)</b>	<b>Digital Hospitals (2015–2017)</b>	<b>Team Finland Health Growth programme (2015–2017)</b>
<b>Programme services and activities (engagement and other)</b>	<ul style="list-style-type: none"> <li>– Seminars</li> <li>– “Thematic groups” with meetings to facilitate networking and exchange around programme themes</li> <li>– Participation in various fora around future healthcare and health tech, with other funders</li> <li>– Marketing/ partnering events, trade fair/ delegation visits to target markets (primarily USA)</li> </ul>	<ul style="list-style-type: none"> <li>– (Yearly) Pharma seminars</li> <li>– Communication and media presence</li> <li>– Commissioned studies, surveys</li> <li>– Mentoring service, assessments and advice for commercialisation of research</li> <li>– Marketing/ partnering events, trade fair/ delegation visits to target markets (primarily China and Canada)</li> </ul>	<ul style="list-style-type: none"> <li>– Communication for policy makers/decision makers, media visibility and outreach in events</li> <li>– Coordination with Nordic Innovation programmes</li> </ul>	<ul style="list-style-type: none"> <li>– Marketing events, trade fair participations, trade delegations and other country visits</li> <li>– Matchmaking and other b-2-b networking</li> <li>– Visits for foreign decision makers and other invest-in activities</li> <li>– Web portal and other marketing/ country branding efforts</li> <li>– Marketing campaigns in target markets</li> </ul>	<ul style="list-style-type: none"> <li>– Market information/ intelligence</li> <li>– Information on purchasing processes and practices</li> <li>– Coaching</li> <li>– Networking</li> <li>– Standard visits and, meet-and-greet events and round tables with healthcare representatives in the target markets</li> <li>– Marketing campaigns</li> <li>– Trade fair visits and event presence</li> </ul>	<ul style="list-style-type: none"> <li>– Building a digital shop window for Finnish healthcare and wellbeing industry, with other TF actors</li> <li>– Gathering existing health and wellbeing business area events and trade fairs in one calendar</li> <li>– Way Forward road mapping project</li> <li>– Participation in international trade fairs, industry events and delegations, buyers’ round tables</li> <li>– Organisation of invest-in oriented enterprise visits to Finland</li> <li>– Investors events</li> </ul>

# 4 FINDINGS ON CONTRIBUTION OF PROGRAMMES

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## 4.1 RELEVANCE, EFFICIENCY, AND EFFECTIVENESS

### 4.1.1 OVERALL RELEVANCE

Regarding relevance, the programme themes have been relevant and timely according to the data, particularly interviews and documents. The programme themes have early on locked onto the discussion that is ongoing in relation to the needs of reform in the healthcare system, the need for preventative care, rehabilitation and maintenance of functionality especially in relation to the elderly population, home care, and for example the ongoing themes of digital health and intersection of health care, biotechnology, medical devices, and IT, personalised healthcare and so on have been recognised early on and implemented in the programmes. Inciden-

tally, some of the largest investments in healthcare are predicted to focus on developing precision insight for optimizing delivery of health care, and platforms for managing data and analytics to provide up to date information for health care management and clinicians<sup>10</sup>. Another ongoing trend that has been an underlying theme in Tekes and Finpro activities has been the development of healthcare system and systemic innovations, which is also nowadays apparent in the transforming business models of the industry.<sup>11</sup>

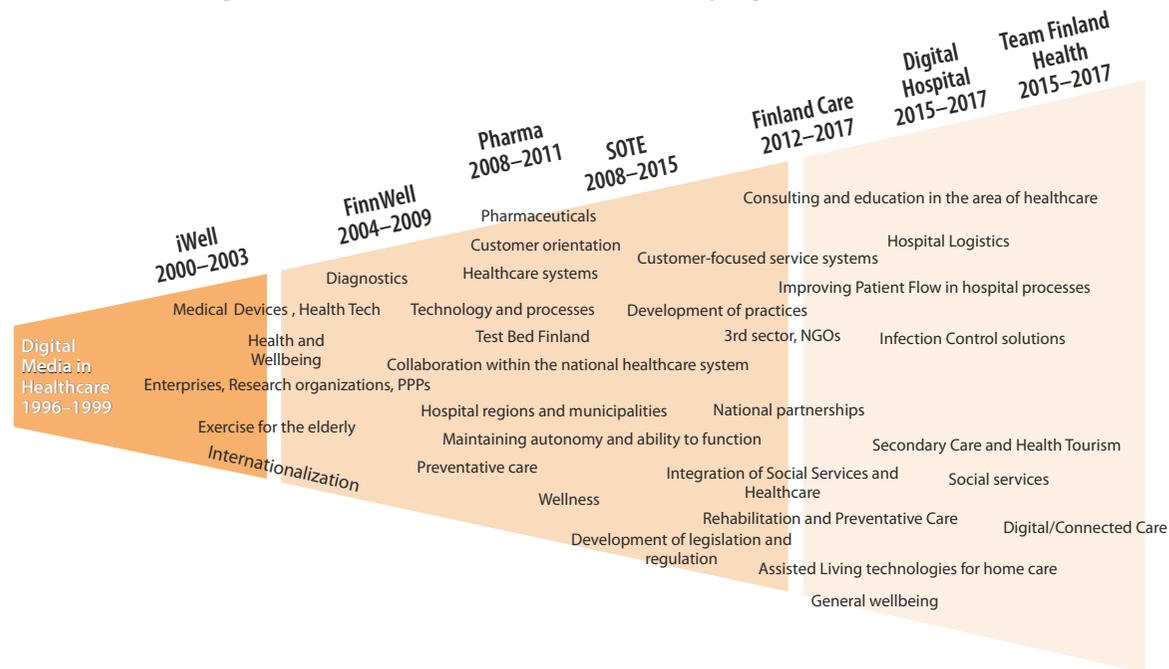
The programme themes have been consistent and there is a continuum over time as illustrated in the following figure. Some of the more persistent themes have been rehabilitation and preventative care and services to support general wellness, another has been building broadening partnerships towards PPP(P)s, and development of service system and various logistical and other processes therein.

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<sup>10</sup> E.g. Suennen, L. (2018). Reading the VC Tea Leaves – Predictions for 2018. <https://venturevalkyrie.com/reading-the-vc-tea-leavespredictions-for-2018/>

<sup>11</sup> E.g. Suennen K. 2018, Disruption or Deck Chair? Healthcare is Changing, But Will It Change for the Better?, Available: <https://venturevalkyrie.com/disruption-or-deck-chair-healthcare-is-changing-but-will-it-change-for-the-better/>

**FIGURE 9.** Programme themes between the evaluated programmes.<sup>12</sup>



#### 4.1.2 EFFICIENCY AND EFFECTIVENESS

The following series of figures presents highlights of the findings on the outcome and impact of the programmes based on the survey to programme participants, the full survey analysis is included in Appendix 2. It is notable that also the Growth Programmes are well represented in the outcomes. Most report at least one new product

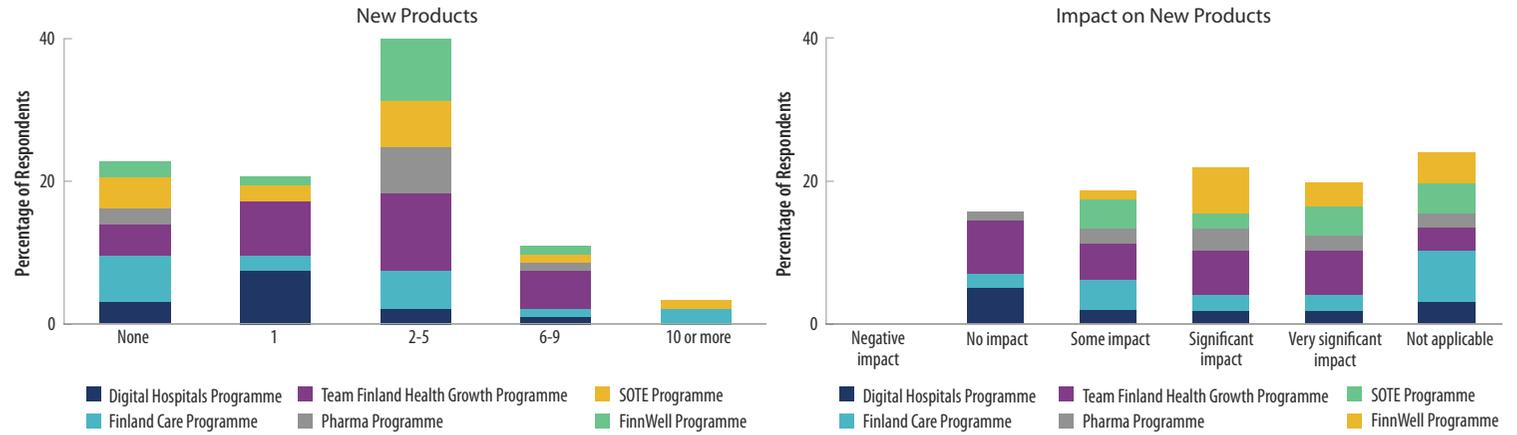
(or service) as an outcome and most have experienced at least some additionality from the programme participation towards new offerings. In the extremes, of those who did not introduce new innovations or and did not see an impact to innovation DH and TFH stand out the most, while out of the Pharma programme participants who responded, 78% developed new products and 86% of those that developed new products attributed positive impact to the Pharma Programme on their ability to do so.

Regarding time to market, the respondents' answers give a rather similar picture, again most have experienced a decrease in time-to-market and again many attribute at least some impact to the programme participation. Here FinnWell stands out as 73% of respondents decreased their time to market, 27% by over one year, and 83% of those that decreased their time-to-market attributed positive impact to the FinnWell Programme on their ability to do so.

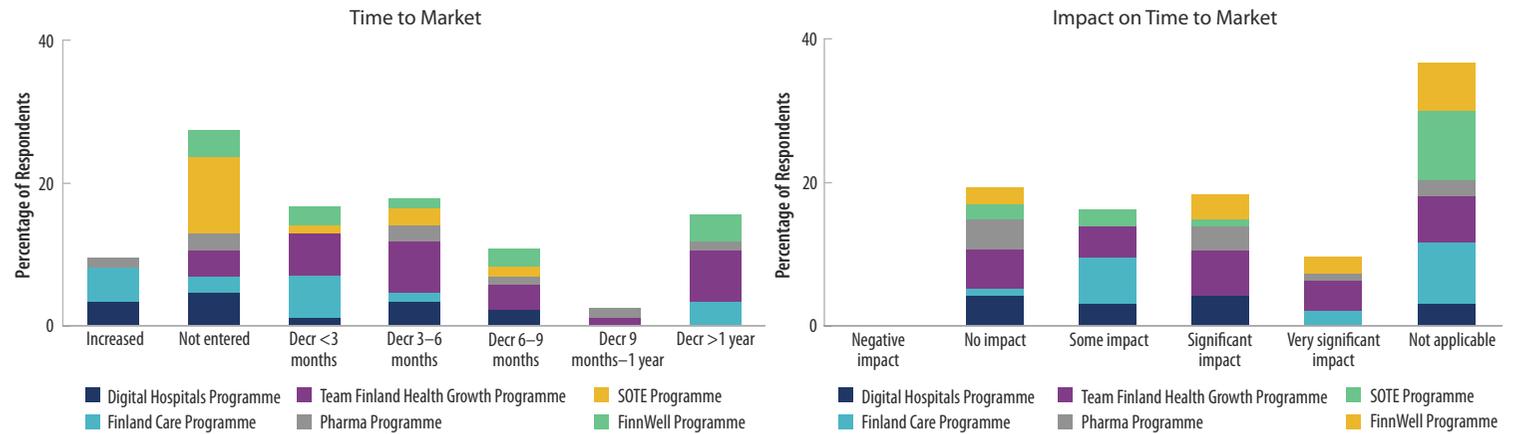
In acquiring new international customers, the participants in Finpro programmes are understandably well represented and vice versa, many of those who had not acquired new international customers participated in FinnWell and SOTE, with a heavy focus on domestic markets. Here Finland Care stands out in relative terms, 86% of respondents acquired new international customers, 29% acquired 4 or more, and 67% of those that acquired new international customers attributed positive impact to Finland Care on their ability to do so.

<sup>12</sup> Adapted and expanded from Saarinen et al. 2009. Terveystieteiden tutkimuskeskuksesta systeemien kehittämiseen: iWell ja FinnWell -ohjelmien arviointi, Tekes ohjelmaraapostteja 6/2009

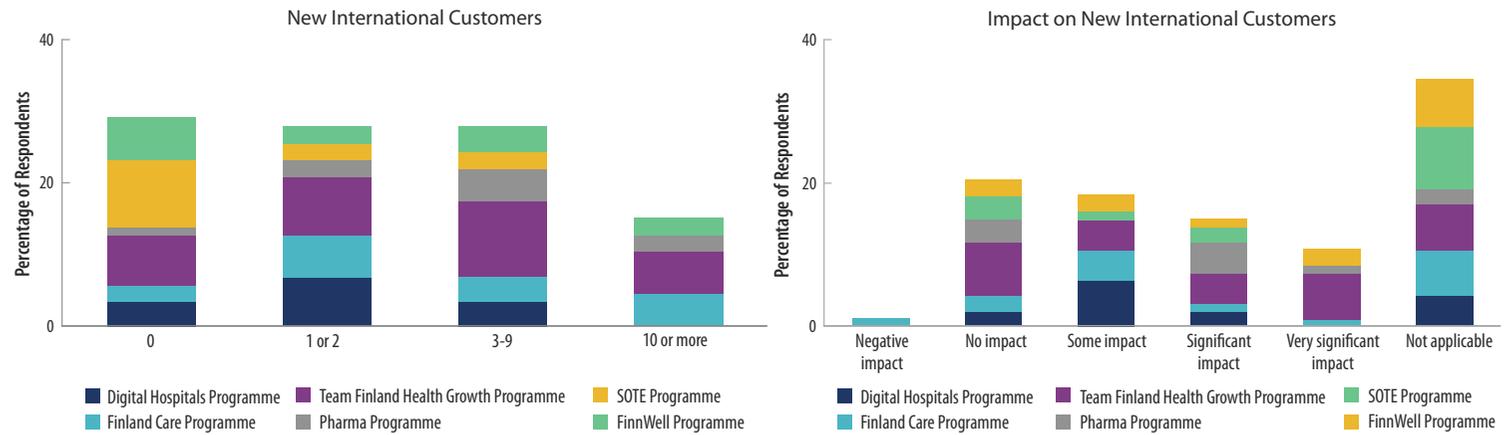
**FIGURE 10.** Programme impact to new products.



**FIGURE 11.** Programme impact to time-to-market.



**FIGURE 12.** Programme impact to attracting new international customers.



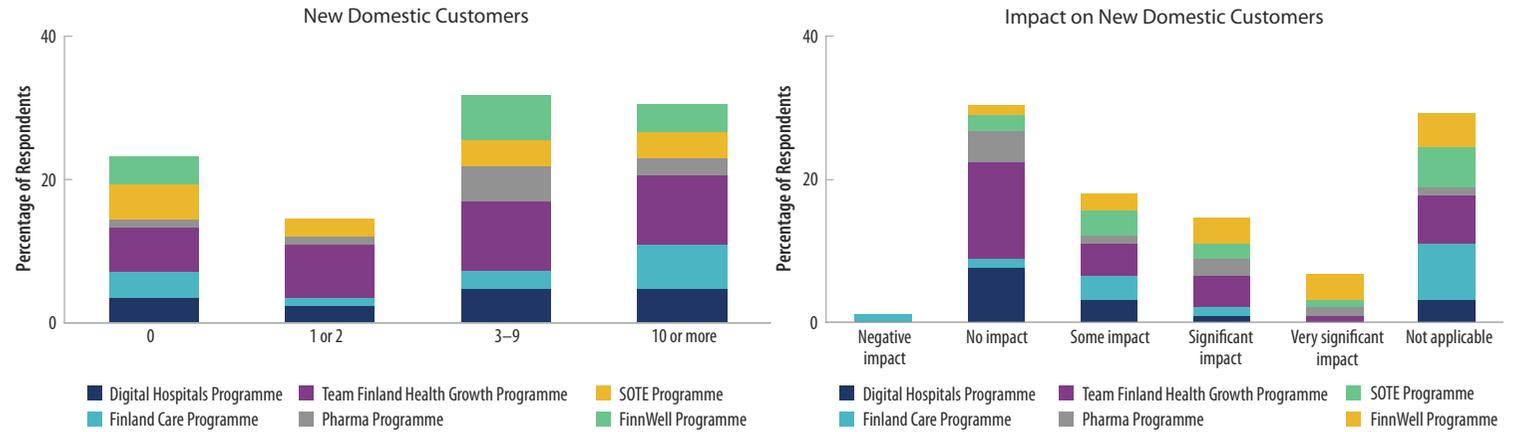
Referring to the previous statement, in regard to attracting new domestic customers, particularly SOTE and FinnWell standout. Out of respondents who participated in SOTE, 67% of respondents acquired new domestic customers, and 100% of those that acquired new domestic customers attributed positive impact to the SOTE Programme on their ability to do so.

In terms of partnering, most respondent, in fact approximately 4 out of five have acquired at least one new partner, and almost half of those who did, found three or more. Most also attribute at least some impact to programme participation. Strongest were SOTE, where 85% acquired new domestic or international partners and 100% of those attributed positive impact to the SOTE. In Pharma 100% of respondents acquired new domestic or international partners; 20% acquired 10 or more, and

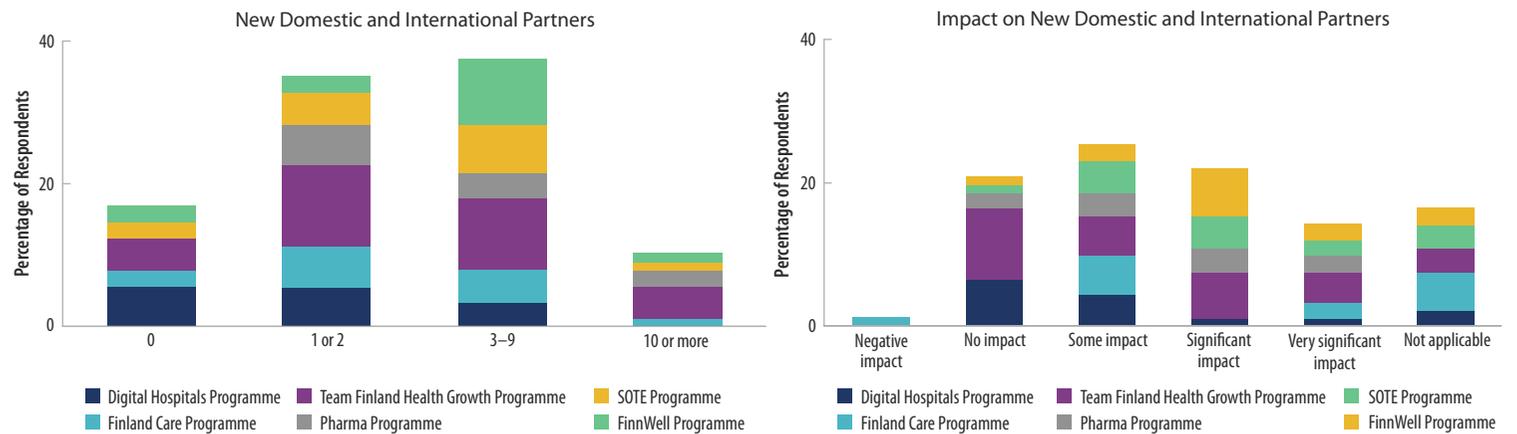
80% of whom attribute positive impact to the Pharma Programme on their ability to do so.

Going towards financial or economic effects of programme participation, again a majority of respondents witnessed at least some growth in revenue and approximately half attribute at least some impact to the programmes. FinnWell is in this respect the most successful of the Tekes programmes, 100% of respondents increased their annual sales revenues and 80% of those that increased annual sales revenues attributed positive impact to the FinnWell Programme on their ability to do so. The respondents reported quite strong results for the Finpro programmes. Starting from Finland Care, 79% increased annual revenues and 71% increased annual revenues by 10% or more since first participation, and 75% attribute positive impact to Finland Care Programme.

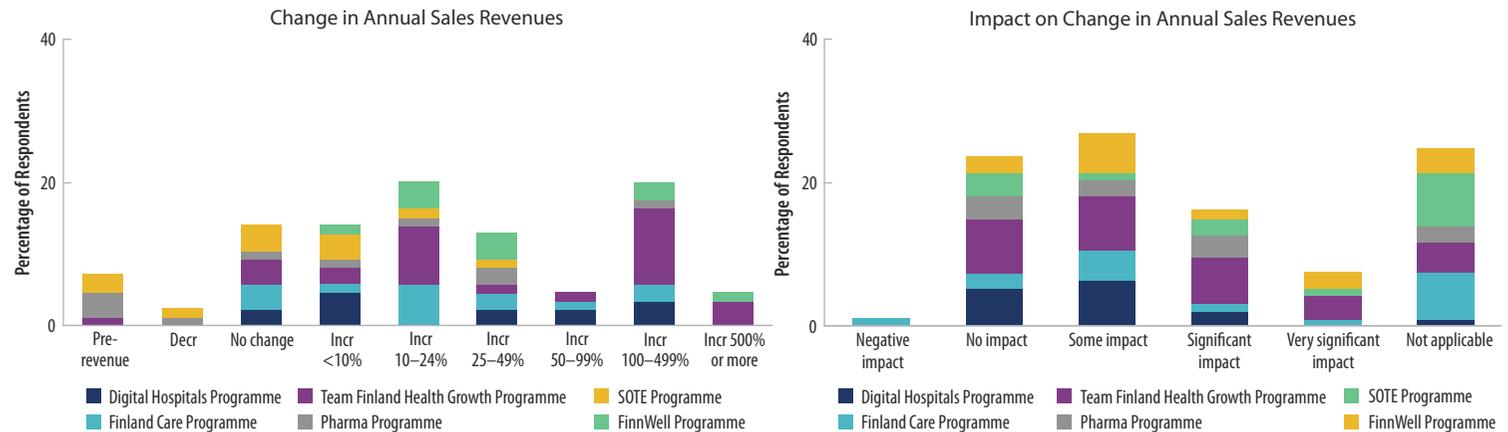
**FIGURE 13.** Programme impact to attracting new domestic customers.



**FIGURE 14.** Programme impact to finding new partnerships.



**FIGURE 15.** Impact on revenues.



In Digital Hospitals Programme, 85% increased annual revenues, over half (54%) by 25% or more and all attribute positive impact to programme. Finally, also in Team Finland Health 85% increased revenues, 78% increased revenues by 10% or more and 68% of those that increased annual revenues attributed positive impact to the programme. These latter findings are poignant as one of the main objectives and rationale for the Growth Programme were increasing sales.

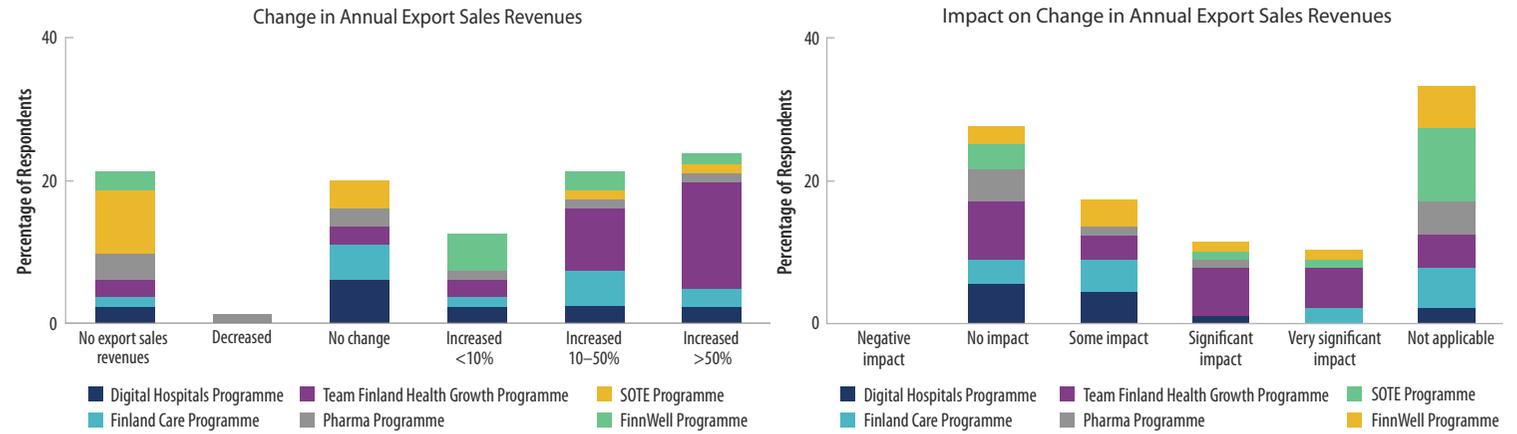
The responses to change in exports sales revenue mirror the previous. Out of the Tekes programmes FinnWell again stands out with 78% of respondents reporting increased export sales revenues and 71% of those attributed positive impact to the FinnWell Programme on their ability to do so. Out of the Finpro programme participants in Finland Care 58% increased annual export sales revenues, 17% by more than 50%, and 86% of respond-

ents attributed positive impact to Finland Care. Similarly, for Digital Hospitals Programme, 46% of respondents increased their annual export sales revenues and 67% of whom attribute positive impact to Digital Hospitals.

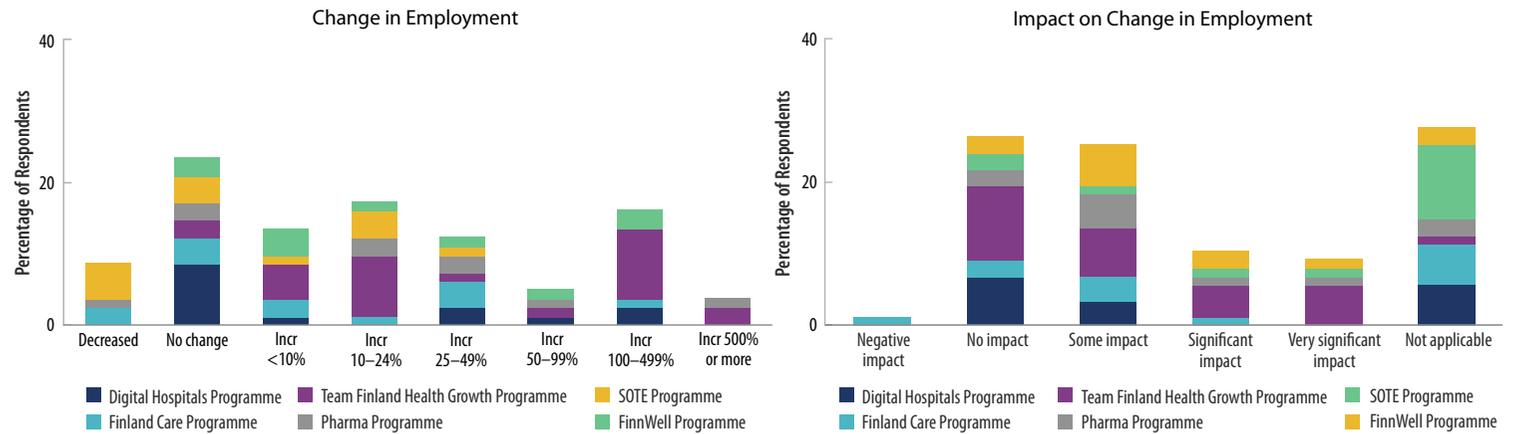
Again, in similar fashion, most programme participants have increased number of employees. Both Digital hospitals and Team Finland Health both have enterprises that have grown aggressively. In Digital Hospitals Programme, 38% increased employment; 15% by 100% or more; 60% of those that increased employment attribute positive impact to the Digital Hospitals Programme on their ability to do so.

Together with the employment growth numbers the final figures on impact to the ability to raise equity finance show that the Team Finland Health had some successful start-ups, besides a general focus on invest-in activities. Out of the respondents who participated in

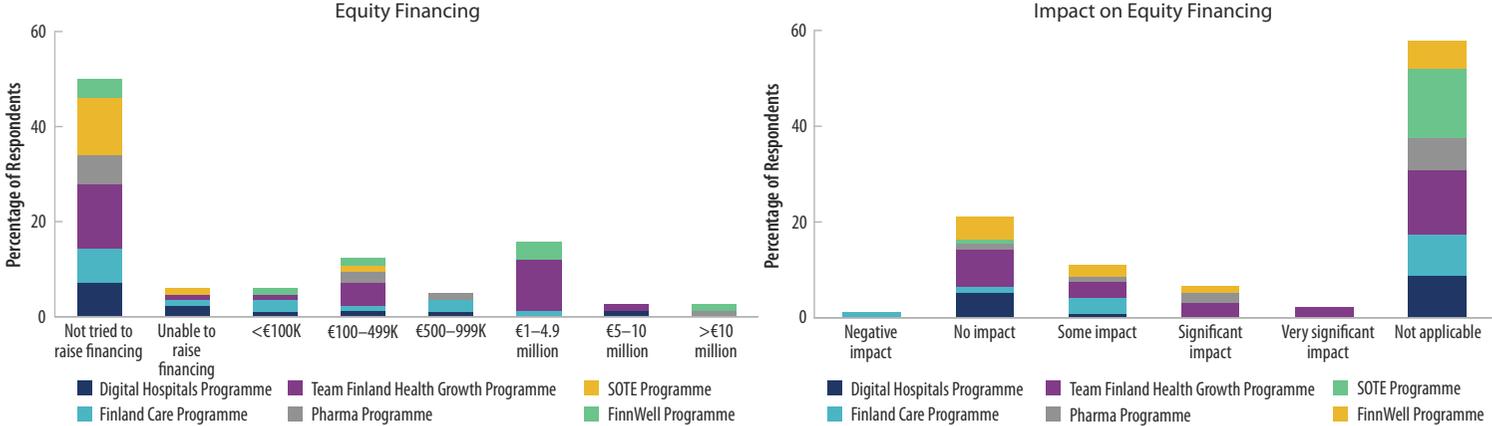
**FIGURE 16.** Impact on exports.



**FIGURE 17.** Impact on employment.



**FIGURE 18.** Impact on raising equity financing.



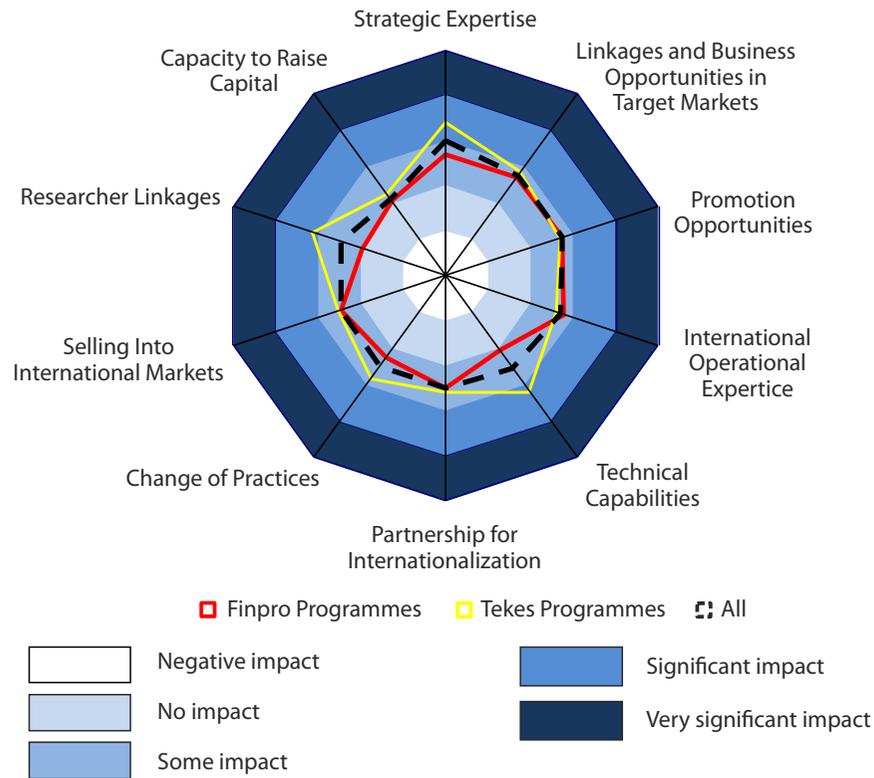
Team Finland Health Growth Programme, 56% raised equity financing, 37% raised € 1 million or more, and 62% of those that raised equity financing attributed positive impact to the Team Finland Health Growth Programme.

Overall, the picture forms that a majority of participants have derived at least some benefit from participation to the programmes, and as such at the project level the programmes have been quite successful. What is notable is the similarities between the profiles of the programmes between Tekes and Finpro in terms of impact to innovation and the complementary profiles in terms of economic impact. That is to say have apparently contributed to innovation with a light advantage to Tekes, and vice versa, both contribute to growth but in terms of particularly export growth Finpro has an advan-

tage. However, as analysed above, the programmed also contain many similar elements regarding partnering and exports promotion activities.

Going from the more tangible measures of success, the respondents were also asked how participation in the programmes contributed to development of capabilities. The following figure illustrates the results. Overall, respondents attributed the greatest average impact to the programmes on their ability to improve their strategic expertise (score of 6 out of 10). Comparing Tekes and Finpro, Tekes programme respondents attribute the greatest average impact on improvements to their strategic expertise (6.8/10) and in the case of Finpro, programme respondents attribute the greatest average impact on improvements to their international operational expertise (5.6/10).

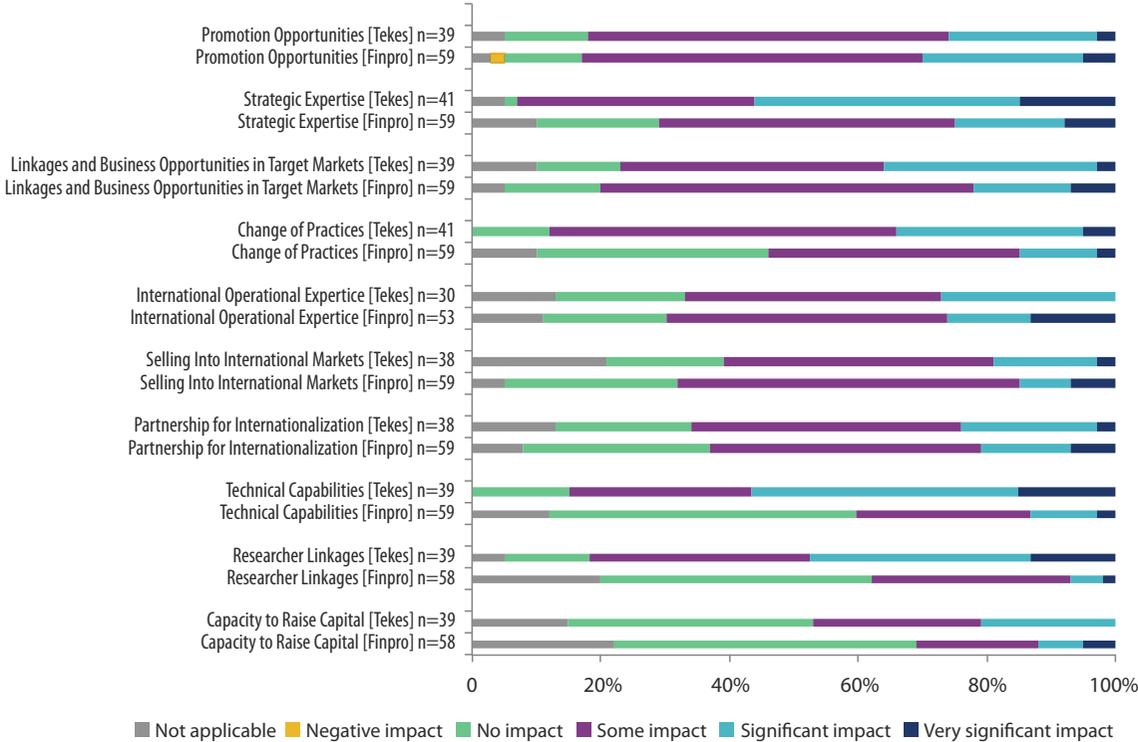
**FIGURE 19.** Impact of programme participation to capabilities.



Breaking down the answers to, the highest percentages of Finpro programme respondents attributed positive impact on improvements to their promotion opportunities (83%) and linkages and business opportunities in target markets (80%). Conversely, the highest percentage of Tekes programme respondents attributed

positive impact on improvements to their strategic expertise (93%) and change of practices (88%). Regarding the last, this is one of the three items with technical capabilities and research linkages where Tekes programmes have had more significantly more effect to capabilities.

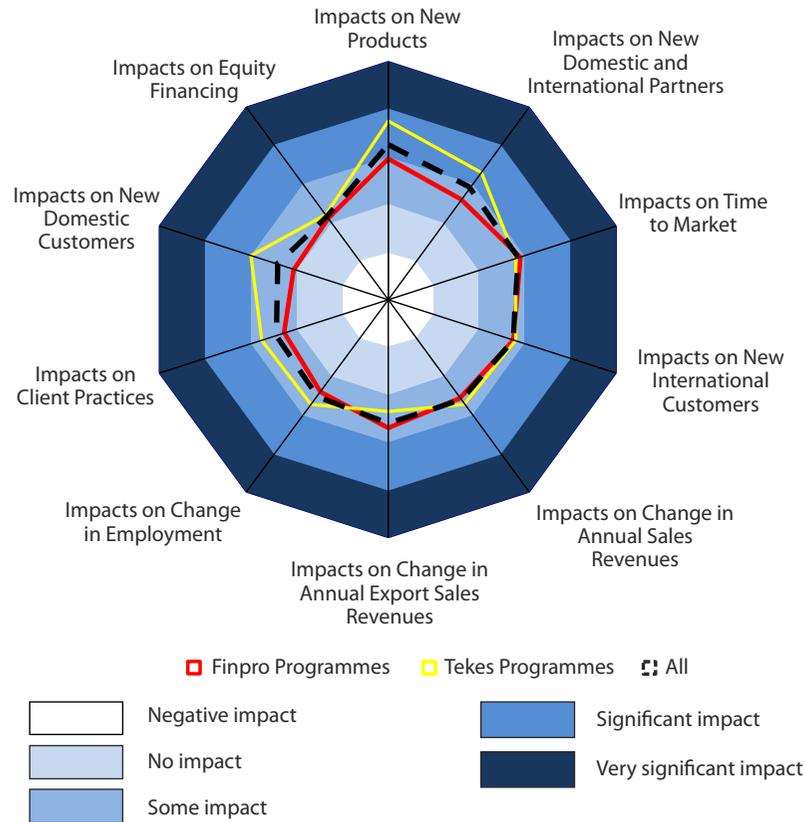
**FIGURE 20.** Breakdown of impact to capabilities.



Regarding change of practices as a specific point of interest, more than 4/5 have experiences some impact to practices in Tekes programmes and approximately 1/3 significant or very significant impact, whereas in Finpro programmes the corresponding fractions are approximately half and 1/10. However, as defined in this evaluation, also new partnerships, international operational expertise and strategic expertise also fall under the definition of new practices.

Finally looking at the overview of the impact measures, respondents attributed the greatest average impact to the programmes on their ability to develop new products (score of 6.5 out of 10), followed by impact on domestic and international partnerships, time to market, new customers, and new revenue. Both Tekes and Finpro programme respondents also attributed the greatest average impact on improvements to their ability to develop new products (Tekes 7.5/10, Finpro 5.9/10).

**FIGURE 21.** Overview of impact.

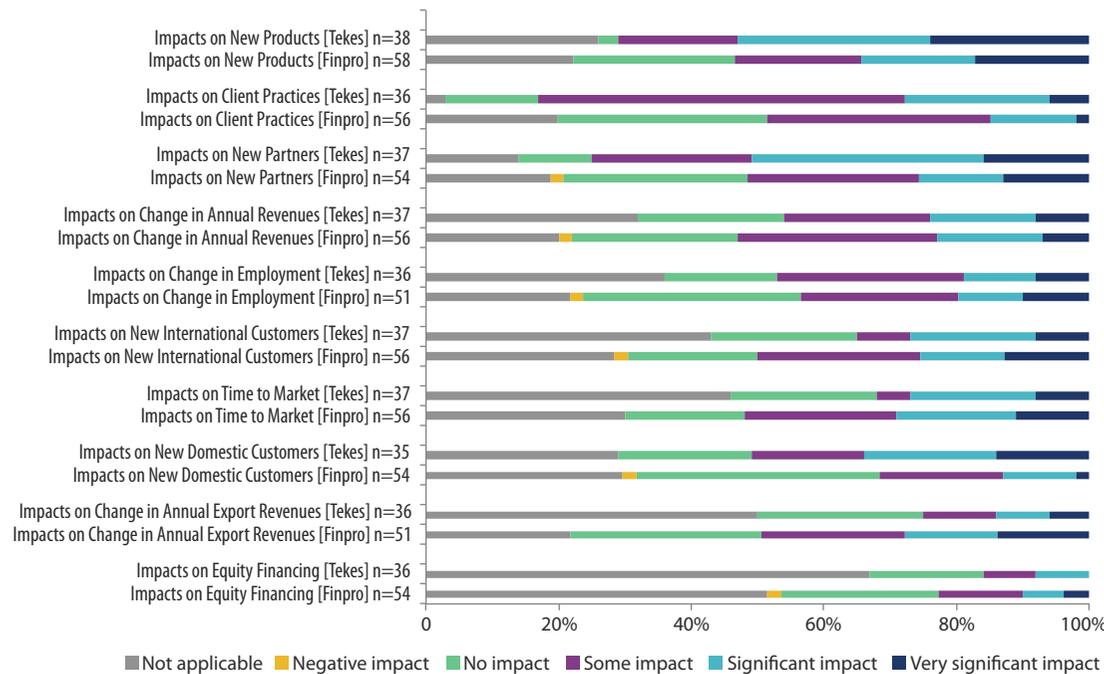


The points of divergence are partially expectedly impact on new products, new partnerships, domestic customers, and client practices to favour Tekes programmes and export revenues to favour Finpro.

Breaking down the impacts, the highest percentages of Finpro programme respondents attributed positive impact on improvements to their ability to develop new

products (53%) and change in annual revenues (53%). The highest percentage of Tekes programme respondents attributed positive impact on improvements to their ability to influence client practices (84%) and their ability to form new partnerships (75%). Again, change of practices is well represented in the impact.

**FIGURE 22.** Breakdown of impact overview.



### 4.1.3 OVERALL IMPACT

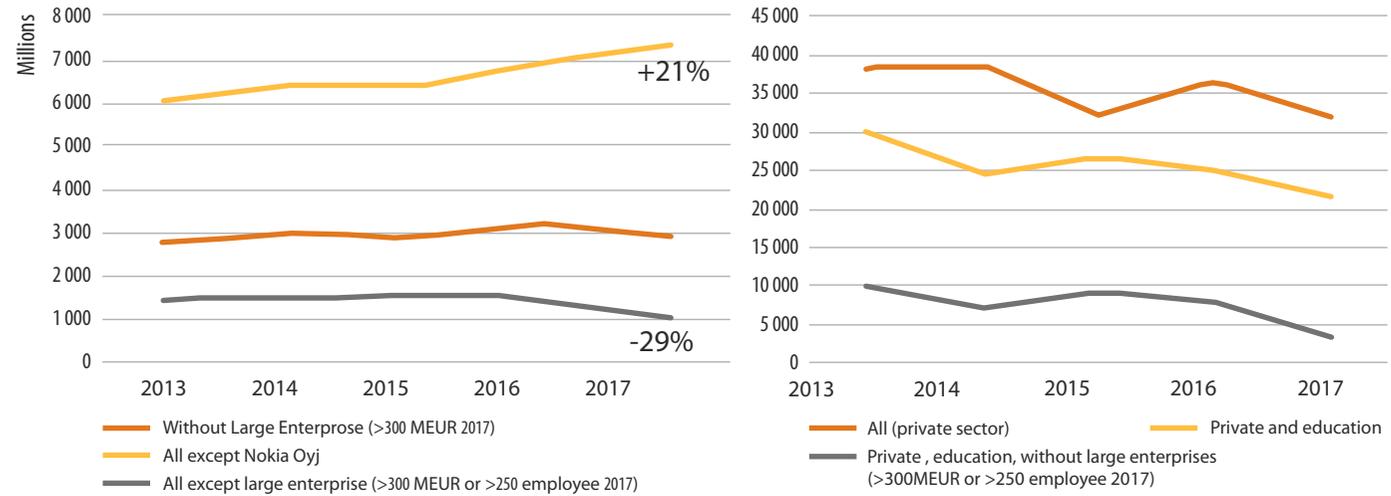
As the survey is necessarily a sample of the population, the following series of figures (figures 23 through 28) present the (recent) development of turnover and employment of the programme participants for Tekes and Finpro programmes and separately a longer view of financial development (per programme analyses are presented in Appendixes). The first pair of figures present development of turnover and employment for Tekes

programme participants and the second for Finpro. Later the long-term development is examined through financial data supplied by BF. Taken as a whole, both groups exhibit very healthy growth of approximately 20% over the last 4-year period. Both groups also clearly have raised average productivity as the employment has declined while business has grown.

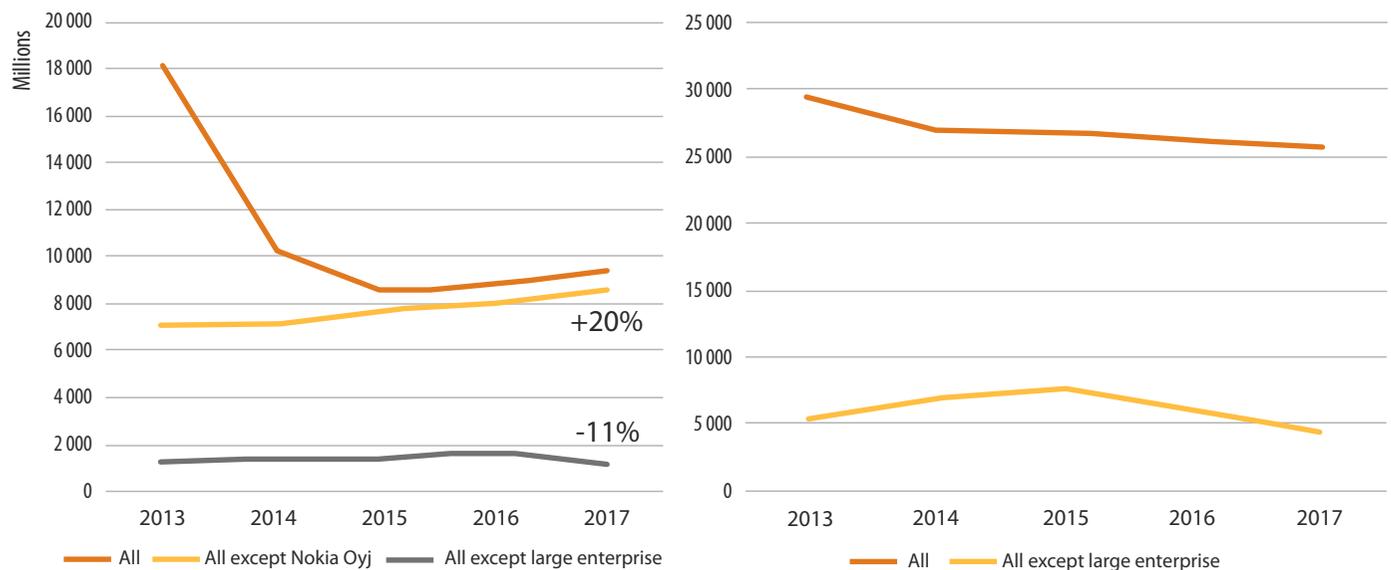
What is more worrisome, is the bifurcation between the development of the population average and small enterprises. The trends start diverging in 2015 and are particularly marked in FinnWell, SOTE and FinlandCare, where a sizeable portion of participants are care operators. The most likely explanation is that, due to the healthcare reform, the plans for the Freedom of Choice legislation that would give citizen the right to choose public or private provider under the universal care was published 2015, and since care enterprises have consolidated aggressively. It is possible, even likely, that the large enterprises are gaining a larger hold of the market at the expense of the small. Additionally, healthcare and health tech are areas that perhaps tend to disproportionately favour economies of scale.

Regardless of the expressed concerns, especially in the longer view, the development is good; with the exception of 2009 and 2012–2013, the yearly growth of Tekes beneficiaries as a group has been between 5 and 21% each year and the turnover clearly surpassed pre-depression in 2015. Thus, the growth of the Tekes-funded enterprises clearly ‘beats the index’ as in it is faster than the average economy. Looking at the per programme figures (see Appendix and below), the most net growth of

**FIGURE 23.** Development of turnover and number of employees for Tekes programme participants.

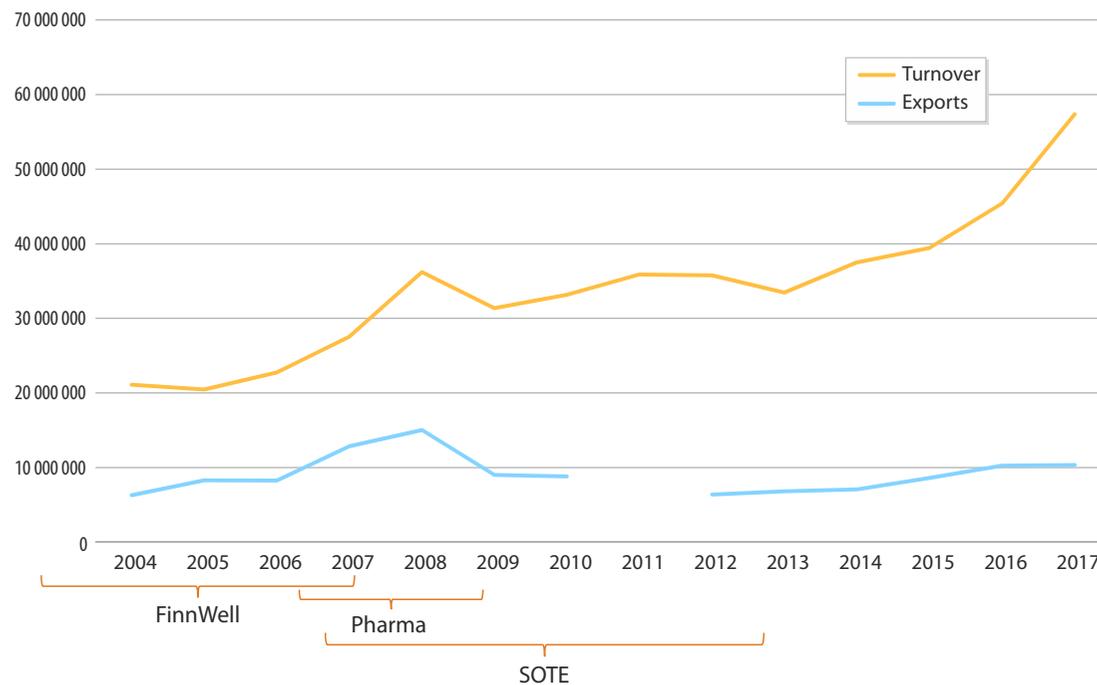


**FIGURE 24.** Development of turnover and number of employees for Finpro programme participant.



turnover and employment are attributable to subsidiaries of pharmaceutical MNEs and consolidation of private care enterprises. Based on the analysis of the survey sample, the conservative lowest estimate based on only the survey respondents is that a net total of € 15 million of new business is attributable to the programme partic-

**FIGURE 25.** Development of average turnover and value of exports across the Tekes programmes.<sup>13</sup>



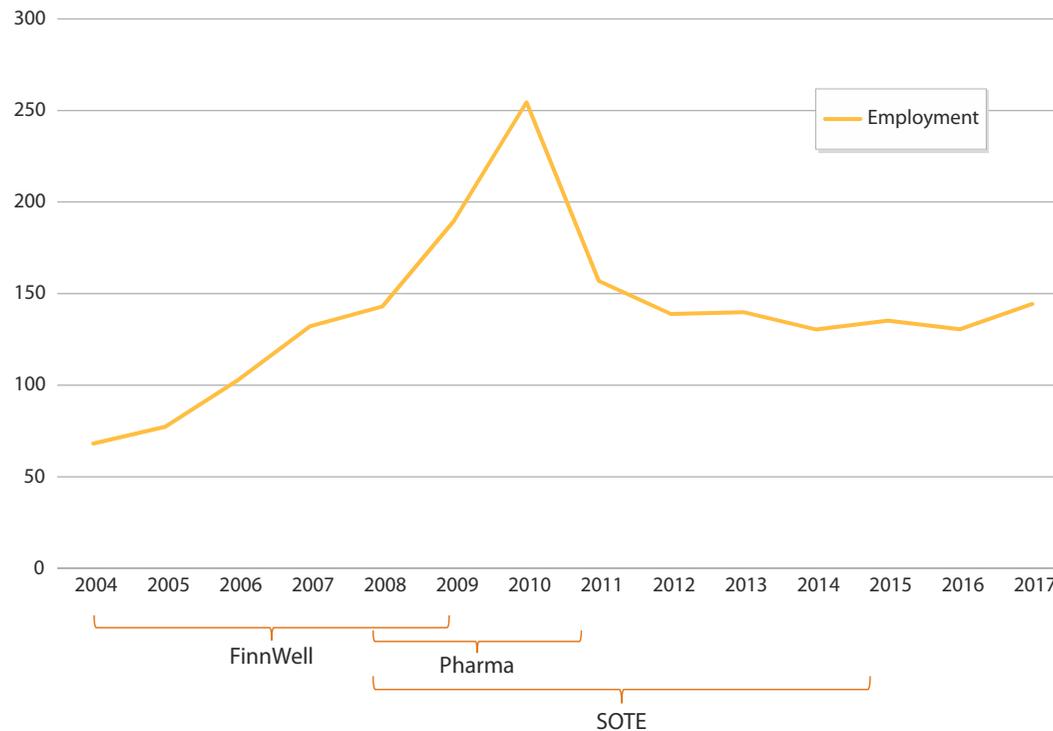
<sup>13</sup> As discussed in Appendix 2, some data gaps and the development of large enterprises financials clouds the average, and thus they are not included these illustrations

ipation and if we assume the sample is representative i.e. non-respondents would have answered in the same way on average, the number would be approximately € 101 million that is directly attributable. These are not mutually exclusive findings, as for example the growth of private healthcare operators is as likely due to the healthcare reform, as it is due their involvement in the programmes.

The impact on exports have not been as favourable, exports have stagnated, and 5-year average value of exports pre-crisis is almost 20% higher than five-year average ending in 2017. Thus, the expectations in terms of exports have not been fulfilled for the average enterprise. On average, the expected growth of exports was almost as high as growth of turnover, marking that on average Tekes programme participants expected most of new growth to come from exports. In terms of sub-groups, particularly FinnWell and Pharma participants have not fared well with regards to exports.

A similar story is told by employment. The development of employment suggest that the enterprises have been investing and hiring aggressively before the financial crisis, and then started rolling back the investments in the aftermath when economy did not take back up. The expected increase in employment has not come to fruition either, as employment has been stagnant since 2011. Without the financial crisis, the story might have been different as it is evident that the employment average has had a very healthy growth from 2004 to 2010.

**FIGURE 26.** Development of average employment for Tekes-funded enterprises.



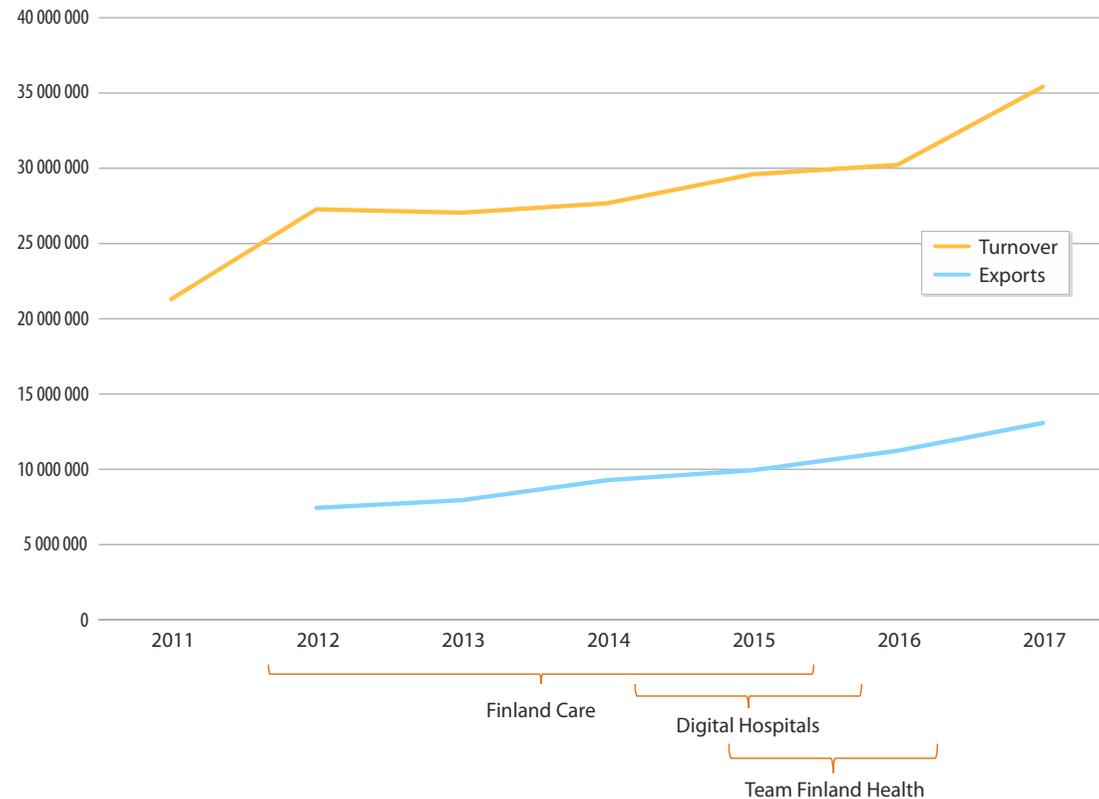
Regarding Finpro programmes, the period of analysis is different, and the financial crisis is not included, which has to be taken into account. Nevertheless, the companies exhibit healthy growth and particularly exports have been growing on average between 7 and 16% each year since 2013, and the average value of exports for the Finpro programme participants is 76% higher in 2017 than it was in 2012. Also, the total exports for all

the Finpro programme participants have approximately doubled from 1.3 to € 2.25 billion a year between 2012 and 2017. It needs to be noted that here also much of the growth is attributable to the growth of private care operators, some of which participated also in Tekes programmes. Thus, the programme aims have been fulfilled in this regard. What needs to be taken into account as a discounting factor is that this is precisely the economic recovery period, but regardless the numbers develop better than average.

The development of employment for Finpro participants is similar to the previous figure, as employment has been rather steady. Average employment has risen from the average of 92 to a peak of 119 in 2015, but on general has stayed on the same level and total employment of the programme participants has contracted slightly. In this regard goals for employment on average have not been reached, even though in the case of individual enterprises they might have been. In fact, regarding both Tekes and Finpro programmes, the first presented finding on the financial development was that large enterprises tend to get larger and small stagnate or contract.

Taking the data altogether, the perception of the programme participants has been quite positive, as discussed in the previous sections, and hence paints a picture of fruitful projects and good results. In a similar fashion, the actual realised financial development of participants is as good as the general economic development (see above), indicating that at minimum project

**FIGURE 27.** Development of average turnover and value of exports for Finpro programme participants.



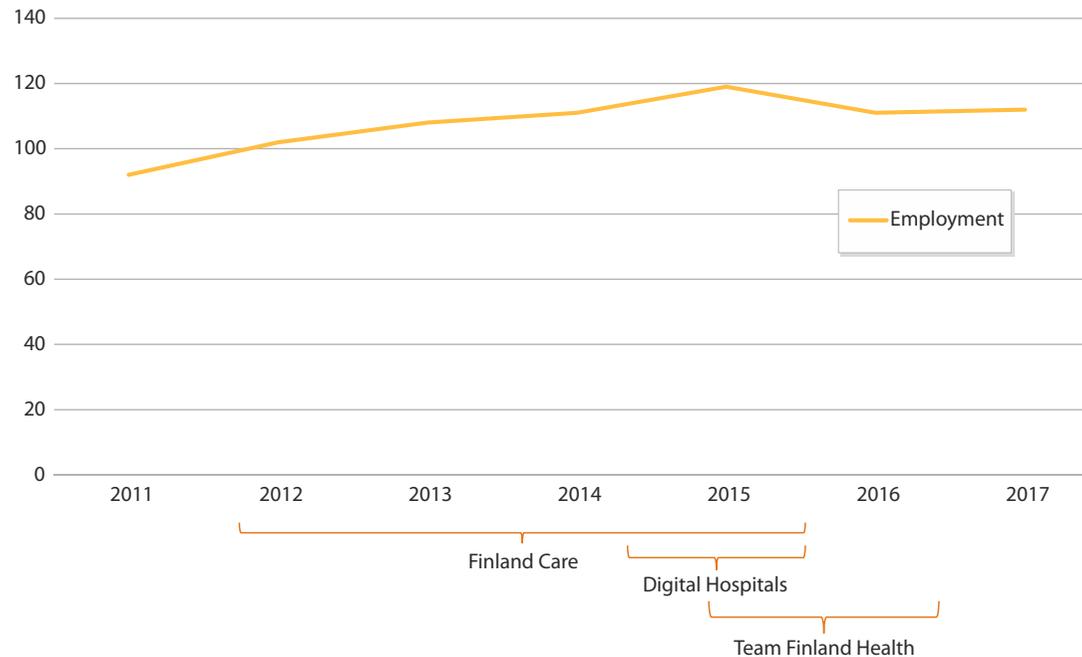
selection has been appropriate and that projects provide added value at the organisation level. As discussed, the financial crisis and its following economic stagnation has likely played a large role in disrupting the otherwise healthy growth. Also, the lack of dynamism between the

stakeholders, as discussed in more detail below, is a factor hindering the development and commercialisation of innovation.

To answer the question how well the expectations set for the projects have been fulfilled, the attention turns to the expectations first. For example in **FinnWell**, the mean expected year for market launch for the projects was 2007 in the application phase and 2008 at project end; the average expected annual growth of turnover as a result of the project was approximately € 30 million per enterprise in the application phase (c.f. table below). During the course of the project this expectation decreased and the beneficiaries' estimate after the project was that the project would generate on average € 12 million of total revenue or turnover, including entirely new business, renewal and retaining exiting, in the target year which was on average 2011, of which € 10 million entirely new turnover at the target year. This analysis focuses on the new turnover as a point of comparison, because that can be seen as an estimate how much the financial figures can be expected to grow.

In their calculations, Tekes desk officers adjust these expectations downwards, based on general experience (realism) on project success, and may make further adjustments to the estimates if the project is a continuation from previous Tekes projects. The adjusted numbers for FinnWell are respectively € 4 million in the application phase, and € 4.2 million after the project. To illustrate the scale of difference between the number offered by the applicants, the estimated volume of new

**FIGURE 28.** Development of average employment for Finpro programme participants.



business in the application phase is three times higher than at the end of the project, and seven times higher than what can be considered tentatively the most realistic, adjusted expectation after the project.

If we look at the development of turnover at the enterprise level, again for FinnWell the five-year average turnover before and during the programme (2004–2008) as the baseline was approximately € 31 million per year, and the corresponding 5-year average after the pro-

gramme (ending 2017) was 39 million, which shows a € 9 million increase in the average. Besides averages, 2017 was a peak year, with € 44 million average turnover and incidentally the average target year 2011 was another peak at roughly the same level, which would mark almost 50% growth from baseline. The comparison is based on 5-year averages in this case to provide a stable base of comparison, as limitations in data and business cycle cause yearly numbers to fluctuate and peak. The yearly numbers are presented in Appendix 2 for reference. The estimations of table 3 can be compared to these figures and indicate that beneficiaries' own estimates have been close, if we assume that their growth of business has come solely from the funded Tekes-projects. This might hold for SMEs with limited product portfolio, but realistically for large enterprises and MNEs the net effect of Tekes-funding is likely smaller than realised growth. The Tekes adjusted estimate thus is prudently conservative in view of estimating the attribution of specific projects.

At the level of the participant group, the applicants estimated to create new business for a total € 4.6 billion, effectively more than doubling the turnover of the group, which declined to approximately € 1 billion by the project end (Tekes-adjusted estimate € 406 million). It is notable that one applicant projected that their turnover grows by 2 billion EUR of new turnover and two others were in the € 500 million range. Taking these as outliers, the average projected growth is € 11 million and group total € 1.7 billion. As a baseline, the 5-year average of total turnover for 2004-2008 among all participants was

€ 3.2 billion, and at the end of the period it was € 2.9 billion. This marks a decline of € 300 million. Thus at the level of a programme, the growth expectation has not been met, while at the level of project the outcome is favorable. What is notable, in the onset financial the data include information for approximately 100 enterprises, in the last years the average number of enterprises that have indicated non-zero turnover is approximately 70, which may indicate that stronger enterprises grow and weaker exit the market, i.e. the industry is in structural change or consolidation.

Aside from turnover, if we look at comparable estimates for exports, the end of the project estimate for new export revenue amounts to average € 9.7 million per enterprise for a total of € 1 billion of additional exports (Tekes-adjusted estimates € 4.7 million average, € 455 million total growth). Here the trends also diverge, but in the opposite direction to turnover: as the average value of exports per enterprise in 2004-2008 was € 21 million, and during 2013-17 € 18 million. The average number of exporters has risen from the level of less than 40 to almost 60 between these periods, and the total value of exports for the whole group has risen from € 736 million to € 967 million. This marks a raise of € 231 million, or 31%, and the last two years were breaking € 1 billion. Here the interpretation is that more enterprises have become active in export markets since participating in FinnWell, so while the average value of participants' exports has dropped, total value has grown. Again, the development is favourable.

Looking at the other, more recent, programmes, the enterprises have developed quite well financially compared to the pre-crisis baseline. However, as the programmes have ended in 2011 (Pharma) and 2015 (SOTE), the project outcomes have not necessarily been as fully realised as outcomes. In SOTE the applicants estimated that year to market would be on average 2013 and in Pharma 2011, but the target years for the new business were 2018 and 2017 respectively.

There are interesting nuances, for example in SOTE, the average expectations for entirely new business have been quite modest and the average growth of turnover has been even more modest, but the development of group total has been something else entirely. One of the main drivers behind this growth is that a handful of private care operators have grown almost exponentially which shows discrepancy between participants' average and the total turnover. Another interesting nuance is that expected value of exports is rather small in application phase and by the end of the project 25 and 24 out of 160 expected new turnover or exports. In actuality both average value of exports has doubled and total value has quadrupled, while the number of exporting enterprises has risen five-fold from baseline. Similarly in Pharma, only 16 and 17 participants expected that they would have new turnover or exports revenues by the end of the project. Nevertheless, both turnover and value of exports has developed well from baseline, in fact turnover has more than tripled and total value of exports doubled. Similarly to SOTE, a handful of multinational

**TABLE 3.** Comparison of financial outcomes of the Tekes programme participants to expectations for entirely new turnover and exports per year set in the application phase, after the project, and as adjusted by Tekes experts (Average is average of participant, and total is sum total of whole programme participant group).

Financial development and outcome						Expected change: new yearly turnover and exports		
	5-year averages for yearly value (w/o outliers)	2004–2008	2013–2017	Outcome/ Change for yearly value €	Outcome/ Change %	Application	End-of-project estimate	Tekes-adjusted end-of-project estimate
<b>FInnWell</b>	Average turnover	30 733 680	39 641 543	8 907 863	29 %	29 875 018	10 114 413	4 183 073
	Total turnover	3 182 518 111	2 879 254 086	-303 264 025	-10 %	4 600 752 824	991 212 560	405 758 175
	Average exports	21 358 075	17 723 873	-3 634 202	-17 %	24 944 332	9 794 324	4 734 916
	Total exports	736 590 807	967 361 358	230 770 550	31 %	3 791 538 532	1 038 198 351	454 551 961
<b>SOTE</b>	Average turnover	21 147 309	21 179 640	32 331	0 %	7 114 163	8 440 000	3 417 695
	Total turnover	584 733 618	1 076 290 821	491 557 203	84 %	305 909 040	211 000 005	78 607 002
	Average exports	182 810	407 798	224 988	123 %	4 311 069	6 270 237	1 941 618
	Total exports	4 192 549	21 170 864	16 978 315	405 %	202 620 256	150 485 702	36 890 748
<b>Pharma</b>	Average turnover	24 971 759	67 079 331	42 107 572	169 %	37 358 196	21 381 312	6 485 087
	Total turnover	411 285 297	1 364 421 641	953 136 343	232 %	1 270 178 690	342 101 100	103 761 400
	Average exports	8 941 227	7 783 867	-1 157 359	-13 %	35 862 500	20 302 547	5 991 194
	Total exports	72 666 503	167 312 469	94 645 966	130 %	1 219 325 000	345 143 300	101 850 300

bio-pharma enterprises daughter companies have driven the growth.

Taking the financial figures critically, it must be recognised that general business cycle and individual enterprises' own development dynamics interfere with the interpretation. In short, these development projects are not the only thing that affects the programme participants, and the numbers indicate that there are other things at play as discussed, for example general consolidation in IT and care and -bio-pharmaceutical sectors, the on-going healthcare reform that has affected the prospects of the care operators, and general recession that struck Finnish economy between 2009 and roughly 2016. Also the numbers of active enterprises that report non-zero turnover or exports develop over time, as an indication of industry consolidation the general trend is that behind the numbers large enterprises grow and SMEs stagnate and number of active enterprises drop during the examined period while, this is especially apparent in FinnWell. The trend is opposite in exports, in all programmes the number of active exporters grows over time. Furthermore, with these data, it cannot be distinguished whether the beneficiaries were in fact more (or less) successful than other comparable enterprises in the same fields.

Thus, the interpretation of the expectations becomes tricky and it cannot be said mechanically that if the outcomes deviate from the expectations that is only because the project was a major success or a failure. However, indicatively, as mentioned, the participating

enterprises have experienced better outcomes than the economy on average and exhibited healthy growth on average. It is more worrisome that the participants have proposed ambitious targets for entirely new exports, in some cases amounting up to almost the whole of the new expected turnover, that haven't been met. The difference between growth of average and total exports indicate that the Tekes programme participants do develop new exports, but the gains are very asymmetric. Nevertheless, it is also notable that the number of enterprises that have reported non-zero value of exports has raised significantly among all programmes between 20 to 50 percentage points, even if the target numbers have not been reached in terms of volume.

A nuance regarding the expectations laid out above is that on critical examination the numbers vary significantly from the initial assessment of the applicants to the project end and further to the adjusted figures, in the case of FinnWell by a factor of three and seven, respectively. The initial hypothesis was that the adjusted end-of-project estimate would be the most realistic, but it turned out to be approximately as unrealistic to the pessimistic direction. The expectations were also brought up in the interviews, as several steering group members criticised the realism of the applicants' expectations and the application process that reinforces optimism bias. In short, there is no incentive to be realistic in the application as the rewards are offered to the most optimistic expectations.

Looking at the numbers, the beneficiaries expectation in the project end turned out to be the best estimate at the project level in the case FinnWell, not counting the attribution problem discussed above, but the initial number submitted in applications may well reflect the total size of the market more than realistic growth. Another point of criticism might be the Tekes expectations regarding exports, in FinnWell and Pharma 82% and 96% of expected gross turnover growth is new exports, which also seems slightly unrealistic in the light of the data discussed above.

This raises two concerns, first from a governance perspective it is problematic to base funding decisions on numbers that all parties know to be unrealistic and the intertwined pragmatic issue is that do the expectations provide meaningful information for project selection and programme steering or implementation if they are known not to be accurate. Second is that overly ambitious goals and expectations make a reasonable, well executed and successful programme look as though it

failed. The balance of evidence after all is that the programmes have been generally successful at the level of individual projects and have contributed to developing and commercialising innovations that would not have likely been developed in the same scale without intervention.

Finally, the following table summarises the impact of the programmes. Overall, the programmes have made progress towards their stated goals and thus have been successful. The aspects of more systemic or wider impact to change of practices is discussed in more detail below, but this is the weaker aspect of the impact. It may be said that at the project level, the projects have been relevant and have produced results such as products, services and contributed to adoption of renewal as well as any RDI programme, but the wider adoption of said practices especially in the public healthcare organisations has not been as large as expected. The ProViisikko case in the Appendix 3 illustrates the challenges faced in these types of projects.

**TABLE 4.** Summary of findings for the programmes.

	<b>FinnWell (2004–2009)</b>	<b>Pharma (2008–2011)</b>	<b>Innovation in social and healthcare services (SOTE-programme, 2008–2015)</b>	<b>Finland Care (2012–2017)</b>	<b>Digital Hospitals (2015–2017)</b>	<b>Team Finland Health Growth programme (2015–2017)</b>
<b>Type and owner</b>	<b>Tekes/ RDI</b>	<b>Tekes/ RDI</b>	<b>Tekes/ RDI</b>	<b>Finpro/export</b>	<b>Finpro/export</b>	<b>Finpro/export</b>
<b>Objectives</b>	<p>FinnWell aims to improve wellbeing and ability to function (citizen/patients), and productivity (of healthcare and enterprises), take end user need into account.</p> <p>The participants of the programme create new and improved care solutions and enterprise participants will create products and services for the international markets</p>	<p>Renewal of pharmaceutical industry and int'l competitiveness of pharma and diagnostics enterprises</p> <p>Speed up development of new processes, methods, and operating models in pharmaceutical industry and associated services</p> <p>Support networking between bio-pharma, diagnostics and clinical research</p> <p>Improve risk management of NPD</p> <p>Encourage PPPs and international networking</p> <p>Improve investment environment for bio-pharma in Finland</p>	<p>Renewal of health care organisations and processes,</p> <p>Development of customer relationship management and new networked service models,</p> <p>Recognition and spreading best practices,</p> <p>Increased quality, productivity and customer/patient-orientation</p>	<p>Promotion of Finnish healthcare technology, competence and services in international markets</p> <p>To create growth, "innovation-driven export growth"</p>	<p>Promotion programme for Finnish companies who market technologies that improve quality, productivity and impact of care</p> <p>Targets particularly Nordic markets and hospital investments</p>	<p>Reinforces the image of Finland as a favourable environment for RDI in healthcare and related areas, lures in investments and business (invest-in)</p> <p>Supports internationalisation of enterprises in the health sector and growth of exports</p> <p>Specifically attracting investments from global pharmaceutical and digital/health tech enterprises</p>

...TABLE 4.

	<b>FinnWell (2004–2009)</b>	<b>Pharma (2008–2011)</b>	<b>Innovation in social and healthcare services (SOTE-programme, 2008–2015)</b>	<b>Finland Care (2012–2017)</b>	<b>Digital Hospitals (2015–2017)</b>	<b>Team Finland Health Growth programme (2015–2017)</b>
<b>How well have the objectives set for the programmes been achieved?</b>	<p>The programme made progress towards its goals to:</p> <ul style="list-style-type: none"> <li>improve the productivity of participants</li> <li>increase healthcare sector revenues</li> </ul> <p>The last objective to increase healthcare sector export sales revenues has not been fulfilled on average.</p>	<p>The Pharma Programme made progress towards its goals to promote new product development for participants foster new partnerships.</p>	<p>The programme made progress towards its goals to improve the national health system and to foster new partnerships.</p>	<p>The programme made progress towards its goals to:</p> <ul style="list-style-type: none"> <li>open new markets for participants</li> <li>increase participants' revenues by 15%</li> </ul>	<p>The programme made progress towards its goals to:</p> <ul style="list-style-type: none"> <li>create a deal flow of € 1 billion in export business; however, all the Finpro programme participants have altogether created roughly € 1 billion in new exports per year.</li> <li>The goal of creating 100 new jobs has not been unequivocally fulfilled as the total employment has been contracting.</li> </ul>	<p>The programmes made progress towards their goals to increase participants' revenues and increase private investments.</p> <p>The Way Forward roadmap had additionality in some areas, but implementation of the roadmap is not finished.</p>
<b>What impacts have the programmes had?</b>	<p>The programme has contributed to commercialised innovations, change of practices, new partnerships and increase in capabilities. These have in turn materialised as increase in sales revenue, exports, growth of employment.</p> <p>Most of the impact is seen at the project level. The larger impact of the programme at the system level is unclear or questionable based on the data.</p>	<p>The programme has contributed to commercialised innovations, change of practices, new partnerships and increase in capabilities. These have in turn materialised as increase in sales revenue, exports, growth of employment.</p> <p>The impact is seen at the project level.</p>	<p>The programme has contributed to commercialised innovations, change of practices, new partnerships and increase in capabilities. These have in turn materialised as increase in sales revenue, exports, growth of employment.</p> <p>Most of the impact is seen at the project level. The larger impact of the programme at the system level is unclear or questionable based on the data.</p>	<p>The programme has contributed to commercialised innovations, change of practices, new partnerships and increase in capabilities. These have in turn materialised as increase in sales revenue, exports, growth of employment.</p>	<p>The programme has contributed to commercialised innovations, change of practices, new partnerships and increase in capabilities. These have in turn materialised as increase in sales revenue, exports, growth of employment.</p>	<p>The programme has contributed to commercialised innovations, change of practices, new partnerships and increase in capabilities. These have in turn materialised as increase in sales revenue, exports, growth of employment. The participants also reported significant contribution to ability to raise equity investment.</p>

...TABLE 4.

	<b>FinnWell (2004–2009)</b>	<b>Pharma (2008–2011)</b>	<b>Innovation in social and healthcare services (SOTE-programme, 2008–2015)</b>	<b>Finland Care (2012–2017)</b>	<b>Digital Hospitals (2015–2017)</b>	<b>Team Finland Health Growth programme (2015–2017)</b>
<b>What concrete results have each of the programmes created?</b>	The projects have created new products, services and technology.	The projects have created new products, services and technology. Pharma Finland web portal with a catalogue of bio-pharma enterprises and capabilities in Finland (since extinct)	The projects have created new products, services and technology.	The participants have created new products, services and technology. FinlandCare web portal with a catalogue of healthcare services and capabilities in Finland (since extinct)	The participants have created new products, services and technology	The participants have created new products, services and technology Team Finland Health web portal with a catalogue of healthcare services and capabilities in Finland (since merged into Business Finland website in a heavily truncated form) Industry-led Way Forward Roadmap to support implementation of the Growth Strategy for Health and Wellbeing

#### 4.1.4 CONTRIBUTION TO CHANGE OF PRACTICES

In the previous section contributions of the projects to change of practices for the beneficiaries was discussed. The following list includes the practices as defined in the evaluation, some of which are rather typical additionalities of RDI projects:

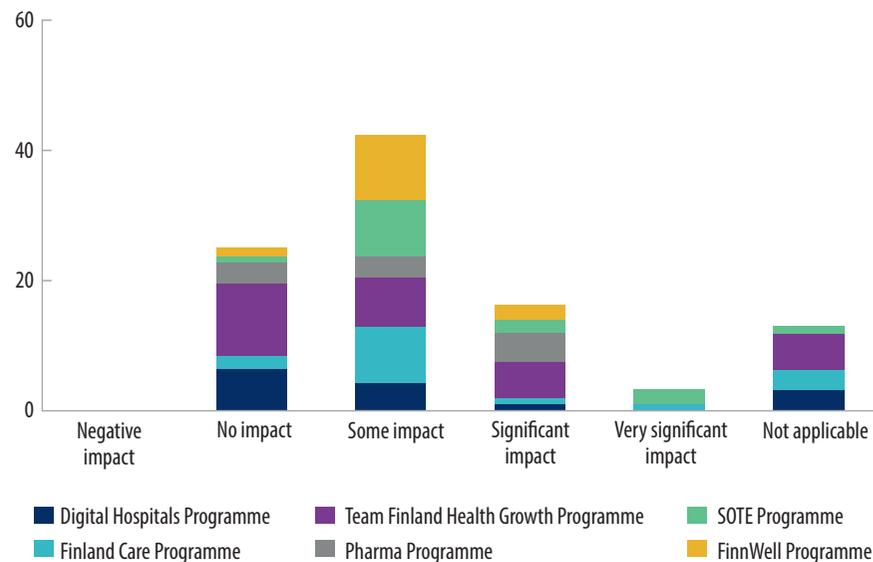
- Internal processes and ways of working
- Service processes
- Partnerships, collaboration and networking, including public-private collaboration,

- Customer orientation
- Joint offerings, and other collaboration for exports markets

Out of these, the last 3–4 were clearly identified as an outcome of the programme participation for majority of the participants. Looking separately at the how respondents who participated in the programmes estimate how well they could influence their client practices, again the majority saw at least some impact. On average, Tekes programme participants report greater ability to influence the practices of their clients as compared to Finpro programme participants. Out of respondents who participated in FinnWell Programme, 92% of respondents indicated positive impact on their ability to influence the practices of their clients, out of SOTE Programme, 86% and Pharma Programme 70% respectively. In comparison from participants in Finland Care Programme, 67% of respondents indicated the Finland Care Programme positively impacted their ability to influence the practices of their clients, out of Digital Hospitals Programme 36% and Team Finland Health, 44%.

In reference to change of practices, the following figure illustrates the differences in the basic logic of the programmes between Tekes and Finpro reconstructed based on the interviews. Stereotypically Tekes programmes gather actors around relatively specific problems to formulate solutions. Further, the programme activities expose the participants between project consortia to further networking and knowledge exchange. In effect the

**FIGURE 29.** Impact on client practices.



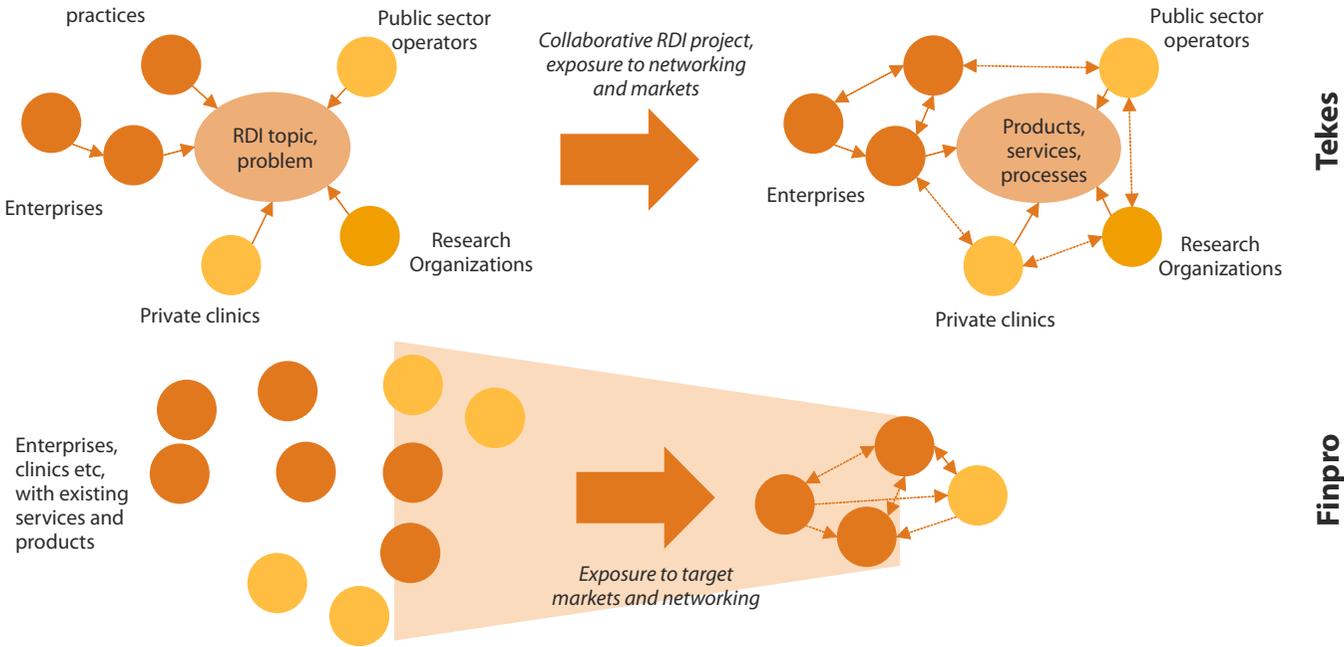
RDI projects and the programme create a platform for organic interaction that stems from mutual interest to solve a problem and/or develop commercial solutions. This structure contributes to building and strengthening ties between the participants and developing new practices.

Alternately Finpro programmes gather the actors typically with existing solutions and exposes them to information about and contacts within selected target markets. The actors/participants arrive in the programme with existing solutions and services, and the programme

acts as a platform to interact and find possible mutual interest while being exposed to market needs. This stereotypical picture is somewhat challenged by the survey results, which indicate that also Finpro programmes contribute to innovation, but it may be surmised the effect is more through feedback.

In effect, both types of programmes contribute to change of practices, the difference is more which (types of) practices. Extrapolating from data, stereotypically Tekes type of programmes contribute typically towards development of technology, knowledge, products or ser-

**FIGURE 30.** Comparison of programme logic between Tekes and Finpro programmes.



**Tekes**

**Finpro**

vices, and/or organisational development, processes and procedures. Depending on the consortium structure, co-development contributes to understanding customer/user processes and needs. Both projects and programme structure contribute to networking and partnerships. In turn Growth Programme type of programmes contributes typically to development of market insight and sales processes, networking in foreign markets and identification of potential partners and customers, understanding market needs that in turn contributes to product and service development. Additionally, the programmatic structure contributes to networking and partnering.

Looking at the earlier reports and evaluations of the programmes, the general view to how FinnWell and SOTE for example have contributed to change of practices in healthcare has been quite optimistic. It is generally reported that the programmes have created networks and partnerships and enabled new kinds of actors to find common interests and develop new products. Similar findings have been presented for Pharma as well. And while the programme structure and aims are slightly different Finpro programmes have for their part contributed to improved sales practices and development of new products and services as well. At their best, the programmes have had a very significant contribution to starting up and developing new collaborations, where the FinnTrials case is a good example.

Taking a more a more critical view to one of the evaluation questions, “was it enough to have Tekes and Finpro programmes in the area” significantly Tekes and Finpro

have not been acting alone as both SITRA and STM have had their own programmes in the area as pictured in section 3. However, based on the interviews and other documentation, all of the stakeholders have been somewhat stymied and frustrated by the task of developing the healthcare system as a whole.

Taking a larger perspective, one of the main bottle necks for developing transformative new systemic innovation in healthcare and social services has been the on-going public sector healthcare reform. As one interviewee summarised “SOTE was a well-run and extremely interesting programme, 10 years too early”, referring to the incentives and motivation of particularly public healthcare actors to engage in development. As a summary of the timeline, the first round of discussion and preparation related to the presently on-going healthcare reform was the Municipality and Service Structure Reform of 2006, which had direct implications on organizing healthcare through the attempt to create larger municipalities to secure a tax base for funding the social and healthcare services. The first attempt at the direct healthcare reform started 2011 with a committee report that was initiated during the previous Municipal Reform and ended up in a parliamentary consensus and a legislative bill that was voted down by the Parliament 2013 in its first version and was ruled unconstitutional in the second version 2015. The present government picked up the reform in 2015 making it as one of the key initiatives of the electoral cycle, but again the proposed legislation ran afoul of the Constitutional Law Committee at the Parliament and the reform was eventually halted in March

2019. In effect, the healthcare reform has been either anticipated or on-going most of the FinnWell period and the whole duration of the SOTE programme. According to the interviews, the uncertainty caused by the reform has also had major ramifications on the receptibility of public healthcare system to invest and engage in RDI in the service system while waiting for possibly large changes in organisation, responsibilities and funding of the whole system.

Some of the problems and challenges are also embedded in the structure of Finnish healthcare and social services system and the complex alignment of incentives. In the current structure all of approximately 300 municipalities (in 2018–2017 311 with a median populace 6 146 inhabitants) are responsible for organizing and commissioning the services for their denizen, and they fund the entire primary care and social services. Further, municipalities belong to one of the 21 hospital districts that administrate secondary care services, and further to 5 Special Responsibility Regions that coordinate RDI activities and the service system within their jurisdictions. The Ministry of Socials Affairs and Healthcare (STM) and its agencies in turn are responsible for political steering at the strategic level, regulation and governance of the system, and funding of the secondary care, which creates a basic tension between funding and steering.

Further the medical profession has installed a strong self-governance structure in codified best practices, maintained by the Finnish Medical Society – Duodecim (the main professional association, essentially the equivalent of AMA or Royal College of Surgeons) that has

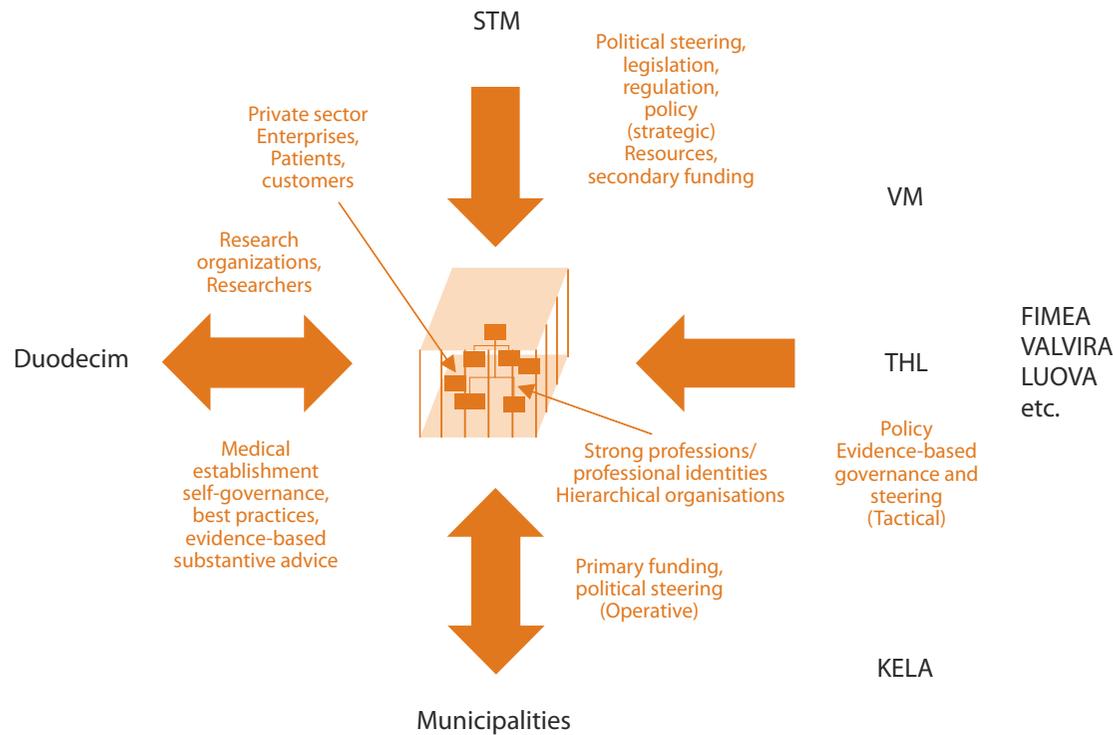
a quasi-regulatory standing. The hospital environment also has been historically a home to strong professions, each with a strong identity, and hierarchy.

The result of this distribution of responsibilities and alignment of incentives is that the number of stakeholders needed to effect systemic change is very large and their incentives have not historically aligned with technological innovation and adopting technology and practices from outside providers. Rather the hospital regions and individual municipalities have had a strong culture and also (indirect) financial incentives for developing local custom solutions rather than collaborating or buying off-the-shelf.

Additional constraints are posed by the Ministry of Finance (VM) in terms of financial and budgetary constraints and The Social Insurance Institution of Finland (Kansaneläkelaitos, KELA) in turn has significant indirect control as a gatekeeper as they will decide which medication and treatments are reimbursable under the universal health insurance. In one illustrative case, KELA in effect blocked development and commercialisation of an electronic prescription system by unilaterally refusing to recognise the electronic prescriptions for reimbursement.

A related practical matter is the commonly repeated critique for public RDI funding for healthcare, that hospital districts are treated as large enterprises in funding. This makes the funding to a degree unattainable and unusable, as the level of subsidy is relatively low, and typical RDI budgets do not tend to stretch to cover the matching funding. This has been a point of discussion

**FIGURE 31.** The innovation space in social and healthcare services.



and contention between the stakeholders which is apparent from the interviews. The positions are approximately that due to State Aid rules inherited from Treaty on the Functioning of the EU, hospital districts do not fill the criteria of research organisation and due to their size, they fall under large enterprise in the classification. On

the other side of the table the argument is that routinely other EU countries, particularly the sister organisations of Business Finland in the Nordic area, are able to fund their national hospital districts on terms similar to research organisations.<sup>14</sup> What this means in practice, work is needed between the stakeholders to build a solution. The stop-gap solution has been that Universities act as de facto decoy applicants for hospital districts, but this introduces another layer of complication especially concerning projects that deal with any health and personal data or significant implications to the service system. The situation is somewhat exacerbated as the sort of applied research does not in practice have other funding sources outside Tekes/BF.

The overall situation is in fact paradoxical, all of Tekes, STM and SITRA have funded a significant portfolio of development programmes and projects, that have been relevant and successful at the project level in creating interesting and useful results and outcomes according to various evaluations, but largely have had limited traction in instilling new practices outside and between the individual projects and creating larger systemic change.<sup>15</sup> According to the interviews, the factors that influence this are partially the inherent rigidity of the system as discussed above, the misalignment of the incentives of the various stakeholders, and the preoccupation with the on-going process of healthcare reform at the top level of the organisations.

<sup>14</sup> The explanation behind the difference is likely various differences in institutional arrangements and also interpretations of international treaties between countries.

<sup>15</sup> For example, evaluation of KASTE programmes Nikander, Tuominen-Thuesen, 2016, Sosiaali- ja terveydenhuollon kansallinen kehittämissuunnitelma (KASTE 2010–2015): Ulkoinen arviointi – Loppuraportti, Sosiaali- ja terveysministeriön raportteja ja muistioita 2016:16;

Looking at it the other way around, the projects that have a directly traceable impact a decade or more later are often those with a strong commitment from the healthcare providers. One such example is the FinnTrials group of projects that aimed for creating a common national framework for clinical trials across different hospital regions (see separate case). This points that for programmes to have a significant systemic effect in the healthcare and social services, they need to come from an express internal willingness and need to reform and the funding and steering needs to be aligned towards common goals.

The interviewees, especially those whom have experience from cross-sectoral affairs, stressed the point that significant systemic changes in the healthcare sector can be achieved only when the incentives and leadership are aligned across the major stakeholders, foremost STM and MEAE. The Growth Strategy is an example of successful inter-ministerial collaboration in that it involves commitment at all levels. At the project level, similarly, the most successful projects involving public healthcare seem to be those where there is an expressed need and interest for a solution, that is then co-developed with enterprise and research partners. This may be the clue for individual programmes to maximise impact at the project level – as discussed, the most impactful cases have been those where there is a clear value proposition and an expressed need for it. The latter is as pertinent for collaboration with public healthcare, the need and commitment to co-development needs to come genuinely from within the healthcare system and have management commitment.

## 4.2 VALUE ADDED OF PROGRAMME SERVICES

The programme services were detailed in the per programme descriptions in section 3.1 and summary in 3.2. As discussed, the programme services are in fact quite similar, and the common denominator is target market engagement. In short all of the Tekes programmes had at least some level of awareness raising about international market opportunities and also international funding such as the EU Framework Programmes and IMI. Also, two of the three Tekes programmes had country/delegation/trade fair visits to selected markets, organised independently or together with other Team Finland actors. In this regard SOTE is slightly different, as it was mostly aimed for developing domestic collaboration for renewal and improvements in the national health systems.

Over time, the level of engagement between Tekes and Finpro programmes has increased. In Pharma foreign visits were organised semi-independently with FinNode. In the latter there was increasing coordination between programmes, in SOTE and FinlandCare to avoid overlapping activities. An going to the latest programmes reportedly Bits of Health and Team Finland Health have organised joint exports activities, e.g. market visits. At the end of the period, Team Finland Health also became a banner for Team Finland collaboration as well as the Growth Strategy for Health and Wellbeing, which made it a natural brand for various internationalisation and export promotion activities.

Going from comparison to stakeholder views, based on the interviews there is a slight difference in perception between Tekes and Finpro services. Tekes is well known as a development partner among the interviewees and is well known as an organisation. The concept of Tekes programmes and the services are also easier to grasp for the potential beneficiaries. The stakeholders also appreciate Tekes role as both funding agency and advisor, coach or development partner for the RDI projects. Altogether Tekes programmes have a strong brand and the stakeholders are in general quite satisfied with the services.

In the big picture, the stakeholders view Finpro as opaquer. Finpro is known as the organisation where to go to get help entering a new market. The Growth Programmes are less known among the stakeholders, the perception of Finpro is that they offer market information and one-on-one consultancy for enterprises. In relation to the programme as a platform -function, one interviewee summarised that ‘the programme was an excellent platform to connect and gain information, and you got out as much as you were willing to put in. Some participants might have been disappointed, because expected to be led by the hand to make business deals’.

The survey results provide more nuance to the picture. Comparing Finpro to Tekes. Out of the offered services, promotional assistance was cited as the one of the most intensively used internationalisation and market support services by Finpro programme respondents. Altogether 62% of Digital Hospitals respondents, 56% of Finland Care respondents, and 42% of Team Finland

Health respondents used this service with moderate or high intensity.

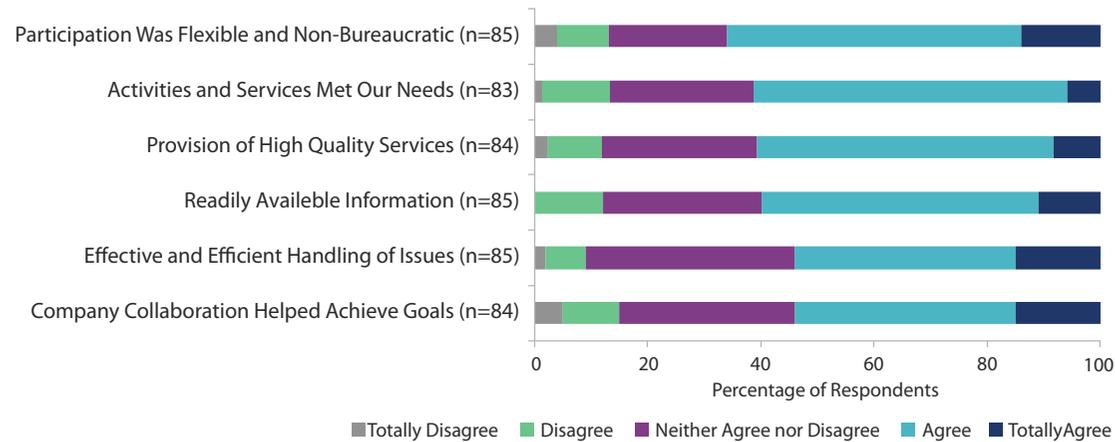
Platform and forum provision were cited as the most intensively used networking, collaboration, and coaching support service for all Finpro programmes. Again 60% of Digital Hospitals respondents, 53% of Finland Care respondents, and 44% of Team Finland Health respondents used this service with moderate or high intensity. This also supports the idea of programme as a platform.

In the Tekes programmes in turn, platform and forum provision was cited as the most intensively used networking, collaboration, and coaching support service for almost all Tekes programmes. 60% of FinnWell respondents, 33% of Pharma respondents, and 53% of SOTE respondents used this service with moderate or high intensity. For the SOTE Programme, platform and forum provision was the second-most intensively used support service, next to training, mentorship, coaching, or consulting services by a difference of 0.3%.

Looking at the whole data, approximately a half of the participants engage moderately with the programmes as a platform for collaboration. In Tekes programmes other services the moderate to intense use of other affordances is approximately 20–30% of respondents (who are 20–30% of all participants). In Finpro programmes, a larger share 50–60% engage with promotional assistance, followed by target market information and buyer/opportunity identification.

In terms of satisfaction to services 66% of respondents totally agree, or agree, that participation in the programmes was flexible and non-bureaucratic and 61% of

**FIGURE 32.** Programme participants' views of the provisioned services.



respondents totally agree, or agree, that the activities and services provided through the programmes met their needs, and that the services provided through the programmes were of high quality. A majority of respondents agreed that the services helped achieve the goals for participation.

Analysing per programme, the following combinations of services are associated with better reported impact/performance of the participants:

- Finland Care: Target market engagement and promotion assistance are most closely affiliated with impact on participants
- Digital Hospitals: Platform and forum provision and the facilitation of connections are most closely affiliated with impact on participants

- Team Finland Health: Company specific coaching is most closely affiliated with impact on participants
- FinnWell: Internationalisation, promotional assistance, and international target market visibility is most closely affiliated with impact on participants
- SOTE: Platform and forum provision and the facilitation of connections is most closely affiliated with impact on participants, specifically impact on capacity to raise capital and the ability to connect with researchers

As an overall summary of the data, generally the pattern is slightly muddled. On the one hand, already the basic programme services are viewed as very valuable by stakeholders when interviewed. Then on the other looking at the survey, less than 2/3 of the surveyed participants agreed that the programme services were high quality and roughly half thought they helped achieve the goals. However, the position of respondents who answered they could not say is rather high probably due to the age of the programmes.

Overall, based on the survey responses with the responses given over the phone when reminding respondents of the survey deadline an estimated 20-30% of participants are significantly engaged with the services. Together, the picture forms that estimated between 1/5 and 1/3 of the participants form the engaged and more tightly woven core network, and for a majority of the programmes are a loose platform and, in the case of Tekes, also a source of funding for some specific RDI need. The evidence does not point that this would be in and

of itself a negative pattern, as the project-level impact measures are good but rather that in order to raise the portion of engagement would likely require more homogeneous participants and/or more individually tailored services.

In a more nuanced view, already the basic organised activity, e.g. programme activities, project presentations, trade fair stands etc. were viewed as valuable platform for building collaborations. According to the stakeholders, the ability to see where the industry is headed, and ability to meet people from the same and adjacent industries that work on similar problems creates value in itself. The view was expressed multiple times that the value and impact of 'old fashioned' networking events should not be underestimated. Tekes/BF has gained a specific position in the Finnish innovation system as a neutral party who most of the stakeholders feel they can trust, and also value Tekes/BF views and thus they are also inclined to attend Tekes events to meet other industry and RDI actors and potential partners.

The value of specific (types of) export promotion activities depends to an extent on the structure of the market. For a centralised and/or centrally governed market with relatively authoritarian or hierarchical culture and large power distance, traditional trade delegation with diplomats or politicians are very valuable. For less centralised and open markets, industry insight and identification of the right partners, clients, and specific people in partner or client organisations gain importance.

## 4.3 GENERAL FINDINGS ON PROGRAMMING

Compared to present programming concepts at Business Finland the previous programmes are somewhat different. At present, simplifying the programme design concept, each programme has a programme manager in charge of the programme and each beneficiary has their own contact, account manager or desk officer. The programmes are primarily steered by the programme managers with input from the BF director in charge and the steering group appointed for each thematic area. The funding decisions are based on the recommendation of the desk officers, or in the case of consortia, based on consensus recommendations between desk officers.

In contrast, in these older generation programmes, each programme had a programme manager, a programme coordinator or several with a relatively large autonomy in the case of the Tekes programmes, and a steering group with industry experience in most cases. The funding decisions were based in many cases on the steering groups recommendation, although Tekes exercised their own judgment in some cases.

The interviewed stakeholders, including programme coordinators, steering group members and programme managers saw programme steering group discussions at least potentially valuable to programme implementation and substance. The experience was that a knowledgeable steering group brings industry insight and supports

programme implementation and can be a platform for foresight-type activities for future business and technology opportunities. Programme steering groups can also be an opportunity to reinforce collaboration and synchronisation between ministries, agencies and other stakeholders, which is especially relevant regarding the stakeholder dynamic in the

Further notes for programming arose from the interviews, particularly the former programme steering group members and industry experts. One point of discussion is balance between cross-industry or horizontal, multidisciplinary, and vertical within-industry value chain focus of the programmes. The stakeholders held very important that basic research and development with 'traditional' industry focus is needed to develop competitive technologies and basic capabilities.

At the same time interviewees also stressed that programmes to be effective for building capabilities, they should be multidisciplinary and have specific and exclusive goals and focused thematic boundaries. Then again horizontal programmes were seen as valuable for more applied RDI and for example for generic technology providers. Based on the data, the right question is not either of, but rather what would be a good balance between vertical and horizontal programmes at a given time.

The programmes as such seemed to complement each other well, and there is a consistency between the main themes throughout the programmes. Most organisations participated only in one programme, and there is relatively little movement from between Tekes RDI programmes or towards Finpro export programmes.

However, several organisations participated also in other (not evaluated here) programmes, such as for example the Young Innovative Enterprises (NIY) or Global Access Programme. While the themes have been stable, there has been a different staffing on the consecutive programmes, some programme managers have altogether left Tekes/BF and outside contracted coordinators have changed too. The most relevant comparison is between FinnWell and SOTE, where the key staff changed while the common goal of renewing public healthcare remained, and there is evidence from the interviews and documentation that the programmes experienced similar challenges.

What was viewed more critically, were the project granting criteria and expectations, and alignment of those with the stated programme goals. This criticism came particularly in relation to the Pharma programme and relates to an extent on the differences of innovation lead times between industries or business areas. Put plainly, particularly in bio-pharmaceuticals the lead time-to-market is rather a decade than 2–3 years as it might be in some other sectors. A related point is that health and wellbeing are industries that favour economies of scale perhaps more than average. Pharmaceuticals, medical devices and diagnostics are industries with heavy regulation, complex regulatory processes and long time-to-market that makes them a field suited for large enterprises. Approximately ten years ago, European Federation of Pharmaceutical Industries and Associations (EFPIA) estimated that the development cost for a successful new pharmaceutical substance is on aver-

age one and a quarter billion euro, by 2013 the estimated cost has risen to approximately € 2 billion.<sup>16</sup> Another interviewee referred to the goals set for growth of the industry and challenges posed by the structure of Finnish health and wellbeing industry in saying “if we take the Mirena product family from Bayer, Planmeca, Kavo Kerr, and GE Health Care Finland away from the € 2+ billion turnover that is supposed to grow 30%, we have 10 percent of the original that is supposed to deliver 700 million new business - we need to think hard where does the growth actually come from”. While the numbers are not exact, the question arises that what in fact are realistic expectations for growth in the Health and Wellbeing area and in what frame of time. The fact is that depending on the source, the Health and Wellbeing industry is approximately € 2–5 billion per year in turnover, and approximately € 2 billion of that is generated by the handful of large multinationals mentioned in the quote that already operate in mature and stable markets. Looking at the financial analysis, the most growth has come out of pharmaceuticals, particularly subsidiaries of MNEs, and associated services, and private healthcare, the latter of which is very domestic-oriented growth.

It is a recognised challenge in Finnish pharma and to some extent health tech and medical devices start-ups, that promising new enterprises often managed to develop a new molecule successfully, but typically fall into the ‘Valley of Death’ as they run out of public fund-

ing or investment too early to gather significant private investment and end up being sold to larger and typically multinational competitors before they are mature enough to stand on their own. An illustrative statement from one interviewee was ‘if you’re really on to something and believe in the invention, it not impossible to raise the first 100 000 for initial development, but then when you need to develop a comprehensive proof-of-concept on humans in a clinical setting, there is nowhere to go to raise € 3–5 million that is needed’. Thus, the usual time horizon of RDI funding and the normal expectations are poorly aligned with the reality of RDI. This aspect was discussed at lengths above when discussing the expectations and realised financial outcomes. This point is pertinent not only for the beneficiaries, but for the economy in general, as typically the sooner start-up companies are exposed to international capital markets, the sooner they tend to be exposed to exits or acquisitions by MNEs, and typically early-stage acquisitions result in the IP being funnelled from Finland to parent enterprise. The more fruitful situation would be that the funding funnel enables start-ups and SMEs to grow organically to an established size, which would provide a better anchor point for IP and employment in Finland even in the case of an exit of the founding team or acquisition.

In a broader perspective, the alignment of programme goals and project selection criteria attracted

<sup>16</sup> The number € 2 000 million includes the testing of up to 10 000 chemical or biological entities and failed clinical trials, the cost of development and trials of one biological or chemical entity is an order of magnitude lower, c.f. DiMasi JA, Grabowski HG, Hansen RW, 2016. Innovation in the pharmaceutical industry: New estimates of R&D costs. *J Health Econ.* 2016 May;47:20-33. doi: 10.1016/j.jhealeco.2016.01.012. Epub 2016 Feb 12.

also some criticism. The Tekes project selection criteria have slightly evolved over time, but generically three things are weighed, the innovativeness and commercial potential as well as how demanding the proposed development project is, how well suited the proposed consortium is for accomplishing the proposed goal and further especially in the case of large enterprises and research organisations the networking aspect between research organisations and large and small enterprises have been evaluated. The Tekes guidelines have not been explicit on the weights, but rather reserved a degree of judgment for the officers. What is typically not included in the project selection or expectations are criteria tailored to broader goals of the programmes. Same criticism applies for the project expectations and follow-up, they are focused on relatively short-term financials, and any of the other goals including network formation and wider policy goals are not applied to monitoring.

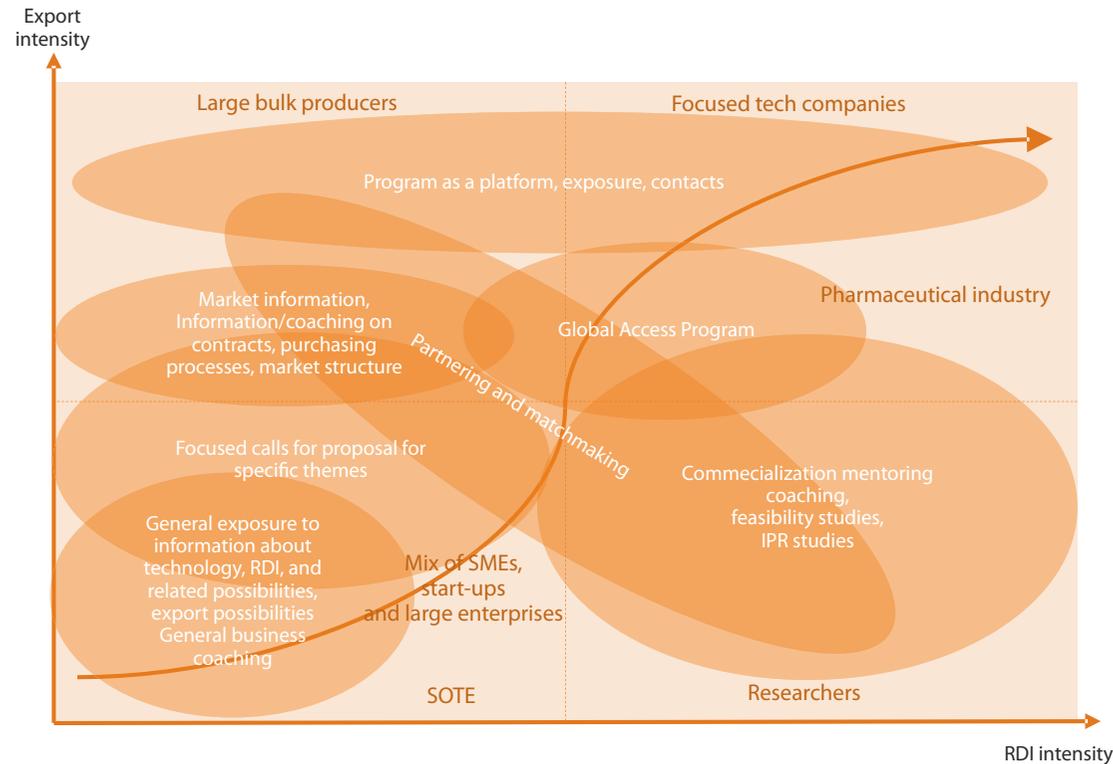
Relatedly, a programme timing is similarly a paradoxical question, as the positions were between "RDI programmes should rather be too early than too late" vs. "SOTE programme was an excellent initiative that was implemented well, 10 years too early". The RDI partners and users/market need to be ready to take advantage

One last point of criticism that is worth mentioning is question relating to intellectual property in collaborative RDI projects. On the one hand, interviewees have indicated enterprises found it difficult to bring some of their inventions to the programmes that required collaboration, because that would also jeopardise appropriability and future commercial potential. From the other

direction, research organisations were eager to collect enterprise partners as it was one of the requirements for funding, and it was easy for enterprises to participate with as little as 10% funding share which was also accepted as in-kind contribution. The problem here was similar, enterprises joined to monitor development of the field, but due to the dynamics between internal RDI and market roadmaps and concerns of IP appropriability. Some interviewees indicated that the expectations regarding the level and intensity of collaboration might have been idealistic.

Another perspective that comes up in the interviews is that what matters more is the substance than the form of activity. Most consistently reported value-added feature in the programmes is relevant and tailored expert advice. Inside grasp of the industry/business area, the pertinent substance and the technology and business dynamic is pointed out as pertinent for great programme implementation. At the same time, services and advice create the most value when they recognise the development stage and needs of the beneficiary. Possibly the largest value added, for especially new enterprises, is that the to the RDI substance. Generally, the best practices raised by the interviewees have been knowledge intensive services. For example, the mentoring services for supporting commercialisation of Research/RDI results in Pharma was raised as an interesting example, although the programme steering group at the time did not regard it as important. Another good practice was specific coaching and training for e.g. market structure, purchasing processes, international contract and IPR

**FIGURE 33.** Tentative segmenting of programme services along participants' export intensity and RDI intensity.



law, negotiation, identification of potential buyers and partners. Support for identifying and evaluating technological/business options in scoping and implementing the projects. What optimally binds these together is advice with insight and experience into the business logic within the industry.

The data here do not give an unambiguous analytical answer what kind of participants particularly derive benefits from each service, but the preceding figure tentatively proposes how the services fall into the space of innovation-led export growth. Further factors that will likely affect which services are important and useful for each potential beneficiary include background and business experience, organisational framework conditions, life-cycle phase of the innovation, market and enterprise. However, there is a line in the sand between programme services and outright consultancy.

# 5 CONCLUSIONS AND RECOMMENDATIONS

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## 5.1 RELEVANCE, RESULTS, EFFICIENCY, AND IMPACT OF THE PROGRAMMES

In general, according to the evidence, the programmes have been timely and relevant. Generally, programmes have been effective and efficient in achieving their goals at the project level. On average the majority of the participants have:

- Introduced new products and services
- Created new partnerships and networks
- Improved their capabilities
- Improved sales and productivity
- Improved international competitiveness as showed by increase in exports
- Developed new practices internally and have affected customer practices

At the level of the programmes, the beneficiaries/participants on average have exhibited healthy growth of turnover, and especially in the case of Finpro participants also growth in the value of exports. The programmes contributed directly and indirectly to internationalisa-

tion. In more nuanced view, particularly the RDI subsidies gave financial security to non-mature enterprises, which enabled them to be bolder in investing into future products and services and develop capabilities. The interviewed start-ups particularly saw subsidies as crucial not only for product development, but for the existence of the whole company.

Based on the survey, PPP-efforts and consortium projects were perceived as beneficial for most organisations. However, some companies identified that PPP-consortiums created added-value only when the idea was derived from an existing need within the company. This view is mirrored in public sector. In consortiums where partners did not share a common goal to begin with, it took a long inception phase to define the common goal and a way of working. Consortiums were public and private healthcare operators worked together for the benefit of the customer, managed to bridge the gap and contributed with a positive outcome for both partners.

Looking at the financial analysis, the picture becomes more muddled. On the one hand the programme participants in both Tekes and Finpro programmes have ex-

hibited healthy growth through the financial crisis and ensuing economic stagnation well above the average. Comparing the outcomes of average programme participant to the total of the group, it is clear that in several programmes the outcomes are highly asymmetric, and some have gained considerably more than average. Finpro programme participants are more even in this sense and the outcomes are more evenly distributed.

There are two factors that need to be discussed in terms of the financials. The first one is that the period of study is extremely challenging for businesses in general, the financial crisis of 2007–2008 started the ‘lost decade’ of brief depression and lingering stagnation in Finnish economy, the healthcare reform has been ongoing in some form for most the period, and generally the stakeholders outside the MEAE sphere have not in general been very receptive for implementing innovations as it is evident in the discussion presented above. Taking the figures before the financial crisis, extrapolation from 2004–2009 puts the size of the industry in another order of magnitude, but in that case it also needs to be recognised that by default exports would have had to grow substantially as likely domestic market would be saturated. Not to forget the natural business cycle, which is much longer than the three-year horizon em-

ployed by Tekes/BF in particular in bio-pharmaceuticals and medical technology.

A related factor that merits discussion is the optimistic nature of the expectations the beneficiaries have posted in their applications for Tekes funding. Several of the interviewed programme steering group members criticised that in several cases as they were reviewing applications, the expectations seemed systematically very optimistic. These aspects were discussed critically and raise two questions, how reliably the estimates can be used in project selection and steering the programmes, if relatively accurate estimates emerge only after project completion.

Despite the criticism, on the balance of evidence, all the programmes were successful in making advancements towards their goals, especially the Finpro export programmes were effective regarding the goal of increasing exports, and have played a role in the shift towards more diverse forms of collaboration in the healthcare sector in Finland. The Achilles heel of impact and change of practices are in the larger scale at the level of the system, particularly the interface with the public healthcare system and its stakeholders, that is to a large extent out of Tekes/BF control. The following table reiterates the conclusions about the programmes.

**TABLE 5.** Summary of conclusions about the programmes.

Programme	Objectives	Evidence of Achievement
<b>Finland Care</b>	<p>Promotion of Finnish healthcare technology, competence and services in international markets</p> <p>To create "innovation-driven export growth".</p>	<ul style="list-style-type: none"> <li>• 83% of respondents reported that it would have been at least somewhat difficult to improve their company's internationalisation efforts without the Finland Care programme</li> <li>• 67% of Finland Care Programme respondents that indicated their company acquired new international customers since first engagement with the programme attributed positive impact to the programme on their ability to do so.</li> <li>• 86% of Finland Care Programme respondents that increased annual export sales revenues since first engagement with the programme attributed positive impact to the programme on their ability to do so.</li> <li>• The turnover and value of exports for the average programme participant have raised significantly (26% and 48% respectively)</li> <li>• Target market engagement and promotion assistance are most closely affiliated with impact on participants</li> </ul>
<b>Digital Hospitals</b>	<p>Promotion programme for Finnish companies who market technologies that improve quality, productivity and impact of care;</p> <p>Targets particularly Nordic markets and hospital investments.</p>	<ul style="list-style-type: none"> <li>• 85% of respondents reported that it would have been at least somewhat difficult to improve their company's internationalisation efforts without the Digital Hospitals programme</li> <li>• 100% of Digital Hospitals Programme respondents that indicated their company acquired new international customers since first engagement with the programme attributed positive impact to the programme on their ability to do so.</li> <li>• 100% of Digital Hospitals Programme respondents that increased their annual export sales revenues since first engagement with the programme attribute positive impact to the programme on their ability to do so.</li> <li>• The turnover and value of exports for the average programme participant have raised significantly (26% and 48% respectively)</li> <li>• Platform and forum provision and the facilitation of connections are most closely affiliated with impact on participants</li> </ul>
<b>Team Finland Health</b>	<p>Reinforces the image of Finland as a favourable environment for RDI in healthcare and related areas, lures in investments and business (invest-in);</p> <p>Supports internationalisation of enterprises in the health sector and growth of exports;</p> <p>Specifically attracting investments from global pharmaceutical and digital/health tech enterprises.</p>	<ul style="list-style-type: none"> <li>• 50% of Team Finland Health Growth Programme respondents indicated 10% or more of the equity financing they were able to raise since first engagement with the programme came from international sources.</li> <li>• 70% of Team Finland Health Growth Programme respondents that indicated their company acquired new international customers since first engagement with the programme attributed positive impact to the programme on their ability to do so.</li> <li>• 70% of Team Finland Health Growth Programme respondents that increased annual export sales revenues since first engagement with the programme attributed positive impact to the programme on their ability to do so.</li> <li>• The turnover and value of exports for the average programme participant have raised significantly (26% and 48% respectively)</li> <li>• Company specific coaching is most closely affiliated with impact on participants</li> </ul>

...TABLE 5.

Programme	Objectives	Evidence of Achievement
<b>FinnWell</b>	<p>Improvement to well-being and ability to function (citizen/patients), and productivity (of healthcare and enterprises), end-user orientation;</p> <p>Creation of new and improved care solutions (public actors), new products and services for the international markets (enterprises).</p>	<ul style="list-style-type: none"> <li>• 92% of FinnWell Programme respondents indicated the programme positively impacted their ability to influence the practices of their clients.</li> <li>• 78% of FinnWell Programme respondents indicated they brought two or more new products, processes, or services to market since first engagement with the programme.</li> <li>• 100% of FinnWell Programme respondents that developed new products since first engagement with the programme attributed positive impact to the programme on their ability to do so.</li> <li>• 83% of FinnWell Programme respondents that indicated their company acquired new international customers since first engagement with the programme attributed positive impact to the programme on their ability to do so.</li> <li>• The average turnover has grown 31% and the total value of exports from the group of participants also 31%</li> <li>• Internationalisation, promotional assistance, and international target market visibility is most closely affiliated with impact on participants</li> </ul>
<b>Pharma</b>	<p>Renewal of pharmaceutical industry and int'l competitiveness;</p> <p>Speed up development of new processes, methods, and operating models;</p> <p>Support networking, encourage PPPs and international networking,</p> <p>Improve risk management;</p> <p>Improve investment environment.</p>	<ul style="list-style-type: none"> <li>• 66% of Pharma Programme respondents that decreased their time to market by 6 months or more since first engagement with the programme attributed positive impact to the programme on their ability to do so.</li> <li>• 80% of Pharma Programme respondents that indicated their company entered into new partnerships since first engagement with the programme attributed positive impact to the programme on their ability to do so.</li> <li>• 75% of Pharma Programme respondents that raised equity financing since first engagement with the programme attributed positive impact to the programme on their ability to do so.</li> <li>• The average turnover has grown 169% and the total value of exports from the group of participants also 130%</li> </ul>
<b>SOTE</b>	<p>Renewal of health care organisations and processes,</p> <p>Development of customer relationship management and new networked service models,</p> <p>Recognition and spreading best practices,</p> <p>Increased quality, productivity and customer/patient-orientation.</p>	<ul style="list-style-type: none"> <li>• 86% of SOTE Programme respondents indicated the programme positively impacted their ability to influence the practices of their clients.</li> <li>• 100% of SOTE Programme respondents that indicated their company entered into new partnerships since first engagement with the programme attributed positive impact to the programme on their ability to do so.</li> <li>• The total turnover has grown 84% and the total average value of exports from the group of participants also 123%</li> <li>• Platform and forum provision and the facilitation of connections is most closely affiliated with impact on participants, specifically impact on capacity to raise capital and the ability to connect with researchers</li> </ul>

## 5.2 PROGRAMME ADMINISTRATION AND SERVICES

Programme services have generally been relevant and effective according to those that have used them. There is evidence that those who were more engaged in programmes also had better outcomes and impact, and further, offering programme services together with funding has more impact according to the data than services of funding alone. The direction of causality in use of services is not definite however; whether more active and engaged enterprises that are more likely to succeed in general also engage with the programmes, or whether it is the services that raise likelihood of success.

However, there is still room for improvement in the quality of all of the support services. This is bolstered by the finding that 69% of Tekes respondents and 57% of Finpro respondents felt that the support services met their needs. To some extent the participants had mixed views on the benefits of some of the activities such as, delegation visits, seminars and consultation services. In general, the more involved the organisations were in the planning of these activities, the more targeted they were, and the better the result was. Further, the types of services on offer, especially those associated with internationalisation, are uniquely targeted to companies that are in a position to advance their international op-

erations. Because of this, the services are not necessarily suited for all companies and care must be taken to ensure that the appropriate services are offered to the participating companies.

More specifically, assuming that the focus is on improving the international practices and export revenues of participating companies, then the programmes should focus their support services on impacting the following capabilities: international expertise, promotional opportunities, knowledge of how to sell into international markets, ability to develop partnerships for the purposes of internationalisation, ability to make target market linkages. However, assuming that the focus is on changing client practices (including those of health institutions), then the programmes should focus their support services on impacting the following capabilities: strategic expertise, technical capabilities, and operational change of practices.

The best estimate based on the data is that between 1/6 and 1/3 participants are actively engaged with the programmes and for the rest the programme itself is less material than solving a specific problem related to RDI and/or exports.

On the balance of evidence, generally those organisations that are more engaged also have better outcomes, but this should not necessarily be interpreted that using any particular or all services are mandatory. Looking past inside individual services, the common denomina-

tor of value creation to the beneficiaries are expertise and insight offered by the coordinators and programme managers, and networking opportunities.

In a more detailed look, the value of specific services to a specific beneficiary depends on their maturity as an enterprise and the phase of development of technology, product or service. There is little specific evidence to say any particular service would be clearly more effective than other across the board, and there is no one single service or list of services that are optimal for the whole portfolio of beneficiaries. Based on the data, stereotypically younger and less-networked enterprises benefit from a broader spectrum of services, including mentoring, coaching and general networking opportunities, whereas for more mature organisations the largest value propositions are tailored advice and networking opportunities. At the level of system, cross-pollination and network building between sectors to reinforce and breed new PPPs carries additional added value.

### 5.3 GENERAL FINDINGS ON PROGRAMMING

As discussed above, the programmes as such have been relevant and timely from the standpoint of innovation and the (global) marketplace. The challenge for the ultimate impact has been the dynamics between domes-

tic stakeholders. Overall, based on the stakeholder interviews, the regulatory framework and the dynamics of incentives between stakeholders in the health and well-being sector are restrictive for innovation and growth. While the Tekes and Finpro programmes are viewed as well-executed as such, stakeholders call for policy makers and regulatory authorities' closer involvement both in framing future programmes and participants in projects for example in the form of an advisory board.

There are four larger points of criticism that were discussed above in more detail, which will be also reflected in recommendations. The first is how lessons have been carried over between programmes. While the content themes have remained stable in BF agenda, there is evidence that as key staff has changed, the programmes have grappled with similar issues and developed similar solutions. The second point of criticism is how programme themes and goals are featured in project selection criteria and monitoring. While the programmes have their own themes and goals, these generally are not transparently and comprehensively implemented in project selection and monitoring or follow ups. The third, related point, is how applicants' expectations of project outcome or impact features in project selection, and the optimism bias this instils. Fourth, according to the interviews, assumptions regarding collaboration might have been unrealistic considering the structure, dynamics and traditions in the concerned sector (-s).

## 5.4 RECOMMENDATIONS

### 5.4.1 RECOMMENDATIONS FOR PROGRAMME ADMINISTRATION AND SERVICES

According to the available evidence, the services in the six evaluated programmes have been rated well by the beneficiaries. The general recommendations are to ensure alignment between service offerings and participant needs first and ensuring alignment between programme objectives and service offerings second. Factors to consider include the size, age, and interests of the applicants when determining whether or not a company should participate in a given programme. The third generic recommendations are to encourage participants to engage in the programmes deeply as greater intensity of use is associated with greater impact.

Fourthly, where possible, providing funding increase impact. According to all available evidence, providing both funding and support services results in greater impact than providing one without the other. Further, requiring participants to pay a fee for service elevates their expectations and may lead to lowered impact if those expectations are not met.

As for the order of importance, the engagement numbers show that the most frequently used services are (not necessarily in order of importance):

- Facilitation of partnering/networking, platform provision
- Promotion assistance, target market and customer identification and engagement

- Training, mentoring and coaching

Among the least used were market identification and market information, although not by a large margin. One of hypothesis for the finding that “all services are as important” is that the programmes in average had different kinds of participants, with different maturity as an organisation and in terms of innovation activities. Thus, each of the services find their users as the programme participants typically comprise enterprises at different stages of maturity and technology life-cycle, and the data does not clearly indicate that any particular type of service would be of little value.

One of the key messages for the future was that the beneficiaries and stakeholders have valued and continue to value Tekes as an independent expert organisation and thus the expectation for the knowledgeableability of the programme administration is high. The stakeholders rated the use of expert coordinators and per-programme steering groups as good practices that also ensure there is sufficient expertise to evaluate and steer the projects. Also, from the other way around, programme services were mostly criticised in cases where the respondents felt the programme staffs’ expertise did not surpass their own.

The different possible roles of various services were discussed in more detailed way above in section 4.3 and shortly in section 5.2. One way to reflect on the services is along the maturity of the enterprise, and according to the data, less mature and perhaps first time participants gain benefit already from the basic networking and platform services, converse, the more networked and ad-

vanced the enterprise, the more targeted and knowledge intensive services they need to gain benefit. Generally, the more tailored and targeted the services are, the better the feedback and engagement with the beneficiaries were, and by extension generally the more engaged enterprises have better outcomes.

#### 5.4.2 RECOMMENDATIONS FOR PROGRAMMING

As discussed, one of the major challenges for the impact of the programmes in terms of change of practices, particularly FinnWell and SOTE, has been the challenging institutional makeup of the healthcare sector. As such this is not under control of BF/Tekes, but if the goal is to either support innovation by co-development and setting up PPPs that provide fruitful reference cases, or improve the national healthcare system through innovation, or both, BF needs to work with all the relevant stakeholders to pave the way for innovation. The stakeholders with experience development of the national health system stressed, that to maximise the impact of interventions, there should be a whole-of-government approach with joint inter-ministry programming. According to the recent mid-term review, the Growth Strategy for Health and Wellbeing has already built up the collaboration between MSAH and MEAE as well as various stakeholders, which suggest the Growth Strategy could be exactly the platform that is needed to build common programming.<sup>17</sup>

The gap for BF specifically in this setting seems to be, that BF is recognised as a neutral party and is in a position to provide a platform for interested parties to build collaborations. With more stakeholder involvement and recognition of the nature of the field and stakeholder interests, as well as more careful coaching of the applicants and project selection BF can provide added value at the system level as well as the project level.

Stemming from the criticism the second, related, recommendation is delineating project selection and monitoring criteria more closely towards programme goals. As of now Tekes/BF have had generic funding criteria focused on short to medium-term financial outcomes with some room for judgement. These do not necessarily support achieving programme goals in an optimal way, especially when the goals are other than growth of business and exports, such as productivity and renewal of healthcare or forming new PPPs. Tailoring funding criteria and monitoring projects more closely would likely support goal attainment – the recommendation is to evaluate applications and applying organizations more straightforwardly with the criteria set for the funding. For example, if the goals are in general to create innovation-driven export growth, new technologically advanced innovations and PPPs, the criteria should probably include evaluation of the consortium members, commitment from the organisations and their management, their capabilities in relation to international state-of-the-art, international networks etc. on top of technological

<sup>17</sup> Owl Group, 2019 Terveysalan kasvustrategian väliarviointi, Available: <https://tem.fi/documents/1410877/2921014/Terveysalan+kasvustrategian+v%C3%A4liarviointi/806d5b61-de4e-2ea9-0a93-43fa0bda281c/Terveysalan+kasvustrategian+v%C3%A4liarviointi.pdf>

challenge and commercial expectations.

In a further related point regarding funding decisions, there were evidence towards that the projects with most impact are those that have top management support in the partner organisations and that stem from genuine (common) interests of the partners. This relates to both research-enterprise relation and PPPs, as implementing innovation and commercialisation of inventions requires risk taking that again typically requires top management approval. This aspect should be considered more carefully in funding decisions. Good practices have been building consortia along the value chain of a lead enterprise or a network engine which has the capacity to scale up innovations for larger markets.

Relatedly, the data also raise some questions how accurately the expectations expressed by the applications reflect the actual business potential and how well they can be used to estimate impact at the project level. If it not feasible to enlist BF internal experts or an independent expert panel to evaluate the business potential of applications, it might provide more accurate estimates if the applicants are asked to estimate the market potential and realistic market share than simple financials such as turnover.

Particularly concerning solving problems with public interest and other PPPs targeted to renewal of the health system, another way to organise innovation programmes would be building missions with clearly defined needs or problems, problem owner (-s) and organisation (-s) ready to implement the developed solutions,

with adequate support for pre-commercial procurement and competition law and other legislative and regulatory obstacles that typically have hindered this type of collaborations. The Reboot IoT Factory<sup>18</sup> ecosystem is an example of such collaboration in another field, where volunteer problem owners/case donors provide smaller or larger missions and offer a pilot or demonstration environment for solution providers. In the healthcare context, the case donor could be a major hospital region that opens up some of its challenges for SMEs to solve.

Finally, concerning the specificities of the Health & Wellbeing area, one is that typically the health tech and pharmaceuticals industries have longer lead times due to regulation compliance, certification and piloting processes that are more complex and time consuming than most other industries. When BF enters these markets, programming should reflect the dynamics and business cycle of the industry. This relates to funding criteria and expectations discussed above, but also types of funding needed. According to the data, particularly interviews, the bottle neck for RDI funding is not as much early concept development, but time consuming and resource intensive proof-of-concept and demonstration phase that need substantial investment, where present instruments or programmes are not particularly suitable. Especially start-ups and small enterprises would benefit greatly from a NIY-type instrument with a longer runtime of up to five years and volume of up to € 5–10 million, with yearly milestones and reviews to enable substantial demonstrations.

<sup>18</sup> C.f. Reboot IoT Factory website: <https://rebootiotfactory.fi/>

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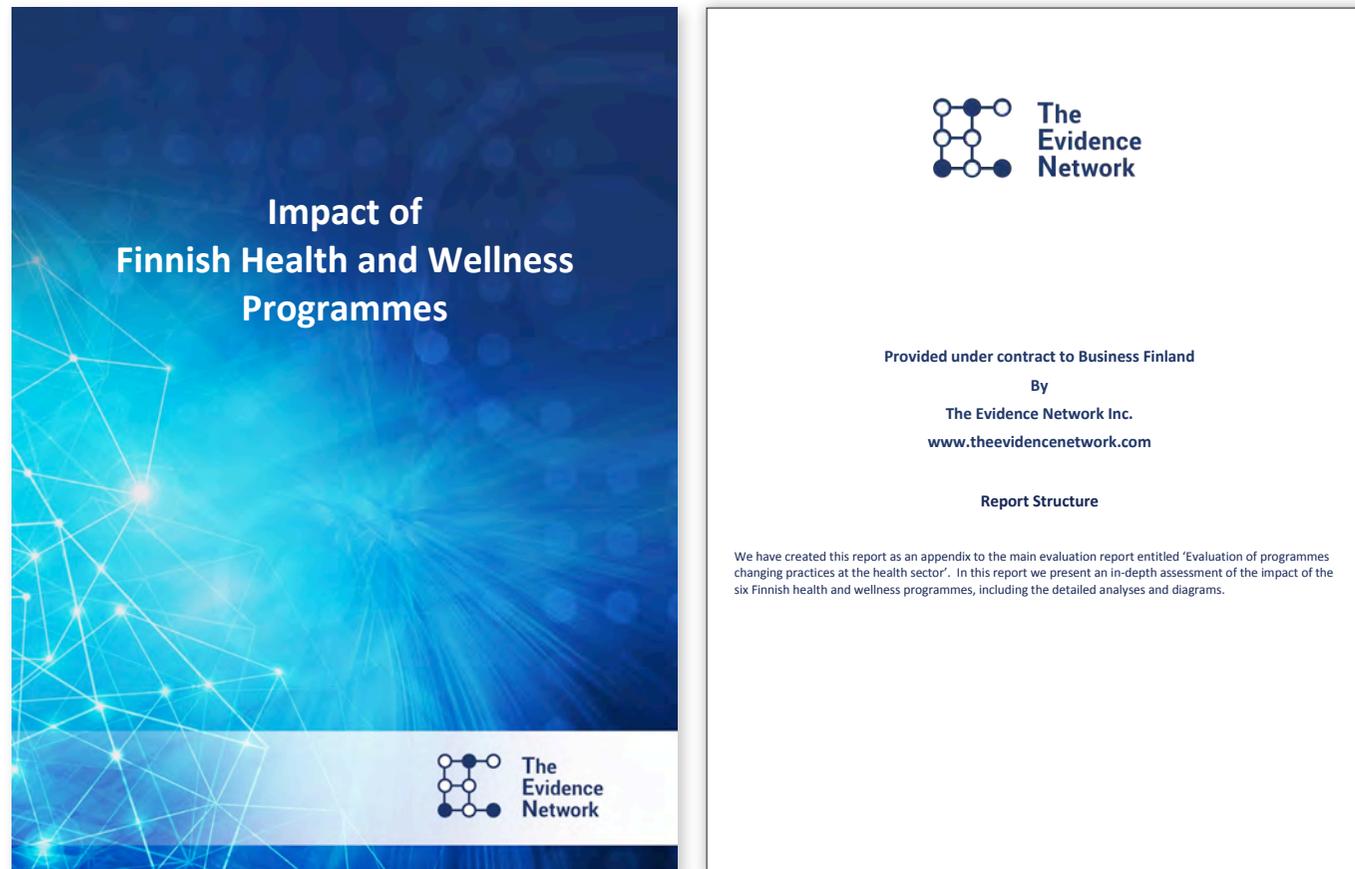
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# APPENDIX 1. SURVEY RESULTS AND ANALYSIS

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Much of the graphs in Chapter 4 are based in data from a separate survey done by the Evidence Network as part of this evaluation. Appendix 1 contains the executive summary of that report while most of the data is included in Chapter 4 of the report in hand.



## EXECUTIVE SUMMARY

This report is an appendix to the 'Evaluation of programmes changing practices at the health sector'. In this report we present the results of an in-depth analysis of the impact of the Finnish health and wellness programmes. The Finnish health and wellness programmes consist of Finpro programmes, which include: the Finland Care Programme, the Digital Hospitals Programme, and the Team Finland Health Growth Programme; and Tekes programmes which include: the FinnWell Programme, the Pharma Programme, and the Innovations in Social Healthcare Services (SOTE) Programme. In February of 2019, The Evidence Network Inc. administered an online survey to 438 representatives of organizations that have participated in these programmes, of which 125 responded to the survey, for a response rate of 29%.

### RESPONDENT OVERVIEW

Nearly two-thirds of the dataset is comprised of Finpro programme participants, which is to be expected given that the most recent Tekes programme concluded in 2015 and participants from those programmes would be expected to have less affinity with the programme and therefore be less likely to respond to the evaluation survey. The organizations that responded to the survey are most frequently business-to-healthcare or business-to-business companies, which are typically growing and generating revenues of €1 million or more. The

majority of the respondent companies operate in foreign countries and have gained foreign customers since their first participation in their respective programme.

### PROGRAMME ENGAGEMENT

The Finpro programmes offer internationalisation and market support services, and both the Finpro and Tekes programmes offer networking, collaboration and coaching support services to participants. In terms of internationalisation and market support, Finpro respondents most frequently used the target market engagement services, high priority customer identification services, and international business opportunity information services. However, respondents most frequently identified the promotional assistance and international business opportunity information support to be the services of the highest quality. This indicates that although they used some of the services the most, they may have done so with low intensity and deemed the services to be of lower quality. This represents an opportunity for improvement, as the mere use of services is insufficient for programmes to have the desired effect on their participants. To generate the greatest impact, services must be used intensively, and in order to be used intensively, services must be perceived to be of high quality and appropriate to the needs of the companies using them. As such, an opportunity exists for future programmes to align with their participants' needs and ultimately deepen engagement. That being said, it should be noted that in the present context, 82% of all Finpro programme respond-

ents indicated it would have been at least somewhat difficult for their company to improve its internationalisation efforts without the support of the programmes.

In terms of networking, collaboration, and coaching support services, respondents most frequently engaged in the platform and forum services, facilitation of connections services, and public engagement activities. Respondents most frequently identified platform and forum services, training, mentorship, coaching, or consulting services, and public engagement activities as being of the highest quality. This suggests that the most frequently used networking, collaboration, and coaching support services were of good quality and were largely aligned to the needs of the companies. Furthermore, we found that 85% of all respondents indicated it would be at least somewhat difficult to access similar support elsewhere.

From the networking analysis we also find that each Finpro or Tekes programme plays an integral role in the network of many of their clients, often acting as a central hub amongst the companies.

## **IMPACT OF THE PROGRAMMES**

In terms of impact on the capabilities of companies, the programmes, when taken collectively, had the greatest impact on the participants' ability to improve their strategic expertise<sup>1</sup>, connect with clients, governments, and

service providers in their target markets, and promote their business. In terms of impact on performance, the programmes had the greatest impact on the participants' ability to develop new products and engage in new partnerships. However, the programmes when taken cumulatively were also attributed with €15.3 million in increased annual revenues, and the creation of 122 jobs. We found that impact on the capabilities and performance of companies tends to be greater for participants that used the support services offered by the programmes, and especially for those that used them with greater intensity.

We conducted an impact benchmarking analysis to compare the six programmes amongst themselves and found that the Tekes programmes generally outperformed the Finpro programmes. In terms of the impact on capabilities, the Pharma programme was attributed with the greatest impact; while the FinnWell programme was attributed with the greatest impact on improvements to the companies' performance. It should be noted that in previous evaluations conducted by The Evidence Network, programmes that provide funding are typically attributed with greater impact than those that do not offer financial support to their participants. This is a key distinction between the Tekes and Finpro programmes; the Tekes programmes provided funding to participating companies, while the Finpro programmes did not.

<sup>1</sup> For the purposes of this assessment, Strategic expertise is a measure that encompasses improvements to companies': marketing or organizational methods in business practices, workplace organization, or external relations; business models, or business plans, marketing and sales strategies, stakeholder relations, financing strategies, or corporate growth strategies; ability to expand of the scale of operations, diversify into new product lines, or expand industrial or geographic markets.

We also benchmarked the impact of the six programmes against other healthcare and business support programmes in Finland and in Canada previously evaluated by The Evidence Network. This analysis revealed that the Tekes programmes ranked above average for the impact on Business expertise measure (which in this assessment is referred to as 'impact on strategic expertise'), and all six of the programmes ranked above average in terms of impact on linkages. In terms of impact on performance, generally, Finpro and Tekes programmes were comparatively effective in terms of their impact on companies' Annual revenues and Employment.

### **HOW IMPACT IS ACHIEVED**

A further analysis was conducted to enable a deeper understanding of how the impact on programme participants was achieved. Two important findings emerge from this analysis. First, we found that impact of the programmes on the shorter-term resources and capabilities of participants increases the likelihood that participants will attribute greater impact to the programmes on their longer-term performance measures. Second, we found that a relationship exists between the intensity of use of support services and the attribution of impact on capabilities and performance. Companies that used the support services offered by the programmes with greater intensity are more likely to attribute greater impact on both their capabilities and performance.

Given the important role that the support services play for the programmes, a correlation analysis was

conducted for each programme individually to better understand which of the support services were associated with various areas of impact. The following support services emerged as the most frequently associated with greater attribution of impact: Finland Care (Promotion assistance and Target market engagement support); Digital Hospitals (Platform and forum provision and Facilitation of connections); Team Finland Health Growth Programme (Company specific coaching); FinnWell (Internationalisation and promotional assistance, and International target market visibility) and; SOTE (Platform and forum provision, Communication with policy-makers and decision-makers, and Public engagement activities). No statistically significant findings were found for the Pharma programme.

### **IMPACT ON CLIENT PRACTICES**

Survey respondents were asked to indicate the impact that their respective programme had on their ability to influence the practices of their own clients (e.g., internal practices, ways of working, service processes, orientation towards customers, etc.). The vast majority (84%) of Tekes programme participants reported that their respective programme had a positive impact on their ability to influence their clients, while only 49% of Finpro programme participants attributed positive impact to their respective programme on this measure. Importantly, when the programmes were compared the SOTE programme was attributed with the greatest impact amongst the six.

## APPENDIX 2. SUPPLEMENT TO FINANCIAL ANALYSIS

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### FINANCIAL DEVELOPMENT OF PROGRAMME PARTICIPANTS/BENEFICIARIES

The following table presents the financial development of Tekes beneficiaries at the programme level. The basis of comparison is averages, as totals are subject to number of enterprises that have posted a non-zero figure each year (number and portion of active in the following table). Additional figures have been calculated excluding outliers which significantly distort or mask the average development of the beneficiaries/participants.

## TEKES PROGRAMMES

PROG.			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
FinnWell	Turnover	Average	475 110 114	503 077 673	612 376 643	559 470 103	906 176 649	358 964 436	390 729 725	310 170 046	155 496 990	151 123 077	66 534 532	43 725 576	43 857 340	42 093 152	
		Average w/o Nokia	30 513 996	27 376 217	39 247 019	27 296 743	29 234 426	27 684 792	30 515 781	46 365 920	39 548 235	36 423 369	37 839 512	39 234 350	40 730 618	43 979 868	
		Number of active enterprises	88	100	106	113	111	112	107	63	77	79	77	75	71	63	
		Grand total	48 461 231 671	55 841 621 693	68 586 183 961	64 898 531 984	107 835 021 248	43 434 696 700	44 543 188 610	20 161 052 978	14 772 214 092	14 054 446 190	6 054 642 439	3 891 576 262	3 727 873 886	3 493 731 653	
		Total w/o outliers	2 685 231 671	2 737 621 693	4 160 183 961	3 084 531 984	3 245 021 248	3 100 696 700	3 265 188 610	2 921 052 978	3 045 214 092	2 877 446 190	2 913 642 439	2 942 576 262	2 891 873 886	2 770 731 653	
		Portion of active enterprises	69 %	79 %	83 %	89 %	87 %	88 %	84 %	50 %	61 %	62 %	61 %	59 %	56 %	50 %	
	Employment	Grand total	58 447	63 669	74 355	63 985	181 534	59 412	40 185	23 015	19 487	15 532	12 168	10 128	9 922	10 151	
		Total w/o outliers	12 865	16 447	25 749	29 057	29 516	29 102	12 531	11 120	11 471	10 703	10 326	9 848	9 641	9 903	
		Average	573	574	664	552	1 525	491	353	354	205	167	134	114	117	122	
		Average w/o outliers	101	130	203	229	232	229	99	88	90	84	81	78	76	78	
	Exports	Average	285 821 240	309 190 558	368 982 427	259 801 036	640 143 561	167 756 191	182 123 025		117 726 189	80 164 222	44 720 258	13 159 690	22 586 096	20 761 652	
		Average w/o Nokia	6 604 624	14 188 207	15 180 303	31 581 115	39 236 124	20 057 660	19 000 956		13 206 000	13 963 713	15 028 507	17 722 284	21 332 242	20 572 617	
		Grand total	29 153 766 459	34 320 151 883	41 326 031 829	30 136 920 147	76 177 083 719	20 298 499 165	20 762 024 854		11 183 987 991	7 455 272 665	4 069 543 433	1 171 212 410	1 919 818 166	1 723 217 115	
		Total w/out Nokia	237 766 459	539 151 883	592 031 829	1 136 920 147	1 177 083 719	521 499 165	494 024 854		765 947 991	795 931 665	871 653 433	992 447 910	1 045 279 866	1 131 493 915	
			Number of active enterprises	36	38	39	36	30	26	26		58	57	58	56	49	55
			Active	29 %	30 %	31 %	29 %	24 %	21 %	21 %		46 %	45 %	46 %	44 %	39 %	44 %
SOTE	Turnover	Average	4 326 066	6 763 955	7 119 396	34 430 927	53 096 201	35 794 502	35 800 346	22 943 575	19 206 790	18 544 179	17 292 007	19 617 452	21 473 935	28 970 628	
		Number of enterprises	13	17	21	26	31	32	36	25	37	40	44	46	46	39	
		Grand total	64 890 996	114 987 230	149 507 326	895 204 109	1 699 078 428	1 181 218 553	1 288 812 467	596 532 938	864 305 570	908 664 787	916 476 365	1 020 107 529	1 116 644 636	1 419 560 788	
		Portion of active enterprises	24 %	31 %	39 %	48 %	57 %	59 %	67 %	46 %	69 %	74 %	81 %	85 %	85 %	72 %	
	Employment	Average	26	28	46	107	133	207	526	256	179	176	156	174	169	191	
		Grand total	389	480	969	2 793	4 253	6 847	18 928	6 665	8 070	8 628	8 245	9 042	8 795	9 346	
	Exports	Average	7 571	351 363	248 510	176 349	130 256	116 522	132 394		177 172	251 654	302 213	436 589	465 418	583 117	
		Grand total	119 130	6 322 526	5 465 218	4 759 424	4 296 449	3 959 723	4 896 583		8 147 885	12 580 686	16 317 499	23 137 176	24 665 121	29 153 839	

PROG.		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
	Number of active enterprises	3	4	5	4	4	5	5		19	22	26	25	26	25	
	Active	7%	9%	11%	9%	9%	11%	11%		41%	48%	57%	54%	57%	54%	
Pharma	Turnover	Average	26 284 844	20 866 274	31 884 474	68 984 021	75 933 600	48 914 454	51 011 078	68 526 714	58 639 196	61 859 484	70 086 678	76 531 957	91 527 090	103 577 342
		Average w/o outliers	28 475 248	27 286 665	21 940 735	20 915 825	26 240 320	30 616 863	33 145 293	38 307 584	48 524 062	45 364 544	57 405 413	59 499 764	73 965 217	99 161 716
		Grand Total	341 702 974	354 726 651	669 573 964	1 655 616 504	1 822 406 393	1 369 604 721	1 530 332 331	1 644 641 126	1 876 454 256	1 855 784 518	2 032 513 668	2 142 894 799	2 379 704 335	2 693 010 883
		Total w/o outliers	341 702 974	354 726 651	416 873 964	418 316 504	524 806 393	734 804 721	828 632 331	881 074 426	1 067 529 356	1 043 384 518	1 205 513 668	1 308 994 799	1 479 304 335	1 784 910 883
		Number of active enterprises	12	13	19	20	20	24	25	23	22	23	21	22	20	18
		Portion of active enterprises	38%	41%	59%	63%	63%	75%	78%	72%	69%	72%	66%	69%	63%	56%
	Employment	Average	178	130	187	301	354	143	139	247	209	235	237	243	253	275
		Average w/o outliers	77	74	59	60	64	134	139	126	147	160	155	154	147	164
		Total	2 320	2 214	3 926	7 226	8 488	4 009	4 155	5 938	6 685	7 056	6 877	6 790	6 584	7 162
		Total w/o outliers	2 320	2 214	1 768	1 796	1 909	4 009	4 155	3 790	4 418	4 787	4 638	4 613	4 395	4 924
	Exports	Average	5 703 451	3 065 611	15 520 305	33 038 688	37 654 828	2 980 732	2 692 324		24 541 541	25 978 608	26 855 982	25 730 241	28 928 131	30 930 828
		Average w/o outliers	12 357 478	10 423 078	9 371 673	6 827 893	5 726 011	6 955 042	7 342 702		5 854 734	6 287 683	5 945 741	7 706 739	9 031 196	9 947 978
		Grand total	74 144 869	52 115 388	325 926 402	792 928 500	903 715 871	83 460 500	80 769 720		785 329 318	779 358 254	778 823 487	720 446 761	752 131 407	804 201 535
		Total w/out outliers	74 144 869	52 115 388	74 973 381	81 934 720	80 164 158	83 460 500	80 769 720		122 949 418	125 753 654	142 697 787	169 548 261	189 655 107	208 907 535
		Number of active enterprises	6	5	8	12	14	12	11		21	20	24	22	21	21
		Portion of active enterprises	20%	17%	27%	40%	47%	40%	37%		70%	67%	80%	73%	70%	70%
Totals	Turnover	Average	168 573 675	176 902 634	217 126 838	220 961 684	345 068 817	147 891 131	159 180 383	133 880 112	77 780 992	77 175 580	51 304 406	46 624 995	52 286 122	58 213 707
		Average without outliers	21 105 103	20 475 612	22 769 050	27 547 832	36 190 316	31 365 386	33 153 807	35 872 360	35 759 696	33 444 031	37 512 311	39 450 522	45 389 923	57 370 737
	Employment	Average	259	244	299	320	671	281	339	286	198	193	176	177	180	196
		Average without outliers	68	77	103	132	143	190	254	157	139	140	130	135	131	144
	Exports	Average	97 177 421	104 202 511	128 250 414	97 672 024	225 976 215	56 951 148	61 649 248		47 481 634	35 464 828	23 959 485	13 108 840	17 326 548	17 425 199
		Average without outliers	6 323 224	8 320 882	8 266 829	12 861 786	15 030 797	9 043 074	8 825 351		6 412 635	6 834 350	7 092 154	8 621 871	10 276 285	10 367 904

## FINPRO PROGRAMMES

		2009	2010	2011	2012	2013	2014	2015	2016	2017
Turnover	Average			213 290 384	124 381 899	117 252 841	52 665 664	38 222 630	39 181 338	47 325 979
	Average w/o outliers			21 293 358	27 275 643	27 047 288	27 667 730	29 594 044	30 220 501	35 418 261
	Total			20 902 457 587	16 418 410 667	15 829 133 530	7 899 849 628	6 039 175 534	6 033 926 111	6 814 940 957
	Total w/o outliers			3 662 457 587	4 691 410 667	4 652 133 530	4 758 849 628	5 090 175 534	5 197 926 111	6 091 940 957
	Active enterprises			95	127	130	144	157	153	142
	Portion of active			55 %	74 %	76 %	84 %	91 %	89 %	83 %
Exports	Average				88 608 699	59 450 400	31 953 406	11 947 954	18 212 990	19 715 227
	Average w/o outliers				7 432 025	7 944 552	9 273 959	9 936 118	11 222 455	13 065 520
	Total				11 696 348 254	8 025 803 985	4 793 010 968	1 887 776 810	2 804 800 508	2 838 992 671
	Total w/o outliers				1 278 308 254	1 366 462 985	1 595 120 968	1 709 012 310	1 930 262 208	2 247 269 471
	Active enterprises				87	92	104	113	115	111
	Portion of active			0 %	51 %	53 %	60 %	66 %	67 %	65 %
Employment	Average			283	194	173	139	132	126	136
	Average w/o outliers			92	102	108	111	119	111	112
	Total			27 720	25 561	23 325	20 869	20 827	19 396	19 547
	Total w/o outliers			15 825	17 545	18 496	19 027	20 547	19 115	19 299

## APPENDIX 3. CASE STUDIES

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### CASE FINNTRIALS

The FinnTrials project or group of projects has the ambitious aim to develop shared and harmonised practices for clinical research and trials between Finnish university hospitals and hospital regions. Tekes role in the project was significant in enabling the collaboration of the actors

#### PROJECT BACKGROUND AND OBJECTIVES

Within the FinnTrials group of projects, a total of 7 projects were funded between five main partners. FinnTrials was an answer to the programme theme "developing of a national framework for clinical trials". FinnMedi, present Tampere University Hospital RDI Center, was the coordinator and other partners included Pirkanmaa, North Ostrobothnia, North Savonia and Finland Proper Hospital regions, which represent four of the five major university hospitals and also major bio-pharma research centers. Short description of the project context and the rationale behind / need for the project.

The overall aim was in short to make Finland a more lucrative country for clinical research both for domestic and international pharmaceuticals manufacturers and develop common practices and processes as well as personal networks between research sites, thereby increasing competitiveness of Finland as a research environment. Additionally the aims included supporting and enabling other challenging clinical research, besides pharmaceutical trials. The large background was, that although Finland is advertised as an excellent environment for clinical research because of best-in-class personal and health registries, relatively good trust in medical profession, good reach of the public health system and genetically relatively homogeneous population, also Finland is a country of small research sites with different processes and procedures for research permits, ethical reviews and other mandatory bureaucracy, which acts as a counter balance for the advantages of Finland as a research environment.

## PROJECT DEVELOPMENT AND ACTIVITIES

The project group include major initiatives where the responsibilities we divided between partners. The sub-projects included operating modes for national research networks, training for clinical research and monitoring of clinical research and building a GCP-network, and development of systems and techniques for storing and cataloguing demanding biological samples in altogether five sub-projects between 2009–2011. The responsibilities for the sub-projects were split between the five University hospitals.

The main activities in the projects included description of processes related to clinical research in each hospital region and further development of common practices to describe samples and other data to achieve comparability and fluid combination of data between Finnish hospital regions. Further development was committed to clinical acceptance procedures and harmonisation of documentation and monitoring of clinical research and trials and common Good Clinical Practice (GCP) -guidelines. Finally, a clinical research desktop application was developed. The common denominator was to work on harmonisation of procedures, and particularly data descriptions, pseudonymisation, interfaces and systems to enable data interchange between hospital regions and research sites while preserving privacy and data security.

According to the interviews, before FinnTrials the main collaboration forum between university hospitals

were meetings coordinating the use of the Government Special Subsidy for Research (EVO), and the regions didn't have extensive joint development projects. When the FinnTrials discussions started, Tekes mandated that all the university hospital regions participate in the consortium and share the results. In the end the project included major stakeholders including the hospital regions, universities and research institutes, and Finnish Pharma Industry Association. In retrospect this "forced" collaboration is viewed favourably, as it laid the groundwork for building the trust and connections that continued to bear fruit in further RDI projects over the years.

## RESULTS AND OUTCOMES

One of the main added value was gathering university hospitals, universities and sectoral research organisations, chief among them the National Institute of Health and Welfare, around the same proverbial table to start developing harmonised processes for clinical research approval, documentation and description and interchange of data.

The outcomes of the FinnTrials have been in the more immediate term increase in collaboration between University hospitals and research organisations and creating a foundation of networks between the national actors that continues to support RDI collaboration. The more concrete outcomes that continue to develop to date are the Good Clinical Practice guidelines for conducting and monitoring clinical research and trials that steer clinical

research in Finland today, the contribution to the layers of documenting and storing human data and samples, and the interfaces necessary to recombine data from multiple sites.

The foundations laid in FinnTrials are to a large extent the basis for the emerging Biobanks that are being developed across university hospital regions. The biobanks in particular are expected to contribute significantly to research abilities and attractiveness of Finland as a research environment. Lastly, the project contributed to the desktop environment for clinical researchers, that support clinical research using the GCP-practices and simplifies workflow for clinical researchers. For its part the FinnTrials group of projects has contributed to the Test Bed Finland concept, as in Finland as a lucrative research environment.

## **TEKES CONTRIBUTION AND OVERALL LESSONS**

One of the interviewees, when looking back, reminisced that the RDI co-operation between university hospitals was relatively modest and more mutual competition than collaboration. Tekes role was pivotal in the inception of the project in facilitating the formation of the consortium and setting requirements that all major university hospitals take part in the project. As such Tekes has significantly contributed to formation of new practices, in this case relating to clinical research and handling of samples and data. According to the interviews one of the key contributions early on was that the

programme coordinator and Tekes programme managers recognised the potential and had the patience to facilitate the consortium building to develop the project to the full potential. One of the main lessons was that the project tried and succeeded in aligning incentives for all involved parties.

Again, according to the interviews, after the FinnTrials, obstacles appeared for university hospitals and hospital regions in general participating in Tekes/BF RDI projects. The current funding Terms and Conditions mean that hospital regions in practice fall under the category of large enterprise that puts them in unfavourable position in terms of funding rates. One of the less apparent problems is regulatory/legislative issues with privacy and data security regarding use of personal data and samples in research, which limits meaningful RDI on public health systems and particularly clinical research. This is directly in conflict with developing the Test Bed Finland concept, i.e. Finland as a cohesive environment for clinical research.

This in turn means that significance of Tekes funding has declined and University hospitals focus on either on their own, typically smaller, development projects or try to build other PPP-collaborations directly with the industry. For example, University of Turku and the Finland Proper Hospital Region recently entered into a framework agreement with Roche concerning research, pharmaceutical trials and education relating to oncology and neurology in collaboration with the national Comprehensive Cancer Center and Auria biobank.

## CASE PROVIISIKKO

### SHORT INTRODUCTION

ProViisikko is one of the early cases for developing eHealth or digital services for healthcare, involving four hospital regions and as many enterprise partners. ProViisikko is also one of the early examples of funding agency collaboration and a source for learning for Tekes.

### PROJECT BACKGROUND AND OBJECTIVES

ProViisikko project started as a part of SITRA healthcare programmes with handpicked partners who appeared interested to develop early eHealth solutions. The overall goal was to develop more responsive primary care services with telecare solutions, ProViisikko was conceived as a project basket for telecare/digital services in healthcare. From SITRA's angle the goals were renewal of service processes, customer-oriented development, and task distribution and avoidance of duplicate work between partners.

In practice, the subprojects were already conceived by the partners-to-be, but they did not have experience in working with Tekes or external RDI funding. SITRA's role to a large extent was to bring the actors together and shape the projects and aid in applying for Tekes funding. Medical Center LifeIT, partly owned by one of the partnering hospital regions, was invited as the project

coordinator as the main partners, the hospital regions, did not have personnel to commit to technical project preparation and management.

The main partners were Kymi and South Savonia Hospital Regions and City of Vaasa who collaborated with MediNeuvo Oy, Central Bothnia Hospital Region collaborated with Raisoft Oy, Ostrobothnia had a sub-project and also participated in coordination through LifeIT (Etelä-Pohjanmaan Life Teknologia Oy).

### PROJECT DEVELOPMENT AND ACTIVITIES

SITRA started developing the project early on and invested in-kind as well hiring a project "moderator" as in coordinator to act between partners. The main funding sources for the R&D were FinWell and a pre-KASTE development grant from STM.

The sub-projects all fell under a theme of digital services and they were built on the needs and ideas from the core partners. The sub-projects were the following:

- Kymi hospital Region: Telephone advisory service and integration of patient information systems
- South Savonia: Internet advisory service, development of an information website, and integration of patient information systems
- Ostrobothnia: Application of process/flow management systems in hospital environment, development and piloting wireless (monitoring) technology
- Central Bothnia: Telephone advisory service, development of call center and patient screening system

Joint vision or shared larger goals were not required nor particularly developed during the project. According to stakeholders themselves, the projects had too loosely defined goals and coordination which meant no significant synergy between the projects was achieved during the implementation. Also, on the other side, the hospital regions themselves had at this point relatively unstructured RDI strategies, which also meant that strong connection to the strategies within the partner organisations weren't made.

Further administrative challenges were posed by the public procurement legislation, as Hospital Regions are bound to publicly tender their purchases according to the national and EU thresholds. The challenge for all parties was in the onset to figure how can the regions work with a chosen partner in developing systems and services in the first place, instead of having to tender for partners and having to change the project entirely if another bidder wins the tender. When this threshold was managed, the same challenge followed in entering into production, as the regions were again bound to ask for tenders to procure a system or service of any significant economic value.

## RESULTS AND OUTCOMES

One of the important outcomes from ProViisikko has been learning both for the partners and the funding agencies. On both sides of the table the stakeholders have learned about each others' ways of working and de-

veloped new practices and routines for project management. The projects also provided initial experiences and pilots of new communication channels to the patients and spurred development to understanding and measuring the processes.

In terms of tangible outcomes, some progress was made in piloting the web- and telephone-based patient advisory and patient screening, and one of the participating enterprises Raisoft (out of three) is still in business, MediNeuvo was declared insolvent in 2012 and LifeIT has ended business activities in 2013.

## TEKES CONTRIBUTION AND OVERALL LESSONS

What is emblematic for this case, is perhaps that the partners were not experienced in working with each other or with this type of public funding, and neither were the funders. The overall readiness seems to have been relatively low. However, most of the administrative issues seem to have been solved with collaboration of the funding agencies and the project partners. In this sense the project has been, among others in the FinWell programme a learning experience for all parties involved at the time. The experiences resulted in refining funding criteria to favour stronger planning and practical application, and developing coordination between agencies.

However, the case highlights the structural challenges of the programmes and projects in the Health and Well-being area. The evaluations done at the time outline the major challenges as: working with procurement legisla-

tion to enable development and adoption of new solutions, ownership of IP and developed solutions, different ways of working, cultures, attitudes and rhythm between public and enterprise partners, lacking documentation and structured data within the hospital regions, lack of cost awareness and accounting systems/information.

None of these challenges are new, and while some can be solved as practical problems, some are more structural that come back to the incentives of organisations. One major challenge is that the objectives for developing the healthcare system are general and quite abstract, out of necessity, but the effect is that they do not steer development in any particular direction. Another structural challenge is the reform of social services and healthcare system that has been pending or an-going in some form and intensity since roughly 2006 or 2011, a decade or more at the time of writing, that has introduced uncertainty to the actors and made then relatively conservative in terms of investing and also made planning for the future difficult. The latter is also related to the incentives and interest to implement innovation in healthcare; typically organisations are open to implement innovation that have a proven record of delivering better outcomes for health, but the flipside is that in the absence of evidence development projects are in a prejudiced position.

The conclusion the funding agencies drew from the case are that instead of focusing on local solutions in individual projects, rather the agencies should focus on accelerating the most promising solutions together to national and international common solutions. This was thought could be achieved by first developing interoperation between policy and funding agencies and developing a portfolio of instruments that enables developing, demonstrating and scaling innovations. Second, what was called for was leadership from policy agencies and collaboration with public healthcare to clear obstacles for adopting innovations.

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## CASE MEDFILES

### SHORT INTRODUCTION

Medfiles have conducted two projects in Pharma programme and later in Bits of Health, the projects have focused on acquiring and implementing technology, developing new service concepts, and acquiring internal partners to reinforce ability to deliver value to customers. Overall Tekes funding has had a significant effect in enabling Medfiles to invest in timely technology acquisition and developing service portfolio in parallel and at an opportune time.

### PROJECT BACKGROUND AND OBJECTIVES

Medfiles Oy is a clinical research enterprise, one of if not the first private clinical research organisations in Finland, founded 1987. Medfiles offers services for the spectrum of clinical research from early safety studies through to market acceptance and post-marketing surveillance and long-term efficacy studies. The overall objective is to develop a leading position in Nordic countries as a vanguard for safety in medical development process.

Medfiles has executed two projects in Pharma programme “Improvement of core services through concept development and networking” (2009–2012) and “Ser-

vice concepts for Health Economics and Clinical Studies for Pharmaceuticals and Devices” (2011–2013). Later Tekes has funded “NwMediGlo -Competitive edge and global vanguard through the development of the cooperation for the companies serving the pharmaceuticals chain” from the Bits of Health programme. The first project aimed to raise the technological competence level in the enterprise and develop a new service concept around technology acquisition, and to develop European partner network further. The second project aimed to develop further service concepts around health economics and clinical services and further reinforce partner network to enable international expansion. Finally the third project continues on the same vein.

### PROJECT DEVELOPMENT AND ACTIVITIES

The common denominator between the projects in Pharma and later has been development of service concepts and processes, and partnerships especially within Europe and the Nordics. This has been directly linked to a long-standing ambition in Medfiles to grow the service business and develop international network and market position. Pharma incidentally was one of the first programmes that accepted service development as subsidisable project and thus Medfiles was able to participate.

In the onset one of the most important aspects in the first project was acquisition and implementation of a technology that broadened analytical capabilities and

enabled development of new service offerings. Besides the focus on reinforcing analytical base and capability, the projects have consistently aimed to develop service concepts and identify partners, foreign and domestic, who can deliver added value to Medfiles service offering and clients and further develop joint offerings and service concepts.

For example, in the Pharma-funded project the aim was to build a network between medium-sized European CROs that is able to offer single point of contact for large multi-site, multi-center clinical trials to compete with larger multinational CROs. In the latest project, funded from Bits of Health, the aim is to develop joint service offering between partner from Kuopio region, who work in different phases on pharmaceutical development cycle from development and trials to dispensing medication to patients. Besides funding, Medfiles has utilised the networking events in the programme and also the opportunities offered by the programme participation to visit conferences and events, including the delegations to China in Pharma.

## **RESULTS AND OUTCOMES**

The key added value of the Tekes programmes has been to enable developing the core services of the company with the breadth and depth that matched the original ambition and market needs. In short, the funding ena-

bled timely investment into new technology and development of new services that were in demand. The outcomes were new services and partnerships through joint projects and exposure to exports markets.

To date, the technology and services developed in Pharma are an important part of the portfolio of Medfiles. More conceptually, the discussion and coaching on building value networks and the various programme activities that aimed networking also have proven valuable over time. For example, participation in Regulanet – International Regulatory Affairs Network is a product of early participation in Pharma.

In general, the subsidy enabled taking bolder steps forward in multiple front at an important time for the enterprise. Without funding, the same things would have been on the roadmap, but they would have been done slower, with smaller budget and ambition and in sequence rather than parallel. The delegation tript to Chine were interesting and enlightening, and offered a good look into the market, but after analysis Medfiles decided their resources would be spread too thin trying to open European and Asian markets at once, and decided to focus on Europe first. However, as such the trip with information and organised one-to-one meetings was a good experience and some connections formed that have been left alive over the years. Now that Chinese enterprises are entering European markets, it has proven a valuable experience.

## TEKES CONTRIBUTION AND OVERALL LESSONS

As discussed, Tekes subsidy was valuable and timely for Medfiles and enabled broadening the capabilities and service of the firm towards new markets. Besides leverage afforded by the subsidy, the services reinforced networking and introduced new ideas to the enterprise. Overall the investments done during Pharma continue to bear fruit even at the time of the writing.

In this case the Tekes additionality is to large extent that the Tekes inputs enabled manifesting the existing ambition to develop new offerings, to find partners and broaden the activities to other markets. Tekes input enabled achieving the existing objectives in parallel, more broadly and ambitiously than would have been otherwise possible. The added value of the other programme services was ambiguous according to the interviews, the mentoring offered in Pharma was viewed more favourably immediately after the programme, while in retrospect it didn't seem to play that large of a role or the inputs were internalised and the role of them later is hard to track. The views toward the exports activities, the field mission to China, were more definite; in general the organised trip with a combination of market information,

specific training and coaching, and pre-organised meetings was a valuable concept. However, the estimation was that organised delegations are the most valuable in centralised markets and countries with relatively hierarchical business culture. In Wester-type open markets especially established actors already know and can reach relevant actors, and in those what matters is industry insight and identifying the specific people within existing organisations.

In general in future programming, according to the interviews, the main message is that Tekes is in an excellent position to offer a 'neutral' platform for networking and information, and this could be cultivated even further through offering low threshold general-interest and industry specific events and information and training on issues that are important business topics and reinforcing basic capabilities and knowledge, starting from GDPR type generic issues to upcoming developments and trends in technology. According to the interviews, value of personal contact and networking should not be underestimated and reinforcing existing and creating an opportunity for new network connections is a service that Tekes has successfully done in the past.

## CASE **KAIKU HEALTH** (FORMER NETMED)

### **SHORT INTRODUCTION**

Kaiku has received funding from Tekes in two rounds: first in 2012 from the SOTE programme and later through the “Nuoret innovatiiviset yritykset “ (NIY) instrument. The objective of the project funded by the SOTE programme was to develop the product, the Kaiku digital solution. The funding enabled the company to focus on product development instead of using a lot of time to seek investors. The objective in the latter project was to support internationalisation and export activities.

### **PROJECT BACKGROUND AND OBJECTIVES**

Founded in 2012, Kaiku Health provides a solution for patient-reported outcome monitoring and a digital health intervention for cancer patients. Kaiku’s aim is to improve quality of life and reduce healthcare costs through data science. Kaiku Health helps their clients (hospitals & clinics) connect with their patients online, and they help their clients capture real-world data and improve clinical efficiency. The service offered includes unique algorithms that enable early interventions and personalised support. Kaiku is a web application that connects patients securely with their care teams on any mobile device – smartphone, tablet or computer. Patients can

keep track of the progress of their treatment and communicate developed securely with their care team. In the project an advanced tool for patient-reported outcome measurement (PROM) was. Kaiku had a project in product developed in the SOTE programme, and participated in TF Health.

Kaiku patient monitoring platform has since been used by over 30 clinics in Europe. The headquarters are in Helsinki, but they have offices in Frankfurt and Stockholm as well. Kaiku has raised over € 6 million in total funding. Kaiku’s revenue in 2017 was approximately € 0.7 million.

### **PROJECT DEVELOPMENT AND ACTIVITIES**

The aim of the SOTE programme was to support customer-oriented social and health services as well as more diverse partnerships and collaboration. At the time of the SOTE programme funding Kaiku’s product was not ready for the market yet. The activities done with the funding related to product development: the funding covered the salaries of a few employees developing the product, and some fixed costs. Kaiku (former NetMed) has managed to gain a good customer base during after the participation in the SOTE programme. The technical scalability of the product that was developed has evolved and with the new product there was better potential for international growth. During the project Kaiku saw that they had managed to deepen their expertise in the field of long-term illness and that they had become a global “communi-

cation and remote monitoring solution” for cancer. Furthermore, internally, the software team’s work processes had developed.

The latter funding from the “Nuoret innovatiiviset yritykset” service was used for exporting activities in Germany and Switzerland. Sales and marketing efforts abroad are impossible without a proper budget, according to Kaiku, so the funding was very useful.

## RESULTS AND OUTCOMES

As a result of the activities funded by the SOTE programme, Kaiku had a finished product they were able to start selling. Kaiku’s products are currently used by hospitals and clinics in five countries and Kaiku employs over 30 people. According to Kaiku, the programme helped Kaiku improve its customer orientation.

With its product and related sales and marketing efforts Kaiku has raised awareness of patient-reported outcome measurement. Their product makes the implementation of value-based healthcare principles easier for the hospitals and clinics, and enables them to actually measure end-user value.

## TEKES CONTRIBUTION AND OVERALL LESSONS

In Kaiku’s view, it was very beneficial for them to receive first funding to support their product development and thereafter funding for sales and marketing abroad. It has brought them high additional value. Without the funding the development path would have been much slower. Also, there is a positive cycle related to Business Finland funding: it is seen by other investors as a sign of quality, and they are more willing to invest in companies that have received BF funding.

Main benefit for Kaiku was from the direct funding. Some of Kaiku’s employees also participated in delegation visits, and partnership events but the perception of added value was low. According to Kaiku, it is unlikely that BF could identify and bring together the key business leaders that would be useful for Kaiku. Also, the consultancy services offered by BF appeared to be too general.

Kaiku representatives mentioned that neither partnership events nor consortium efforts had worked that well for them. Kaiku has been requested to take part in some consortiums, but so far they have not done so. They could not see the added value of the joining the consortia, as in their estimate the partners interests were not aligned with the interests of Kaiku or between themselves.

## CASE FIRSTBEAT

### SHORT INTRODUCTION

Firstbeat, founded in 2002, produces performance analytics for stress, recovery and exercise. Firstbeat makes the benefits of digital physiological modeling available to everyone with near-laboratory accuracy. Over 20 years of experience studying dynamic heartbeat signals transformed into understandable and useful information that matters.

Firstbeat has three customer segments: wellness services offered by wellness professionals or employers, professional sports and consumers. Firstbeat offers both devices and analytics based on a unique heart rate variability analysis for both lifestyle assessment suitable for anybody as well as sports assessments tailored for the needs of professional athletes. Firstbeat has also licenced its technology to manufacturers of sports watches (such as Garmin and Suunto), making their technology available through various devices.

Current turnover is approximately € 20 million, and exports generate about 85 % of the turnover. Firstbeat has sales representatives in 30 countries.

### PROJECT BACKGROUND AND OBJECTIVES

Firstbeat has been supported by Business Finland in several ways: they have received direct R&D funding, they have participated in consortia funded by BF, they have used consulting services offered by BF and they have participat-

ed in BF seminars. Therefore, it is difficult to discern which type of support had what kind of effect on Firstbeat's business. The objective of all projects has been to develop the product further and thereby increase turnover.

### PROJECT DEVELOPMENT AND ACTIVITIES

The initial technology was in place at the start of 2004 when the company received its first support from BF. Firstbeat has undertaken many different projects during the time it has received support from BF: some have been related to technology and knowledge, others to creating a concept for export. All projects have helped the company reach a next level. The support by BF allowed for greater risk taking and this help has been crucial for Firstbeat in the first phases of development.

### RESULTS AND OUTCOMES

The support from BF enabled Firstbeat to take some of their pilot products to the market, and also to further develop new products and services. According to Firstbeat, it might be that the company would not exist currently without the crucial funding support it received in the early days (2004 onwards).

According to Firstbeat at least the following outcomes can be attributed to the projects:

- New products, services
- Export opportunities
- Partnerships, both public and private (however these partnerships have not led to direct development or growth.)

During the time Firstbeat has received support from BF in different forms, the company's turnover has increased from 0 to € 20 million. According to Firstbeat, approximately 75 % of this is directly or indirectly attributable to the BF support.

### **HAVE THE RESULTS OF RESEARCH PROJECTS BEEN TAKEN INTO USE BY THE END USER?**

Firstbeat has participated in consortiums with a research focus. However, these projects were not as useful as other types of support. The PPP consortiums were seen as challenging, because partners come into the collaboration in with different objectives. From the viewpoint of Firstbeat such projects were put together just for the sake of receiving the funding for the partners, and if the partners did not have the same business interest in mind the outcomes were not that useful for Firstbeat. However, Firstbeat suggests that in a partnership with for example a bigger company (with market access) and a smaller one (in product development phase) the synergies when working together could be better.

### **CONTRIBUTION AND OVERALL LESSONS**

Firstbeat has received direct funding, been part of consortiums and also attended some visits arranged by Finpro. The company sees that the support it has received from BF has been crucial for their growth.

The services are important for different phases of company growth. Consultation services are seen as important in the beginning of the path. It is seen as valuable to get more structure into the development activities. Also, Firstbeat found it valuable to get consultation services from a service provider who is not on the private market.

The Finpro delegations were seen as valuable at Firstbeat, not necessarily because they can achieve direct benefits in the form of new business, but because a company can get a better understanding of the markets, competition and customer needs. This "reality check" forced Firstbeat to focus their development activities better. Firstbeat sees that there are synergies in working together with Finnish partners. But they see that it would be even more valuable to have Nordic collaboration, e.g. in trade fairs (e.g. in the US).

Firstbeat sees that it would be important first to have a good foothold in the domestic market before going international. However, according to Firstbeat, there are too many obstacles (regulatory) in Finland right now to foster real innovation and growth. They say that they needed to go to Singapore to continue product development testing, and bringing the product into the market.

The company sees that the services offered by BF are too detached from political decision making and that ministry representatives for example should be more closely involved both in programme planning and in also e.g. as part of advisory board in the actual projects. This way the development of technologies, product and services could be done in dialogue with the regulating authorities.

## CASE HUR

### SHORT INTRODUCTION

HUR produces and delivers exercise equipment targeted at the elderly population. FinlandCare Growth Programme has helped HUR in developing their concept of smart training equipment. FinlandCare is a programme that aims to bring together Finnish healthcare and well-being service providers. HUR was a very active member in the FinlandCare network.

### PROJECT BACKGROUND AND OBJECTIVES

FinlandCare is a programme aimed at bringing together Finnish healthcare and wellbeing service providers. The programme was launched by the Ministry of Economic affairs and Employment 2011, to support internationalisation of healthcare companies, and to promote export. The programme was operated by Finpro together with the Ministry and participating companies. To participate actively in the programme, the company paid a fee. There were 32 active member companies. According to the programme goals the members received: 1. a membership in an internationalisation network 2. potential for new business opportunities 3. the possibility to function under a joint brand (FinlandCare) and to participate in shared marketing under the brand 4. joint visibility under the FinlandCare brand. Also, other companies

could participate in FinlandCare events and delegation visits. The objectives of the FinlandCare programme were: internationalisation and improving competitiveness, establishing Finnish growth companies in international markets and creating awareness and demand for Finnish treatment, opening doors and helping Finnish healthcare companies create national and international contacts.

### PROJECT DEVELOPMENT AND ACTIVITIES

HUR produces and delivers exercise equipment targeted to the elderly population. FinlandCare Growth Programme has helped HUR in developing their smart training concept. During the FinlandCare programme, HUR launched a € 1.5 million project (the Gym Tonic project) together with Raisoft and the Kokkola University Consortium Chydenius, Department of Chemistry. The project consortium was created via FinlandCare networks and funded mainly by Lien Foundation partly as a result of FinlandCare partnership events and delegation visits.

HUR managed during their participation in FinlandCare to increase its sales to multiple Asian companies (e.g. Singapore Retirement Home Project). HUR fitness equipment for the needs of the elderly is currently in use in 23 nursing homes in Singapore. As a participant in FinlandCare HUR was also actively involved in promoting the internationalisation of Finnish health and care companies.

## RESULTS AND OUTCOMES

According to HUR the participation in Finland Care was a great success for the company. The company was a very active member in the FinlandCare network and felt that the participation had long lasting results.

HUR had products on the market at the time of the participation and they had already international customers, but they felt that the participation further enhanced the internationalisation of the company.

HUR states that the concrete results were international customers and sales growth. HUR further states that some of the direct outcomes were related to partnerships that were established between the Finnish companies who participated in the programme.

Thus, there were direct synergies for all members in the programme. If one company managed to get a new international customer, the other members could benefit from that. There had apparently been a great atmosphere of co-learning and co-development between the companies.

Some concrete results from the programme was the Gym Tonic project HUR put together with Raisoft and the Kokkola University of Chemistry.

## TEKES CONTRIBUTION AND OVERALL LESSONS

According to HUR the programme was a great success, and HUR feels that they got much more out of the programme than what the cost was to participate. However, HUR states that they themselves were very committed and also brought in other companies into events and visits and that they actively wanted the programme to succeed. The representative from HUR comments that you could see amongst the member companies that the most active ones were the ones that got the most out of the programme.

A similar programme could perhaps succeed also in the future, but the timing is of utmost importance. FinlandCare launched at a very opportune time and managed to build a platform as was its goal. FinlandCare even managed to develop into an established brand, and thus accomplished perhaps even more than originally planned.

However, HUR felt that in the end of their participation the programme lost its value-added. This was mainly due to changes within Finpro and the coordinators of the programme. HUR felt that due to changes in organisation of the programme the added value declined for HUR and to an extent the needs for support was not as acute, since HUR had already managed successfully to establish themselves in the Asian market.