How STPs can support the implementation of Industry 4.0-products in the health-tech sector

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Executive Summary
This study explores what role science and technology parks (STP) can play when aiming to increase knowledge regarding the implementation of products for the health, social welfare, and medical technology sector (health-tech), including Industry 4.0 technology-based products (products), on a national level in Sweden. Such products, have problems reaching the market due to increased complexity from a purchase perspective. In this study, an STP developed a guideline on implementation-advice based on user-needs, literature studies, and focus groups. The guideline was presented at a seminar, where representatives from all regions in Sweden attended. The STP initiated the project, developed the guideline, and disseminated it successfully at a national level. The guideline was evaluated six months after the seminar, indicating that it created value in practice. This indicates that STPs could take an active role supporting products in the health-tech sector. New seminars are planned, and further studies are suggested.

Background
Products are increasingly using Industry 4.0 technology, i.e. robotics, internet of things, and artificial intelligence (henceforth, products), for the health, social welfare, and medical technology sector (henceforth, health-tech). Hence, these products are becoming progressively more advanced and therefore more difficult to analyse from a purchase perspective. As a consequence, this prevent these products' possibilities to reach the market.

This problem affects not only the companies that have developed products in terms of decreased sales opportunities, but also the social and elderly care driven by the municipalities (welfare technology), as potentially good products may not be bought and used. Västerås Science Park (VSP), a science and technology park (STP) in Sweden, identified the slow and ineffective processes in municipalities regarding implementation of welfare technology as one of the major obstacles to successful commercialization of new digital innovations. In this paper, welfare technology, is defined as digital technology aiming at maintaining or increasing security, activity, participation or independence for a person who has or is at increased risk of having a disability.

Prior studies have shown that STPs may have a positive impact on SMEs' innovation performance when developing and providing innovation management services[1,2], and may therefore also have the ability to increase knowledge about implementation of health-tech products. Therefore, this study explores how an STP can increase knowledge regarding how to implement health-tech products in the social and elderly care market.

Main objective
The main objective of this study is to explore the STP's role when developing and disseminating a guideline tool (henceforth, guideline) regarding how to implement health-tech products for welfare technology, and to explore whether such guideline is of interest for those it concerns. If so, what

[1] Johnsson, M., Ekman, S., Wiktorsson, M., & Karlsson, T., (2010). Innovation Advising in practice: Four cases where the RAFT model has been used in environmental innovations, and how twenty-one STPs offers Innovation Advising. In *The XXVII IASP Conference,* Daedeok, Korea, May 23-26, 2010.
[2] Johnsson, M., & Karlsson, H., (2011). External Innovation Driver (EID) – a Developing and Organization Learning Service in Innovation Management. In: *The XXVIII IASP conference*, Copenhagen, Denmark, June 19-22, 2011.

content is important in this guideline, and what role would an STP have in its development and dissemination?

Method
This longitudinal project, spanning about 12 months, was funded through the project Smart4U, financed by the European Union, Tillväxtverket and the Region of Västmanland, a project aiming at, among others, to develop methodologies to implement new products in the area of health-tech sector. In the development of the guideline, the project leader was a senior advisor with extensive experience, such as ten years as project manager in developing eHealth, strategic advisor to municipalities, presenter at conferences in ten different countries, and about 25 years of experience as physical therapist in social elderly care.

The guideline was developed through five steps:
1) The problem was identified and framed to understand why health-tech products are difficult to implement, both from the end user- and innovation perspective. This work was conducted by two, in health-tech and welfare technology, well experienced VSP representatives.
2) The guideline was developed through data collection from, such as online references, including governance authorities, research institutes, and organisations within health-tech sector. In total, the guideline refers to thirty-eight digital sources, all retrieved in April 2018. The data was analyzed and structured into a logic process describing how new products could be implemented in the health-tech sector. The guideline emerged in iterations with a reference group through three workshops to ensure that proper quality was achieved.
3) The guideline, as it emerged, was tested on representatives from six municipalities in Sweden to provide feedback on understandability and usability and to determine strategic choices on the limitations and the scope, the level, and the structure of the guideline.
4) printed hard copies of the guideline were introduced to a network of innovation-advising organisations, that also approved the guideline's quality and usability.
5) As part of the dissemination work, hard copies of the guideline were sent to relevant receivers and a seminar was planned and conducted, where the guideline was presented to an audience. Additionally, the guideline was (and still is) free to download[3].

Result
In this section, the guideline is presented in brief, where content related to the objective stated with this study.

The Guideline
The final guideline was structured and demonstrated in seven chapters to provide a holistic picture of the implementation process, covering: Ch. 1) External analysis; Ch. 2) Change management; Ch. 3) Value creation modeling; Ch. 4) Administration; Ch. 5) Prerequisites; Ch. 6) Service design; and finally, Ch. 7) Implementation. Each of these chapters was divided into three to five subchapters to demonstrate more explicit advice. The reading structure was to some extent logic, not necessarily in chronologic order, as the practical work is iterative.

In the guideline, one will notice that Service design (Ch. 6) and implementation (Ch. 7) are two aspects that are undertaken in relation to each individual service that is to be implemented. Prerequisites (Ch.5) have more to do with common issues, on which all or most of the services are dependent. While administration (Ch.4) is a process that follows after implementation, at the same time it is also something that needs to already exist as part of the design and implementation process in order to succeed. Change management (Ch. 2) and value creation modeling (Ch. 3) are overall processes that permeate all other work. External analysis relates (Ch. 1) to what is happening around us all the time; without good, continuous external analysis, unnecessary mistakes will be made.

To ease the understanding of the content, as introduced above, three important elements were used, developed from the analysis of the problem and iterations with the reference group; 1) clearly marked sentences with advice and recommendations; 2) instructive original illustrations; 3) and adequately links to external information and practical examples. The guideline turns to

[3] http://www.valfardochhalsa.se/pages/Vagledning_For_Implementering_Av_Valfardsteknik, retrieved 2019-03-26.

politicians, decision-makers, strategists and development managers, investigators and project managers, business managers and personnel, and other functions that are covered by the work on introducing welfare technology, such as lawyers, procurers, IT staff and communicators.

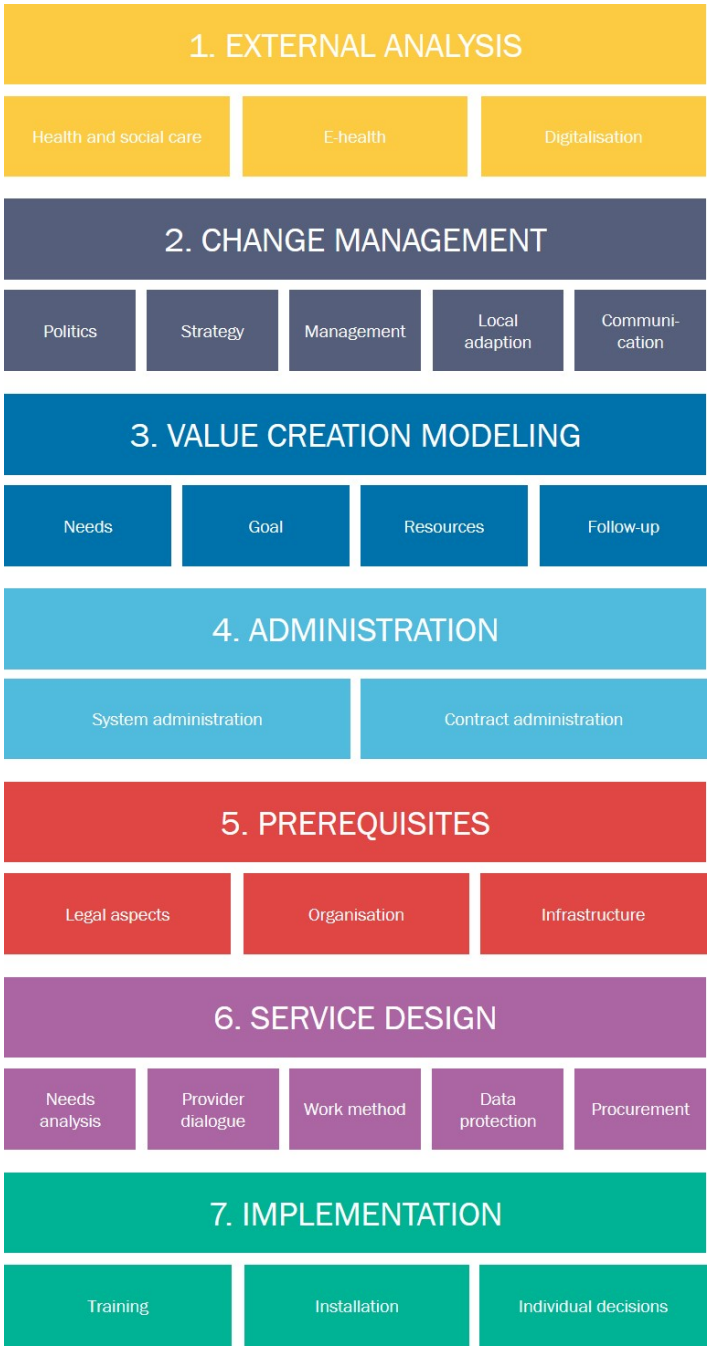

Figure 1: A holistic illustration of the guideline's structure and content.

In sum, the guideline aims to highlight that a successful implementation of welfare technology imposes particular demands on the social services when it comes to planning, competence and collaboration. In order for the implementation of new products to lead to permanent change and make a real difference to individuals and operational units/departments, a number of aspects need to be considered:

- External analysis and collaboration need to take place nationally, regionally and locally within the areas of operational development, e-health and digitalisation.
- The quality of the entire process needs to be assured through committed change management work that involves politics, the highest level of executive management and

operational managers. The work needs to be governed by strategic position-taking, and a strategic approach to the work involving communication is of the utmost importance.

- Clear effect/outcome goals related to identified and prioritized needs must be set, monitored and followed up. The practical realization of achieved effects/outcomes must be planned and executed in a cohesive process of value creation modeling.
- The future system and contract administration must be planned and prepared for from the very beginning. Sufficient resources need to be budgeted and allocated to ensure they can be maintained on a permanent basis.
- Regardless of which services that are to be implemented within welfare technology, certain fundamental, common prerequisites need to be met. Legal issues need to be highlighted, the distribution of organisational responsibilities needs to be clarified and mapped out, and the technical infrastructure, in the form of e.g. data communication and equipment, needs to be in place.
- For each service that is to be implemented, it is important to perform an operations-related and individual-centred needs analysis, conduct an ongoing provider dialogue, allocate sufficient resources, focus on a changed work method, ensure data protection, carry out a procurement process in the form of collaboration/partnering, and strive to achieve opportunities for co-creation with individuals, relatives and the civil society.
- No service, regardless of how promising it may seem, will create a real effect without a successful implementation process. Training, installation and decisions about who should be able to use the service are all vital parts of the implementation process.
- When implementation takes place with a holistic perspective, good conditions are created for a successful transition from project to a permanent change in work methods and operational performance.

CH1, EXTERNAL ANALYSIS

The first chapter is about external analysis. The implementation of welfare technology in health and social care is not, and should not be, an isolated process that is kept separate from other change and development processes. It is important to place planned activities in a context so that they occur in coherence with everything else that is happening, both within and outside the municipality. At the same time, this desire for coordination must not be allowed to become a reason for doing nothing and just waiting on other parties. Prior to an investment in welfare technology, it is important to at least gain an overall picture of what is happening within related areas such as operational development, e-health and digitalisation.

CH 1.1 Health and social care

It is, however, of fundamental importance that all work with welfare technology is based on well-described and prioritized needs within the operational units/departments, that it supports other development work that is ongoing, and that it takes place in close collaboration with the operational units/departments. In this context, the implementation of welfare technology in municipalities with external practitioners represents a special challenge. Regardless of who takes the initiative for the implementation of welfare technology, it needs to be harmonized with all parties' other operational development work. If some form of reorganisation is planned or ongoing within the operational units/departments involved, it is important to take this into consideration. The same applies if other major changes to work approaches and methods are ongoing. Sometimes it is possible to achieve synergy effects through coordination, and sometimes it is better to schedule the work so that the changes do not occur simultaneously.

CH 1.2 E-health

E-health is a term that relates to an area that is greater than welfare technology, and it covers, among other things, Electronic Health Record, EHR, and its equivalents in social care. Activities within welfare technology need to be designed with consideration of what is otherwise happening within the area of e-health, at both national and regional level. It is also important to be aware of and to plan in accordance with what is being done in other municipalities, and to seek collaboration with other municipalities when possible and relevant. In this work it is appropriate to use a combination of activities, such as research via the internet, study visits and relevant conferences.

CH 1.3 Digitalisation

Regional collaboration can facilitate both the procurement and the implementation of solutions within welfare technology. In order to succeed with such collaboration, it is necessary to have a mutual dialogue, whereby the unique conditions and circumstances of the parties involved are made known in the digitalisation process, so that common investments in things like infrastructure support the work within health and social care.

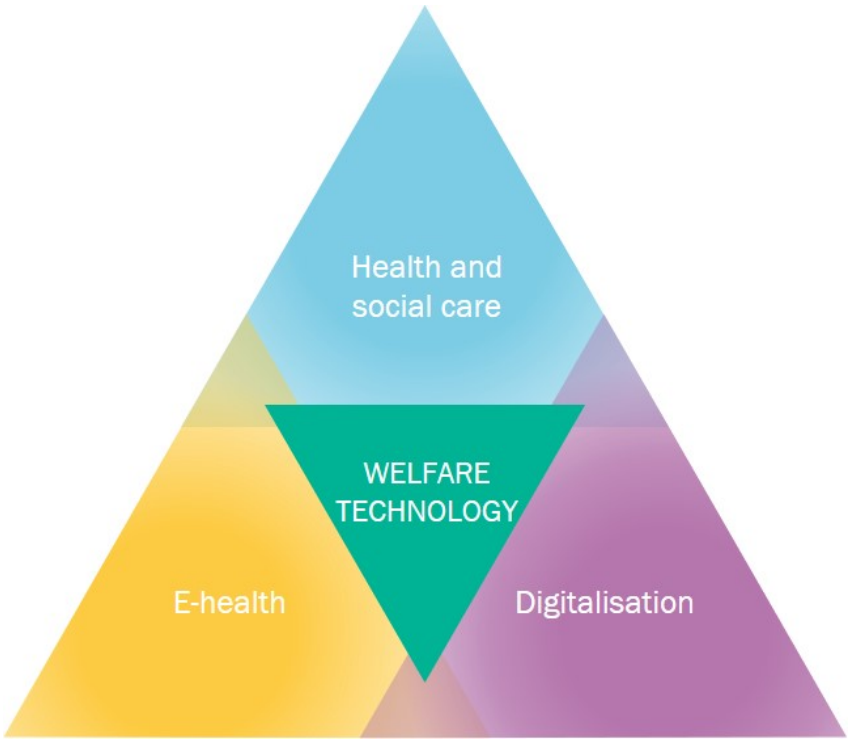

Figure 2: External fields of importance for welfare technology

CH2, CHANGE MANAGEMENT

The second chapter is about change management. Digital transformation is no different from any other type of change-related work. In order to succeed, it is necessary to consciously work with change management and to achieve integration with other change processes within five areas: politics, strategy, management, freedom to act, communication.

CH 2.1 Politics

The implementation of welfare technology is so pervasive when it comes to both the interaction with citizens and the internal operational processes, that it is of the utmost importance that politicians at various levels are involved in the work.

CH 2.2 Strategy

It is important to have a strategic focus on the work with welfare technology. If such a strategic focus does not exist, there is a major risk that the activities will simply become individual projects, with no coordination, prioritization or permanency. In the long term it is appropriate to produce a document of the type strategy, policy, or guideline. The strategy can address issues such as the overall purpose and goals of digitalisation, organisation, responsibilities and roles, and resource allocation. It can also deal with issues such as demarcation boundaries with regard to the municipality's undertaking versus that of the citizen, how the issue of what does or doesn't constitute a subsidized assistive technology is perceived, the grounds for prioritization between various possibilities/opportunities within digitalisation, and how innovation and welfare technology are viewed. The strategy can be very specific in relation to welfare technology and e-health, but it can also be a well-developed part of a more overall strategy, for example a strategy for digitalisation or for the development of the social services.

CH 2.3 Management

When all levels of management within the organisation are well-informed, motivated and actively involved in the work, conditions are created for the longevity (i.e. patience and endurance) and the focus that is needed in order to succeed with the implementation of welfare technology.

Sufficient priority needs to be given to both the planning and the activities. All managers need to be involved in and committed to the communication work, both internally in relation to employees, and externally in relation to citizens. As with the politicians, it is important that the highest level of executive management achieves a concrete understanding of the possibilities/opportunities and the challenges associated with welfare technology.

CH 2.4 Local adaptation

A particular challenge is represented by what is usually referred to as broad implementation or rollout. Quite often, the service design will have taken place in project form, or as a pilot study on a small scale. When the time then comes for the use of the service to be scaled up and become part of the everyday work in all operational units/departments, it is necessary to weigh up and find the right balance between, on the one hand, holding the methodology together so that it becomes uniform throughout the entire municipality, and on the other hand, creating a certain amount of freedom for the involvement of personnel and managers in each affected unit/department.

CH 2.5 Communication

It is easy to underestimate the importance of systematic and appropriate work with communication, both internally and externally. Communication strategists and communicators are often an undersized resource in the municipalities. It is therefore important to create a communication plan at an early stage of the process. As a minimum, a communication plan should at least describe the purpose, goals, message, target groups, channels, activities and persons responsible, and should contain a budget and schedule. Target groups that are important to reach in order to create involvement in the work include, among others, citizens, users, relatives, personnel, managers, stakeholder organisations (associations representing retired persons, disabled persons and relatives), staff organisations and business/collaboration partners. One generally successful way to reach a large number of target groups with a positive message regarding welfare technology is via local media, ideally through “in the home of” reports featuring satisfied users and their relatives. A report via radio, TV or a newspaper can have a tremendous impact if it features real “flesh and bones” people who are talking about how the technology has contributed positively to their level of security, independence, participation, activity or social contact.

CH3, VALUE CREATION MODELING.

The third chapter is about value creation modeling. The changes that are being made, for example in the form of digitalisation, always have one or more explicit or implied values (benefits) as goals. The values could be economic in nature or quality-related. It is important to systematically clarify the values that the solution is intended to achieve, and to monitor and follow up, not only whether the values actually arise, but also that they are used as intended, for example in the form of reduced cost increases, the freeing up of resources or more time for the users. It is important to clarify which values are expected to be achieved, and to try to quantify them to the greatest extent possible. State where the values arise, and how they are to be monitored and followed up. It is appropriate to clarify need, goal, economy, quality, resources and follow-up/monitoring as separate items when describing the value creation process.

CH 3.1 Needs

It is possible to spend major resources, in the form of surveys, focus groups and in-depth interviews, in order to capture descriptions of needs from all parties involved, i.e. citizens, users, personnel, etc. Sometimes it may be justified to collaborate with local universities in the form of research projects and/or student assignments. Other times, it may be more relevant to invite representatives from a number of different parties to attend a shared workshop, at which different stakeholders can work together to map out, describe and compare the needs that exist. It is recommended to use IBIC (a Swedish acronym for “Individens behov i centrum”, which literally translates as “The needs of the individual in focus” and is a needs-oriented and systematic work method), because the needs of the individual constitute an extremely important piece of information in the development of the solution.

During the work involving the needs analysis, a great many needs will always need to be described, all of which it is possible to meet with digital solutions. Consequently, it is important to adopt as objective and pedagogical an approach as possible when it comes to comparing the various needs, and assessing the potential associated with the implementation of digital solutions to meet them. In this work the use of interdisciplinary groups (i.e. groups consisting of representatives from different stakeholders) is recommended. Important parameters to assess include how many different values (benefits) are deemed to arise, resource allocation and consumption during both the implementation phase and ongoing operation, and alternative scenarios.

CH 3.2 Goal

Once the needs have been defined and prioritized, it is time to set the goal or goals, for example project goals, results, outcome, and/or effect goals. At least some of the goals should be of the SMART type, in other words Specific, Measurable, Agreed, Realistic and Time-bound. The goals should then remain in focus throughout the entire process, so that choices and decisions regarding various activities and resource allocations can be made in relation to the goals that have been set.

To meet economical goals are always of interest. There are often two sides to the economic calculations prior to the implementation of welfare technology: Expected costs and expected cost reductions. The costs should be described in terms of one-off costs and permanent costs.

Even though economical goals are important, quality is equally important. At some point in its development, society decided that elderly care and care for persons with disabilities is allowed to cost money, in order to create a worthy life for the individuals involved. Consequently, it is at least as important to emphasize the quality-related improvements that welfare technology achieves, as it is to talk about the economic effects. Equally, it is important to allocate resources to the measurement of the SMART goals that have been described above. Remember to involve users and relatives in the formulation and design of goals and the methods for measuring them.

CH 3.3 Resources

All change-related work requires the allocation of sufficient resources in order to succeed. The work can be organized in different ways; as a project with specifically allocated resources, or within the ordinary operational activities. Regardless of how the work is organized, it is important to identify and allocate resources in advance for all necessary activities, such as e.g. planning, needs analysis, provider dialogue, procurement, development of new work methods, training, installation and follow-up/monitoring. If the work is carried out in project form, it is important to ensure in good time that a successful handover takes place from the project to the ordinary operational units/departments. Many (otherwise successful) implementation projects have failed in the long run due to a failure to ensure the existence of sufficient resources, competence and procedures in the regular operational units/departments after completion of the project.

CH 3.4 Follow-up/monitoring

Follow-up/monitoring is a central and integrated part of change, measured in connection with the value creation modeling work, and it is always performed in relation to the previously set goals. The form of practical execution of the follow-up/monitoring process may vary depending on the particular conditions and circumstances. The follow-up/monitoring work may be performed by the municipality's own personnel, or by an external resource, for example a local university. It may be performed with the support of both qualitative and/or quantitative methods. The results of the follow-up/monitoring work need to be immediately disseminated to the "clients", i.e. politicians and decision-making executives, as well as to other relevant stakeholders, not least informants such as users and personnel.

CH4, ADMINISTRATION

The fourth chapter is about administration. New digital services need to be administered, in relation to both provider contracts and IT systems. A common mistake is to not start to think about these aspects until the contracts have been signed, the delivery has been completed and the services have been implemented. The conditions for successful system and contract administration are improved considerably if the entire implementation process and the future operation of the service or services are viewed as one cohesive process, and if the maintenance of that process is planned from the very beginning. In conjunction with the development of welfare technology, experienced system administrators should already be involved at the idea stage. In order to achieve successful contract administration, it is important to continue the close cooperation that the procurement officers and the operational managers have had during the rest of the purchasing

process, so that the administration does not become a responsibility for only one of the parties. An important aspect of contract administration is to commence preparations for future procurements in good time, so that an unnecessary panic due to shortage of time does not arise because the existing contract is about to expire without an extension option.

CH5, PREREQUISITES
The fifth chapter is about prerequisites. Irrespective of what type of welfare technology that is to be implemented, there are often a number of more general prerequisites that must be met, for example clarifications of legal issues, organisational distribution and technology and other infrastructure. Such prerequisites must be developed and implemented in connection with the implementation of the first service, which is why it is important to make the implementation as generalizable as possible, so that the work can be reused in conjunction with subsequent implementations.

CH 5.1 Law / legal aspects
Legal aspects regarding the individual, the use of the product and the product itself have a major influence on the implementation process. It could have to do with the issue of which individual is to be offered the possibility to use a new product, or how the product can/may be used, or it could concern the technology associated with the product in question. One way to achieve a good overview is to perform a consequence analysis that shows how the various aspects impact on one another, so that documented reasoning forms the basis for the implementation.

Figure 3: The relationship between welfare technology, assistive technology for daily life and medical devices

CH 5.2 Organisation
Strive to create a seamless care chain that offers coordinated services. One step on the path to achieving this is to keep all involved parties informed about planned measures that are to be carried out.

CH 5.3 Infrastructure
Reliable technical infrastructure is crucial to the implementation of welfare technology, and factors such as data communication, the availability of the services and power supply (among others) must be considered. Different solutions have different advantages and disadvantages associated with them, which can impact on reliability and costs. One way to gain a greater level of control is to request that API may be used by third-party providers, in order to be able to create better information flows between different systems.

CH6, SERVICE DESIGN
The sixth chapter is about service design. For each individual service that is to be implemented, a service design process is established to ensure that the service (or services) in question is designed appropriately and implemented permanently, and that it creates the expected values (benefits). The service design process becomes an integrated part of the change management process and the work involving value creation modeling. At this stage, focus is placed on one individual service, or on several closely related services that are to be implemented simultaneously. Based on the findings from the external analysis, needs analysis and provider dialogue, the new work method is developed. This can take place in a pilot project, in a test bed or as part of the ordinary operational activities. The procurement process is carried out and data protection is ensured, so that everything is ready for the implementation. Eight aspects of the service design process play a crucial role in

achieving the desired results: needs analysis, provider dialogue, the interplay between the needs analysis and the provider dialogue, the work method, dissemination, information security, procurement and co-creation.

CH 6.1 Needs analysis

A needs analysis has already been performed as part of the value creation modeling work. The purpose at that stage was to prioritize the needs into the order in which they would be met with welfare technology. In this phase it has more to do with gaining sufficient knowledge about the individual need, in order to be able to develop the work method and procure the right technology (i.e. technology that really does meet the need in question). When conducting this work it is important to ask the question: what are the real needs experienced by users, citizens and the operational units/departments? It is easy to get stuck on how services are currently offered/provided, and to believe that this represents a need or needs. In such case there is a risk that the new work methods that are developed in relation to the welfare technology will be far too similar to the old ones. For example, “being looked in on three times a night” is not a need. Rather, the individual who thus far has been checked up on three times a night is more in need of something along the lines of “secure and undisrupted sleep during the night”. The difference in how needs are formulated will impact on the analysis of which technical functions should be used. The purpose is to identify needs that can be met by e.g. technical development or the identification of relevant technology. Ideally, needs analyses should be performed through the conscious use of different knowledge collection methods such as e.g. interviews, observations, workshops, focus groups, inspiration days, surveys and statistics.

CH 6.2 Provider dialogue

A continuous, ongoing provider dialogue is an essential part of the implementation of welfare technology. This holds true in relation to all purchasing processes, but since the implementation of welfare technology often involves new solutions on a dynamic market where there is a lot going on all the time, both in relation to providers and services, it is of extra importance in this context. Important parts of the provider dialogue include e.g. various design and development phases, technology maturity, business models and different functions in future generations of the solution.

CH 6.3 Interplay between needs analysis and provider dialogue

The work process for needs analysis and provider dialogue is an iterative process in which the work connected with these two aspects overlaps and must be redone from time to time, based on continuous learning during the course of the design and development process, in order to make further progress.

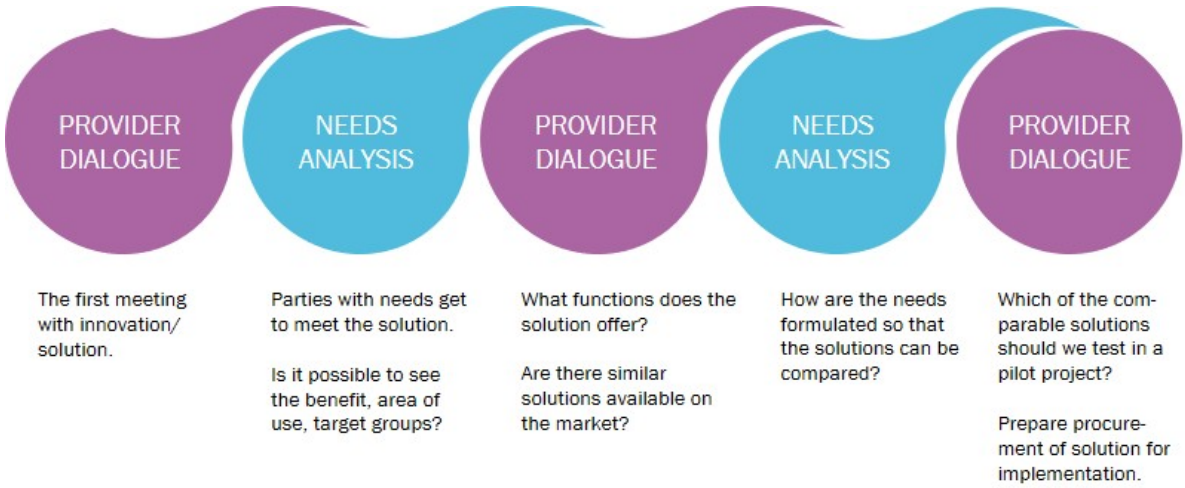

Figure 4: An iterative process in which market analysis and provider dialogue impact on one another.

CH 6.4 Work method

Developing a new work method requires both the right competence and sufficient resources. Consequently, such work is often best carried out in project form and on a small scale, prior to a broad implementation/rollout. It is of the utmost importance that those who will ultimately be

using the new work methods are made active participants in the work involving the development of the new work methods. The citizen/user also needs to be made a participant in the process in some way.

CH 6.5 Dissemination

Once the work methods have been developed, they need to be documented and disseminated to other operational units/departments in conjunction with a broad implementation/rollout. This aspect also requires the right competence and sufficient resources. It is worth taking a little extra time and effort to also develop methods for the dissemination work. A challenge is that those who have participated in the pilot project have had both extra support and a great deal of influence over the design and development of the work method.

CH 6.6 Data protection

Data protection has to do with ensuring the following four aspects:

- Availability, which means that the system can be used, and that it is possible to access data in the system when you need it.
- Confidentiality, which means that data is protected against unauthorized access through, for example, a secure login function so that it is clear who is using the system, and through the use of permissions so that the user can only access the data that he/she needs.
- Integrity, which means that the information that is presented in the system is correct.
- Traceability, which means that it is possible to retroactively see who has done what, when someone has had access, and who has entered or changed information.
  Procurement

CH 6.7 Procurement

Procurement, and in particular LOU (the Swedish Public Procurement Act), is often pointed to as one of the greatest obstacles to a faster and better implementation of welfare technology in health and social care. While there are certainly a number of challenges associated with the procurement process, the obstacles perceived/experienced are largely due to shortcomings in the municipalities' execution of the procurement process, rather than limitations imposed by LOU. Close cooperation between operational representatives and procurement officers is one of the keys to a successful procurement process. Three central aspects that need to be given consideration are: specifying functional requirements, specifying qualification criteria, and signing contracts that include a functionality guarantee/warranty for a specified period of time.

CH 6.7 Co-creation

With the major challenges that current demographic trends and developments entail, and the completely new possibilities and opportunities that digital technology offers, society must strive in the direction of increased "co-creation" in relation to users' everyday lives. A life event perspective can often be a good way to get closer to the implementation of welfare technology, not least in connection with the desire for co-creation. Together, a picture is created of how the individual, with his/her personal technology, can collaborate with society's resources and technology.

CH 7, IMPLEMENTATION.

The seventh chapter is about implementation. Far too often, investments in the implementation of welfare technology have come to a halt at the pilot project stage or in conjunction with an evaluation, and have never materialized into a permanent implementation in the ordinary operational units/departments. Ensuring that one considers all factors that are required for a successful implementation of welfare technology from the very beginning, is one way to be better equipped when it is time for a broad implementation/rollout and a transition to administration. The information below highlights three aspects that are of particular importance for a successful implementation: Training, Installation and support for Individual Decisions.

CH 7.1 Training

It is a requirement for all new work methods that those who will be using them in their everyday work must gain sufficient competence to feel secure in the use of the new methods. Training courses should be designed so that they address both the need for competence and skills development and the need to work with attitudes and values. Positive experiences have been gained from working in accordance with a three-step model when it comes to the implementation of

digital services in health and social care, a model that provides scope and time to process what is about to happen, which is a requirement for getting everyone on-board with the change process.

In brief, the model can be described as follows: Information - inspiration - training. Information has to do with ensuring that all involved parties are given overall and concise information about what is about to happen. The information can be provided at a workplace meeting or via email, on the intranet or in a video blog from management. Most important is to ensure that the information reaches everyone. Inspiration has to do with ensuring that the persons involved get to meet the service/services in question and are given scope and an opportunity to freely discuss it/them. Training in the use of the service is carried out directly in conjunction with its implementation. It is important that this training step has been preceded by the first two steps, in order to avoid the risk of problems arising during the implementation.

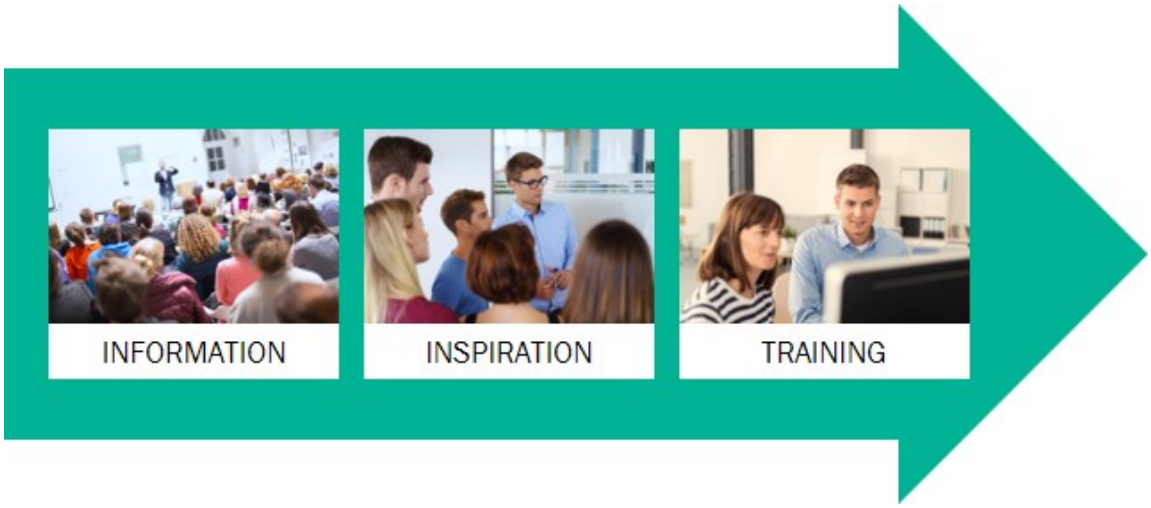

Figure 5: The three-step model for training.

CH 7.2 Installation

Most welfare technology solutions require some form of configuration and/or installation. Sometimes products need to be installed/assembled in the home or at a residential care facility for elderly or disabled persons, and sometimes mobile products need to be configured for use. On other occasions, software needs to be installed in the staff member's and/or the individual's equipment. Regardless of the specific situation, it is crucial to begin planning at an early stage in terms of who will do what, when it will be done, and how. It is, among other things, important to ensure that the technology provider's responsibility in this regard (if applicable) has already been regulated in the requirements specification prior to procurement of the service.

- Who: Perform a thorough analysis of the alternatives available when it comes to the question of who is to do the installation, and ensure that it is possible to maintain a sufficient level of competence, continuity and preparedness if a staff member is absent or terminates his/her employment.
- When: Analyze the needs, and assess how cost-driving it is to specify short response times as a requirement. Be clear about procedures and follow-up/monitoring processes, regardless of whether it is the organisation's own personnel or an external party that is responsible for the installations.
- How: When permanent installation/assembly is required in an ordinary home or a residential care facility, it is important to determine how the installation is to be performed, and how big structural impact is allowed in the home/residence.

Some modern welfare technology solutions may require that trained personnel perform the disassembly and removal of the product, and as a rule the procedures do not permit the use of a key to gain access to the home/apartment when no one is there. Ensure that there are procedures prepared and in place for how the disassembly and removal is to be executed.

CH 7.3 Individual decisions

Even if all of the other preceding steps have been carried out, experience has shown that it is still difficult to achieve an increase in the volume of digital services. This is due to uncertainty or a lack of resources for care managers, contact persons, or operational managers to make decisions for the individual concerned. In order to facilitate the decision-making process, it is important to ensure that key persons:

- have clear procedures and sufficient time available, especially during the implementation phase;
- receive sufficient (and ideally repeated) training;
- have access to communication material and support in the communication with the individuals and their relatives;
- are given guidance and continuous support; and
- are monitored/followed up to check how things are going and to identify what challenges they are perceiving/experiencing.

Quality check of the guideline

During the development of the guideline, it was first introduced at a network meeting with innovation advising organisations, all offering advice to SMEs. These organisations served as a final test group for the guideline, as the organisations were knowledgeable about the implementation of health-tech products for welfare technology.

Dissemination of the guideline

As the overall impression was positive at the first introduction, the guideline was printed and sent to all 290 city councils, located in 21 regions, in Sweden. A seminar was planned in collaboration with a network of innovation-advising organisations within health-tech, executed four months after the first introduction. At the seminar, 128 participants representing all regions of Sweden attended. And, at the time of the seminar, the guideline was downloaded 898 times from www.valfardochhalsa.se, a platform supporting e.g. innovation advisors, SMEs, providers, and purchasers of health-tech products with relevant information in the health-tech and welfare technology sector. Two months after the seminar, the number of downloads had increased to 1.123, and after another four months, the guideline had been downloaded 2.204 times.

During the seminar, it was recognized that different municipalities, even though they usually do not work together, share a lot of experiences in this topic. It was also recognized that, when specialists within different areas meet, as e.g. social care, IT and end users, new insight and knowledge is built. Additionally, it was highlighted that the guideline served as valuable information to SMEs developing new products, as they could use it to better understand the market for which they were aiming.

To support further development and dissemination, the guideline is published as “open content” through Creative Common licence (CC-BY-NC-SA 4.0) This means that the guideline is free to download, use, spread, modify, build on, and to create new material from. The condition is that the new work is licensed in the same way.

A follow-up of the attendees at the seminar was conducted five months after the seminar, where 45 persons completed a questionnaire consisting of three questions, as demonstrated in Table 1:

Table 1. Results from questionnaire related to the seminar

Question & no of Yes/No	**Examples of quotes (respondents answering yes)**
1.Has the guideline been to any use? (Yes=37, No=8) 33 positive quotes 1 non-positive quote	Good overview on the topic
	The structure of the guideline has helped us find our own structure
	We use the guideline when we are going to do an investigation and feasibility study.
	To demonstrate the complexity.
	It gave me insight that knowledge about the users of the procured technology is lacking. It

	also became clear that the author and the organizer totally lacked insight and interest about work organisation, processes, environment, risk and consequences for co-operation.”
Have you had any concrete use participating in the seminar? (Yes=20, No=17) 15 positive quotes 0 non-positive quote	I have used the document as template, many questions were more comprehensive but practical tips are used.
	How I would set up the communication plan for implementation.
	I have quoted the report, commented on it in context, received interesting contacts and will make study visits.
If you are not from this region, would you like us to organize a similar seminar in your region? (Yes=14, No=17s)	Out of “14 yes”, there were 8 concrete suggestions for future seminars.

Discussion, conclusions and future work

In this study, VSP identified not only lack of knowledge regarding how to implement health-tech products but also initiated and developed a guideline serving as an educational tool, that both social and elderly care technology and SMEs benefit from. Additionally, VSP co-organised a seminar, attracting attendants from all parts of the country to take part of the guideline’s content.

Referring to the objective stated for this paper, this study showed that STPs may have not only the potential to identify important problems in society, but also the capability to develop solutions that have a great impact in a specific area and successfully disseminate results. As in this study, in health care and social welfare. Meaning, STPs can be an active part, making a difference where it finds it necessary and value creating. Further, as the questionnaire demonstrates that the guideline is usable in practice, it can contribute to increased number of products entering the market, and that the actors in the social welfare market can share experiences and networks.

In conclusion, a guideline that is explained through a mix of information, hands-on advice, and examples serves as a useful tool to start increasing the knowledge regarding implementation of health-tech products. It may also support SMEs in the development process of new health-tech products. The number of participants at the seminar and the number of downloads revealed great interest in the guideline, considering that there were representatives from all regions of Sweden at the seminar.

As a result of the successful seminar, VSP is planning to conduct more seminars for further dissemination and adoption. Therefore, it is suggested that future studies continue focusing on the adoption and value creation. Further, what results it is generating over time through future seminars and practical use. However, one should be aware of that the guideline was developed in a Swedish context before considering implementation elsewhere, as the conditions most likely differ in other countries.