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# D4.1 Business Plan and Deployment Report

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<b>Abstract (for dissemination)</b>	<p>Dementia is a major public health problem with enormous costs to society [1]. A major element of the economic impact of caring for people with dementia is the increasing risk of requiring admission to residential care [4]. Most services tested during the RemoDem project focuses on assisting persons with dementia to stay in their own homes as long as possible.</p> <p>In the Faroe Islands and the two municipalities in Norrbotten, iPads has been tested as a tool to improve the communications and support from home care services to persons with dementia and their families. In Western Isles, the Giraff has been tested with the same goal. In Norrbotten, a GPS-based safety alarm and cameras for nightly supervisions of users have also been tested.</p> <p>The tests of the RemoDem services indicate saved travel costs and saved time for health care staff when ICT-tools are implemented in the home care services. The longer the distances from the users to home care headquarters and the more avoided physical visits, the greater the savings from avoided travels are.</p> <p>Funds for investments as well as training and technical support must be allocated by central or local authorities. Costs of broadband connections will probably be covered by the users.</p> <p>The project has generated promising results, but all services require further testing.</p>	

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## Executive Summary

Dementia is a major public health problem with enormous costs to society [1]. An ageing population means a substantial increase in persons with dementia [2] and costs of caring for people with dementia will therefore increase dramatically the coming years [3].

A major element of the economic impact of caring for people with dementia is the increasing risk of requiring admission to residential care [4]. Most services tested during the project focuses on assisting persons with dementia to stay in their own homes as long as possible. In the Faroe Islands as well as Pajala and Arvidsjaur municipalities in Norrbotten, iPads has been tested as a tool to improve the communications and support from the local service providers (municipal home help services) to persons with dementia and their families. In Western Isles, the Giraff has been tested with the same goal. In Norrbotten, a GPS-based safety alarm and cameras for nightly supervisions of users have also been tested.

The tests of the RemoDem services indicate saved travel costs and saved time for health care staff when ICT-tools are implemented in the home care services in rural areas. The longer the distances from the users to home care headquarters and the more avoided physical visits, the greater the savings from avoided travels are. If for instance the iPad or broadband connection is used for other services, cost-effectiveness increases. These services may also be suitable for persons with other diseases and other needs than those of dementia patients. In the longer run, it is expected that the services may contribute to enhancing the feeling of safety for persons with dementia and their family, possibly resulting in delayed admittance in nursing homes.

To implement the services in large scale, routines for technical support and training must be generated for most services. Funds for investments in equipment as well as training and technical support must be allocated by central or local authorities. Costs of broadband connections will probably be covered by the users.

In all test sites there were few participants and thus little data was generated. Nevertheless, the project has generated promising results, but all services require further testing to produce data to enable a thorough evaluation of all aspects concerning the implementation of the services in large scale.



## Abbreviations and Acronyms

DKK	Danish Krone (Currency)
DRG	Diagnosis Related Group
EHR	Electronic Health Record
GP	General Practitioner
GPS	Global Positioning Service
ICT	Information and Communication Technology
NHS	National Health Service
SEK	Swedish Krona (Currency)



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# 1. Introduction

## 1.1 Purpose of this document

Dementia is a major public health problem with enormous costs to society [1]. An ageing population means a substantial increase in persons with dementia [2] and costs of caring for people with dementia will therefore increase dramatically the coming years [3]. A major element of the economic impact of caring for people with dementia is the increasing risk of requiring admission to residential care [4]. Most services tested during the project focuses on assisting persons with dementia to stay in their own homes as long as possible. Different services have been tested in the Faroe Islands, Pajala and Arvidsjaur municipalities in Norrbotten, Sweden and the Western Isles in Scotland.

The Business Plan and Deployment Report includes a description of the disease and the tested RemoDem services, as well as results from the economic evaluations at the test sites. Short business cases have been created where data is available.

Technical, organizational and economic issues which arise when planning the implementation of new services in the health care services are discussed and analyses of whether it is possible to implement the service in large scale within the existing regulations are presented.

This report compiles the results from the Business Plans and Deployment Reports for the different partners. The complete plans are set out in Appendices A-C.

## 1.2 Dementia

Dementia is a word for a group of symptoms caused by disorders that affect the brain. Dementia is not a specific disease. It's an overall term that describes a wide range of symptoms associated with a decline in memory or other thinking skills severe enough to reduce a person's ability to perform everyday activities. People with dementia may not be able to think well enough to do normal activities, such as getting dressed or eating. They may lose their ability to solve problems or control their emotions. Their personalities may change. They may become agitated or see things that are not there [5]. Most dementia symptoms are progressive. The prevalence of dementia increases dramatically with age and as more people are living longer, dementia is becoming more common.

Many causes of dementia symptoms exist [5]:

- Alzheimer's disease. This is the most common form of dementia, a group of disorders that impairs mental functioning. Its most common symptoms are short-term memory loss and word-finding difficulties. This is the most common type of dementia; it accounts for an estimated 60 to 80 percent of all cases. Alzheimer's is progressive and irreversible.
- Frontotemporal Dementia. This is an umbrella term for a diverse group of rare disorders which primarily affect the frontal and temporal lobes of the brain.



- Huntington's disease. The disease is a result of genetically programmed degeneration of brain cells. It is a familial disease.
- Vascular dementia. This is an umbrella term that describes impairments in cognitive function caused by problems in blood vessel that feed the brain.
- Wernicke-Korsakoff Syndrome. The syndrome involves loss of specific brain functions caused by a thiamine deficiency.
- Dementia with Lewy Bodies. The disease is caused by the build-up of accumulated bits of alpha-synuclein protein in the areas of the brain which control particular aspects of memory and motor control.



## 2. Description of RemoDem services

### 2.1 Communication Tools

#### 2.1.1 iPads

iPads are tested as a tool for improved support for people with dementia (users) and their family. The iPads is used by the users and their family to communicate with the home care services, home nursing services, and other health staff.

The service is offered to persons with dementia living in their own homes. Different iPad-services have been tested in in the Faroe Islands as well as both Norrbotten municipalities.

#### 2.1.2 Giraff

Home visits to persons with dementia can be made via the Giraff, which is a remote controlled mobile device with a camera and monitor providing remote assistance and security to the elderly in their own homes. Home care staff and friends or family may call the person with dementia from their computer. The caller may control the Giraff from the computer, moving around in the user's home. The user may also call from the Giraff, using a remote control. The service has been tested in the Western Isles.

### 2.2 Night Cameras

Many persons with dementia living in their own homes need supervision during the night. Home care staff is therefore scheduled to visit to check their condition at appointed times during the night. Night cameras installed in the user's home make these visits redundant. Health staff are able to check the users' condition at scheduled times without leaving their office. Pictures are not recorded or saved. Night cameras have been tested in Arvidsjaur.

### 2.3 GPS

The Posifon wrist band is a GPS-tool suitable for assisting users to navigate when being outdoors. The wrist band contains a GPS, an alarm button and a mobile phone. When the user pushes the alarm button, the phone calls or sends messages to family or health staff. A map service informs of the user's position.

The service has been tested in Pajala and Arvidsjaur for persons in the early stages of dementia.

### 2.4 Dementia Friendly Community

NHS Western Isles is currently working in partnership with local businesses across the Western Isles that have an ambition to become Dementia Friendly. The Dementia Friendly initiative aims to give public recognition and support to shops, businesses and towns across the Western Isles that are taking steps towards being more inclusive towards people with dementia.



### 3. Business Plans and Deployment Reports for the regions

A major element of the economic impact for caring for persons with dementia is the increasing risk of requiring admission to residential care [4]. An English study estimated that almost 69 % of total costs of caring for persons with dementia are costs of institutional care [6]. Most services tested during the project focuses on assisting persons with dementia to stay in their own homes as long as possible. In the Faroe Islands and the two municipalities in Norrbotten iPads has been tested as a tool to improve the communications and support from the local service providers to persons with dementia and their families. In Western Isles, the Giraff has been tested with the same goal.

In this chapter a summary of test results are presented. See Appendices A, B and C for a more thorough review of results and analyses.

#### 3.1 Faroe Islands

##### 3.1.1 Introduction

This section focuses on a service consisting of contact persons who communicate with persons with dementia and their family via iPads and iPhones (Skype or Facetime). Contact persons for persons with dementia, where each family is assigned a dementia coordinator and an occupational therapist as contact persons, is a new service in the Faroe Islands.

##### 3.1.2. Tests

Test participants were recruited by informing all citizens over 60 years in the test areas about the project by distributing newsletters. Seven users and seven participants of the multidisciplinary health staff team (two occupational therapists and five nurses and assistants) received iPads and participated in the tests.

No schedule for the use of iPads was planned for the testing period; the iPads were to be used according to the individual user's needs. At the end of the test, three of the users still use their iPad; two use it for communication with the contact persons, but one also to keep in touch with family living abroad. The iPads have also been used for activities like reading, listening to music and games. None of the relatives have used the iPad for communication with the contact persons. The other test participants stopped using the iPad during the testing period as their dementia had progressed.

##### 3.1.3 Business Case

The table show the annual economic result for Allmannaverkið per user when implementing iPad-visits. The result depends on the distance the user lives from the home care headquarters. It is assumed that one physical visit per week is substituted by a visit via iPad and that broadband costs are covered by the users or their family. A three year lifetime for iPads is assumed and a discount rate of 3.5 is used to calculate annual capital costs. An annual maintenance cost of 10 % of purchase price is included in this cost.



Costs of training health care staff and technical support are not included in these calculations and neither are avoided costs from delayed nursing home admittance. Based on the assumptions presented above, break even (costs equal saved costs) is estimated at 1.4 kilometres.

Distance to HQ	Annual capital costs in DKK (€)	Saved travel costs in DKK (€)	Saved time costs in DKK (€) <sup>1</sup>	Result in DKK (€)
5 kilometres	1,232 (165€)	1,986 (267€)	2,508 (337€)	3,262 (438 €)
10 kilometres	1,232 (165€)	3,972 (533€)	5,016 (673€)	7,756 (1,041€)
20 kilometres	1,232 (165€)	7,944 (1,066€)	10,032 (1,347€)	16,744 (2,248€)

Table 1: Annual economic result (2013-prices) for the Allmannaverkið per user if users live 5, 10, and 20 kilometres from home care headquarters

### 3.1.4 Deployment

The project group will recommend to the Allmannaverkið to implement contact persons for persons with dementia and their family in routine operation.

The iPads can also be used for replacing physical visit by the home health service for other user groups, for instance for supervision visits as well as monitoring of blood glucose level and blood pressure or other monitoring issues.

## 3.2 Norrbotten

### 3.2.1 Introduction

RemoDem services are tested in two rural municipalities in Norrbotten: Pajala and Arvidsjaur. Framework conditions are similar in the two municipalities. In addition, similar services are tested. Therefore, evaluation results and business cases are jointly reported for the municipalities.

The services iPads for improved support, night cameras and GPS watches are tested during the project period. All tested services build on already existing services, but new tools for delivering the services are introduced: Physical visits are replaced by virtual visits (iPads), night cameras also replace physical visits and the GPS wristband replace existing safety alarms.

### 3.2.2. Tests

iPads are tested in both municipalities as a tool for improved support for people with dementia (users) and their family. In Pajala, the iPads have been used for communication between family of persons with dementia and contact persons in home care, as well as between family and persons with dementia. Four users completed the five month test. In Arvidsjaur, the iPads is used by the users and their family to communicate with the home care services, home nursing services, and other health staff. One person tested the tool in

<sup>1</sup> An average travel distance of 70 kilometres per hour is assumed.

Arvidsjaur for six months. While the users employ iPads, health care staff uses PCs and web cameras.

The GPS wristband was tested in both municipalities; four users in Pajala and two users in Arvidsjaur. During the test, all wristbands have been linked to family of the users.

The night cameras have been tested by two users in Arvidsjaur.

### 3.2.3 Business case

All tests had few participants and are too short to give conclusive evidence on costs and savings. Nevertheless, the results point at saved costs and saved time for health care staff when face-to-face meetings are replaced with virtual meetings via iPads. Saved travels are specifically important in rural areas where health care staff drives long distances to offer home care services to the users

Table 2 shows that the economic result depends on the distance the user lives from home care service headquarters. It is assumed that one physical visit per month is substituted by a visit via iPad and that broadband costs are covered by the users or their family. A three year lifetime for iPads is assumed and a discount rate of 3.5 is used to calculate annual capital costs. An annual maintenance cost of 10 % of purchase price is included in this cost. Based on the assumptions presented above, break even (costs equal saved costs) is estimated at 6.6 kilometres.

Distance to HQ	Annual capital costs in SEK (€)	Saved travel costs in SEK (€)	Saved time costs in SEK (€)	Result in SEK (€)
<b>5 kilometres</b>	1,828 (203€)	348 (39€)	360 (40€)	-1,120 (-124€)
<b>10 kilometres</b>	1,828 (203€)	696 (77€)	720 (80€)	412 (46€)
<b>20 kilometres</b>	1,828 (203€)	1,392 (155€)	1,440 (160€)	1,004 (112€)
<b>50 kilometres</b>	1,828 (203€)	3,480 (387€)	3,600 (400€)	5,252 (584€)

Table 2: Annual economic result (2014-prices) per user if users live 5, 10, 20 and 50 kilometres from home care headquarters.

The results from the tests indicate that it is likely that the investments will be earned/paid back during the first year after implementation. See Appendix B for a more thorough report on tests and results.

Business cases have not been made for the two other services (GPS wristband and night camera) as there was not sufficient data available from the tests.

### 3.2.4 Deployment

The implementation of the services demands investments in equipment and training. In most cases, a technical support service must also be available. Allocation of funds for this purpose must be allocated by the municipalities. The present organization has the necessary competencies to handle the new services, but will have to rely on ICT-support from other municipal departments. During the test period, there have been problems with mobile broadband connections.



The municipal service provider allocates home care services to the users according to their individual needs. If the tested services are implemented as a routine service, the service will be allocated based on the same principles.

The municipality will cover the service costs, but there are user fees for receiving all home care services. This principle will also apply for this service. The users will probably be required to cover costs of broadband connection themselves.

In Arvidsjaur, the iPad service did not work very well due to technical problems. The service will not be implemented between health care staff and users or their family.

The family contact persons in Pajala thinks that the iPad service has worked well, but the decision whether to implement the service will be made by the municipality.

IPads can be used for many other purposes in the home care services. Physical supervision visits may be replaced by iPad visits. It is also possible for occupational therapists and physical therapists to follow-up the users via iPad. iPad services may also be suitable for other user groups. The more services the user's iPad is used for, the higher the possible cost-effectiveness of the investment will be.

The test of the GPS wristband showed positive results, but the municipalities must allocate funds for investment in equipment if the home care service is going to provide the service permanently. Because there are ethical issues concerning this service, a special procedure including the dementia team may be introduced during the allocation process. It is not clear how many people with dementia in the municipalities that would benefit from the service.

The results from the tests of night cameras were positive in Arvidsjaur. To implement the service, support from the municipal ICT-department is necessary. There are currently five potential users.

Further testing is needed to demonstrate costs and benefits of implementing these services.

### 3.3 Western Isles

#### 3.3.1 Introduction

In the Western Isles, a selection of assistive technologies (sensor mats, radio calendar clocks, wander reminders and proximity voice memos) as well as the Giraff, a tool for remote communication, has been tested. In this chapter, the tests and results are presented.

#### 3.3.2 Tests

Problems with the Internet connection on the Western Isles have made it difficult to carry out a trial of any length of the Giraff. The test was completed during one day at a day care centre. Present was eight persons with dementia and ten staff of different professions.

Prior to the test, the Giraff got negative publicity in the local press and there was much hostility from both carers and staff regarding the Giraff. On the day of the test, the sound didn't work and the head of the Giraff did not tip down. However as the Giraff was being controlled from another room, leaving the door open made it possible to hear clearly the person controlling the Giraff.



All eight people with dementia received the Giraff well. The staff thinks that the Giraff will be an excellent aid for those in early stages of dementia and provide a good way of communication when it might otherwise not be possible. In their opinion it would be good for being able to do additional checks, particularly at times when the relative cannot be reached by telephone.

The project team is now working closely together with the Shetland partners to test the Giraff in an area with good Internet connections.

In addition to the Giraff, different types of assistive technology have been tested. In all 35 items of sensor mats, radio calendar clocks, wander reminders and proximity voice memos have been deployed with users.

### 3.3.3 Business case

Complete evaluation has not been possible due to time constraints and circumstances. In the longer term and with more time for trial and evaluation, the cost of supplying Giraff could be measured against the cost of admitting someone into hospital or residential care. The Giraff probably would turn out to be the most cost-effective solution.

The potential benefits of the tested services are for the 315 people currently diagnosed with dementia, their families, informal carers and professional health and social care staff.

### 3.3.4 Deployment

Decisions on the implementation of any new services would be taken at the highest level of Health and Local Authority services. However, new ways of working inherent within the Remodem Project have not been regarded as entirely new services but a way of enhancing and improving existing services. Consequently it is and will remain, largely, government funded. There are no user fees for these services.

The short term nature of the project has not been long enough to effectively evaluate any aspect of this project. However, there has been significant progress in highlighting dementia, the needs of service users and their carers and generating interest in professional and public circles. The Giraff type technology is not only suitable for persons with dementia. It is also viewed as the way ahead for people with any long term condition, living in remote and rural areas and who require support in self-managing their condition or when health and social care staff require daily contact (possibly during a temporary exacerbation or another short term condition worsening the situation or in the temporary absence of a carer) and travelling would be an issue. Additionally, it could allow family, living at a distance, the reassurance of multiple daily contacts, if required or desired. This is particularly pertinent to island communities. There is huge potential for this type of technology in both rural and urban areas.

Qualifications, knowledge base, experience and competencies needed to offer the service are in place across the health and social care sectors.

There may be issues regarding responsibilities and privacy (including transfer of sensitive information where this might apply). The short term nature of the programme has not given time to consider these in any great detail.

There is a lack of infrastructure in the Islands. Broadband is necessary for using the Giraff and similar technologies which could be introduced to assist people in isolated situations. Broadband speed is not consistent even in the better serviced areas. In some areas it is so weak as to be unusable. This is detrimental to the use of technology and creates inequity of service provision.



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## 4. Conclusions

The tests of the RemoDem services indicate saved travel costs and saved time for health care staff when ICT-tools are implemented in the home care services in rural areas. In the table below, costs and savings per patient for virtual communication services are shown, assuming that one physical visit per week (Faroes) or one visit per month (Norrbotten) is replaced by virtual visits for users living 10 and 20 kilometres from home care headquarters. The longer the distances from the users to home care headquarters and the higher frequency of avoided physical visits, the greater the savings for avoided travels are. Although there are variations in the figures for each region, the results show that there is a huge potential for these types of technology in remote and rural areas.

Service	Annual capital costs per patient	Annual net savings per patient	
		10 kilometres	20 kilometres
<b>IPads</b>			
Norrbotten	1,828 SEK (203€)	720 SEK (80€)	1,004 SEK (112€)
Faroe Islands	1,232 DKK (165€)	7,756 DKK(1,041€)	16,744 DKK(2,248€)
<b>Giraff</b>			
Western Isles	£ 7,500 (9,146€)	-	-

Table 3: Summary of annual costs and savings in national currency and euros.

If for instance the iPad or broadband connection is used for other services, cost-effectiveness increases. These services may also be suitable for persons with other diseases and other needs than those of dementia patients.

In the longer run, it is expected that the services may contribute to enhancing the feeling of safety for persons with dementia and their family, possibly resulting in delayed admittance in nursing homes.

To implement the services in large scale, routines for technical support and training must be generated for most services. Funds for investments in equipment as well as training and technical support must be allocated by central or local authorities. Costs of broadband connections will probably be covered by the users.

Most tested services are a new way of offering existing services. The allocation of these services to the users will follow established routines for allocation of home care services in all participating regions. In some of the regions there are user fees for receiving home care services. This regulation will also apply for RemoDem services when implemented in routine operation.

During the test period, several of the partners experienced technical difficulties. Examples are poor Internet connections which hampers services requiring connectivity or problems with mobile broadband connections.

In all test sites there were few participants and thus little data was generated. Nevertheless, the project has generated promising results, but all services need further testing to produce data to

enable a thorough evaluation of all aspects concerning the implementation of the services in large scale.

## A. Appendix: Business Case Description for the Faroe Islands

### A.1 Introduction

In this chapter, the use of iPads and iPhones for communication between dementia contact persons and the person with dementia and/or family is analysed.

The chapter starts with a brief description of the region and the municipalities, followed by a description of the health- and care services and dementia services. The RemoDem services will be described and economic results analysed before the potential for deployment of the services in routine operation will be examined.

### A.2 Market Analysis

#### A.2.1 General Characteristics of the Faroe Islands

The Faroe Islands lie northwest of Scotland and halfway between Iceland and Norway. The archipelago is composed of 18 islands covering 1399 km<sup>2</sup> and is 113 kilometres long and 75 kilometres wide. In 2010, the population was almost 50,000 people.

The Faroe Islands have been a self-governing country within the Danish Realm since 1948. Administratively, the islands are divided into 30 municipalities within which there are about 120 settlements.

#### A.2.2 The Faroese Health and Social Services [8]

The health service is managed by the Faroese home rule. The structure of the hospital/specialist health service is similar to the Danish system. The same applies to nursing homes, home nursing and home care and dental treatment. The health- and social care system is financed by the Faroese authorities. The general practitioners are all public employees, but are mainly remunerated per benefit from the public health funds. They are administered both by local authorities and the state authorities.

All Faroese citizens over 18 years pay 265 DKK (36€) per month in health insurance tax. All treatment from hospital, local doctor and emergency room and are paid by the authorities. There are three hospitals with a total of 240 beds. Non-emergency referrals to the Hospital System during normal working hours are routinely made by the General Practitioners located throughout the country.

The new EHR (electronic health record) system was implemented in 2011. All three hospitals and all local doctors (general practitioners) are now part of a single system.

In May 2012, work started on a new Faroese health plan. The plan's purpose is to reorganize the health care system and make the service more efficient. Focus areas are the prioritization of preventive action, increased emphasis on self-management for chronic patients, holistic approach to health care and the consideration that hospitals are staff intensive and therefore are of great importance for the local economy. In addition, a target area is greater involvement of all citizens in their treatment.

### A.2.2.1 Economics

About three-quarters of the health and social services are financed through block grants from the state. The remainder is financed through a basic contribution from the municipalities and activity-related grants (Danish Diagnosis-related Group (DRG) system). There are no user fees.

Medical expenses are covered partly by health insurance contributions and partly by the user. Pensioners are reimbursed user payments above a certain amount. Medicine may also be granted by the Care Law.

In the Faroes both the health and social services are publicly provided and are administered by the national government (Allmannaverkið). The intention is that from 1 January 2014 the responsibility of The Home Health Service (Eldradepilin) will be dispersed to seven local areas, which then will be administered by the municipalities. Even though care for the elderly at the moment officially is the responsibility of the national authorities several local municipalities have already invested in homes for the elderly while others have not. In addition, Area 1 has established a preventive home visiting service.

The responsibilities of the national government are:

- Pays for employee salaries, excluding night watches on elderly homes built by local municipalities.
- Provides financial support to the municipalities for transport to day care, doctor's appointments, physiotherapy, hair dresser, food provision etc.
- Day care for Persons with dementia in Area 4.
- Provides medical equipment on loan for patients living at home, free of charge. Nursing homes or homes for the elderly can rent or purchase medical equipment.
- Care pay for relatives.

The responsibilities of the municipalities are:

- The daily operation of homes for the elderly and salaries for night watches.
- Parts of the food provision and transport.
- Day care for pensioners living at home.
- Payment for respite care when people receive said care in another municipality.

Personal payment:

- Home care is free for people with a low income. Otherwise the charge is relative to the income, but maximum 30 hours per month.
- Home visitations by nurses are always free of charge
- Nursing homes and care homes, relative to income.

- Symbolic payment for transport and food service.
- Payment for respite care, provided by law, available for 90 days per year.
- A fixed payment for day care/day respite care.
- Discussion groups in the Alzheimer's Society.
- Medical equipment for tracking (GPS).

The contributions from volunteer organisations are:

- The Red Cross has a home visitation service, although not for Persons with dementia.
- The Alzheimer's Society provides telephone services for relatives, free of charge.
- Churches provide visitations on a regular basis to homes for the elderly and care homes.

#### Key figures:

- Total costs of health- and care services in the Faroe Island were 1,045 million DKK (140 mill €) (2009)[8].
- Average health and social costs of persons with dementia are 127,000 DKK (17,047 €) (2010) per year (Danish statistics).
- Permanent residency for people with dementia costs 570,130 DKK (76,528 €) (2010) per year per person[9].

### A.2.3 Target population

Table 3 shows the population in The Faroe Islands older than 60 years in 2012. There were 6,849 recipients of old age pensions this year. 158 lived in shared homes for elderly and 423 lived in nursing homes (this number includes both residents and respite care). There are 81 places at nursing homes or care homes specifically for people with dementia and two day centres for people with dementia [9]. There were 480 recipients of home help, receiving on average 7.2 hours of help per week (2010).<sup>2</sup>

<sup>2</sup> [www.hagstovan.fo](http://www.hagstovan.fo)



Age group	Male	Females	Total
60-64	1508	1377	2885
65-69	1262	1093	2355
70-74	856	838	1694
75-79	660	684	1344
80-84	431	618	1049
85-89	209	441	650
90 and over	113	248	361
<b>Total</b>	<b>5,039</b>	<b>5,299</b>	<b>10,338</b>

Table 4: Population over 60 years in the Faroe Islands, (01.01.2012)

Table 4 reports the estimated numbers of people of dementia in the Faroe Islands by gender and age. The reported numbers are an estimate based on Danish statistics and the assumption that approximately one third of people with dementia receive a diagnosis.

Age group	Male	Females	Total
60-64	3	3	6
65-69	23	15	38
70-74	27	32	59
75-79	46	52	98
80-84	63	101	164
85-89	44	126	170
90 and over	38	120	158
<b>Total</b>	<b>244</b>	<b>446</b>	<b>693</b>

Table 5: Estimated number of people with dementia in the Faroe Islands.

## A.2.4 Dementia services in the Faroe Islands

### A.2.4.1 Plan of Procedure for Dementia in the Faroes 2012: Forgetful but not forgotten.

There are no public guidelines for dementia in the Faroes. Professionals in the primary and secondary health sectors have suggested a plan of procedure for the dementia sector in the Faroes. The plan was delivered to the ministers of social and health services in February 2012.

Due to an ageing population, the number of people with dementia will grow over the next years. The Faroes are a small country which requires special solutions. The Plan of Procedure



suggests potential solutions and proposes reforms to the dementia care in the islands. The aim is that the plan will be an incentive for the authorities to formulate a political strategy in this area.

The plan of procedure focuses on seven areas for development and reinforcement:

- i. Organization and cooperation
- ii. Diagnosis
- iii. The role of professional social care
- iv. The area of law and dementia
- v. Cooperation with relatives
- vi. Education
- vii. Research and information

#### A.2.4.2 Existing services

The Home Health services in the Faroe Islands divide the country into six areas (Figure 1). Table 5 shows existing dementia services in these six areas.

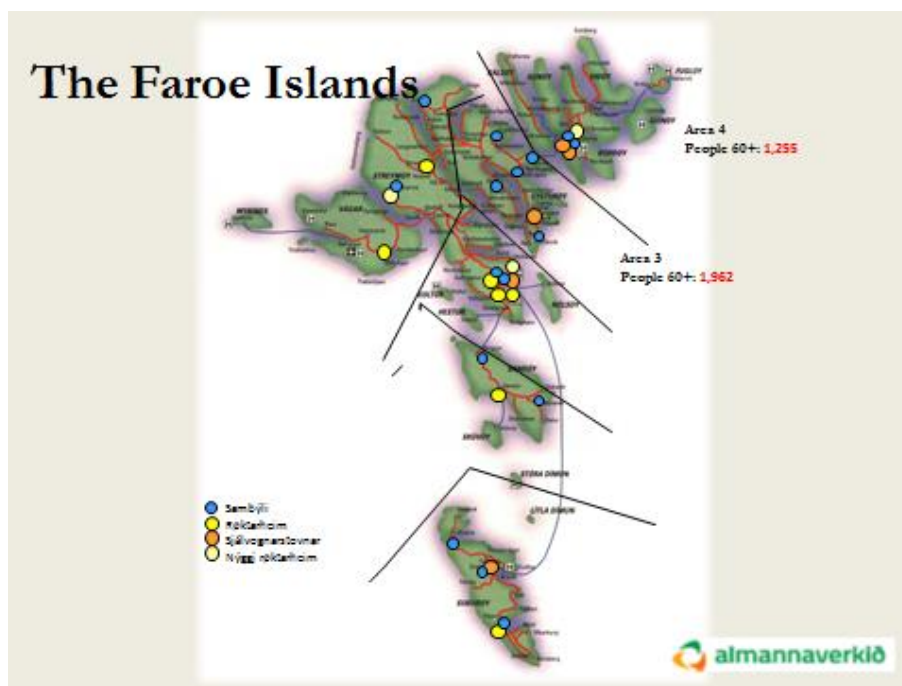


Figure 1: Home health service areas in the Faroe Islands.

Areas	GPs and Dementia Clinic	Home Help Services	Dementia Specific Day Care Centres	Psychosocial support of families	Home Respite Services
Area 1	x	x	x	x	
Area 2	x	x	x		
Area 3	x	x			
Area 4	x	x	x	x	
Area 5	x	x	x		
Area 6	x	x			

Table 6: Dementia services in the Faroe Islands in the six home health service areas

Below the services for direct support of the person with dementia are described in greater detail:

- The Dementia Clinic in the National Hospital provides services for the whole country. This is where everyone with dementia is examined and diagnosed. The Dementia Clinic also provides follow-up, for instance with medication treatment.
- Direct services for persons with dementia after visitation, provided by The Home Health Service. This is not a specialized dementia support service.
- Trained dementia care nurses. These do not operate as a structured service but only according to requests made by the Home Health Service.
- Day care services for persons with dementia
- Respite care in nursing homes and in homes for the elderly; not specifically for persons with dementia.
- The Medical Equipment Centre (HTM) provide electronic equipment, such as safety phones, GPS, the Paro-seal, dementia puppet, telephone with images, electronic calendar with reminder, door surveillance. Electronic equipment for tracking and surveillance are difficult to obtain, as this requires consent from the persons with dementia. Because of the dementia this therefore is not always possible.

Support of family and other informal carers:

- Relatives have the possibility to receive payment from the national authorities which equals 50 % of worker's wages. They are also allowed to have a half time job on the side.
- The Alzheimer's Society is a private organization and offers a telephone service two hours a week, with information and guidance to patients and relatives. The telephone service and the discussion groups are run voluntarily by professionals. The Society also has organized groups where relatives can receive instructions and have opportunities to

discuss issues which they may be struggling with. Eight-hour group lessons are offered in the evenings.

### **A.2.5 Needs assessment**

- There is a need for counselling when dementia is suspected and when the diagnosis is received.
- There is a need for Day Care Centres.
- There is a need for assistive technology for providing structure and safety in the daily life of persons with dementia.
- There is a need for support of family of persons with dementia
- There is a need for competent health care staff.
- There is a need for volunteer work, where participants have received training.
- There is a need for educations in schools on the subject of dementia.
- There is a need for information exchange between organisations.

## **A.3 Economic Evaluation**

### **A.3.1 Contact persons via iPads**

#### **A.3.1.1 Service Description**

The service consists of contact persons who communicate with persons with dementia and their family via iPads and iPhones (employing Skype or Facetime). Contact persons for persons with dementia is a new service in the Faroe Islands. Each family are assigned a dementia coordinator and an occupational therapist as contact persons.

Dementia is a progressive disease and the challenges of the disease changes constantly. This service gives persons with dementia and their family easy access to counselling and guidance without the physical presence of the specialists. The iPad can be used for normal supervision, but also for the clarification of specific issues concerning the user's health. Both users and contact person may initiate iPad visits. These visits may take place at times when physical visits would have been difficult to organise in the schedule of the contact persons. iPad visits may replace both physical visits and telephone visits. The iPads and iPhones may also be used by persons with dementia to communicate with family and friends and to other activities like listening to music, reading and games.

#### **A.3.1.2. Description of tests**

The RemoDem test areas are areas 3 (Eystroy) and 4 (the Northern Islands). About 3,200 persons over 60 years live in these areas.

Test participants were recruited by informing all citizens over 60 years in the test areas about the project by distributing newsletters. About 40 persons contacted the project team. The respondents were mostly relatives of persons with dementia or persons experiencing memory

loss. Only 12 were diagnosed with dementia. A multidisciplinary team of health professionals made home visits. 15 persons were included in the project and gave informed consent to participating; three of these were not diagnosed with dementia but showed signs of the disease. The participants have filled in questionnaires for the evaluation process.

The tests started in March/April 2013. Seven users and seven participants of the multidisciplinary health staff team (two occupational therapists and five nurses and assistants) received iPads and participated in the tests.

No schedule for the use of iPads was planned for the testing period; the iPads were to be used according to the individual user's needs. At the end of the test, three of the participants still use their iPad; two use it for communication with the contact persons, but one also to keep in touch with family living abroad. The iPads have also been used for activities like reading, listening to music and games. None of the relatives have used the iPad for communication with the contact persons. The other test participants stopped using the iPad during the testing period as their dementia had progressed.

During the project period, health care staff also used the iPads for sending emails and documenting home visits and group meetings.

### A.3.1.3 Costs and benefits

#### *Costs*

The unit cost of an iPads is 2,695 DKK (362€). In addition, there are costs of training and technical support. During the project, 14 iPads have been distributed to the seven test participants as well as the seven participating health care staff.

During the test period, the project has covered mobile network for the users. The costs of "normal" use of mobile phone services are about 300 DKK (40€) per month. 1GB data costs an additional 150 DKK (20€)<sup>3</sup>. However, most users have employed their personal broadband connections for using the iPad<sup>4</sup>. The communication costs will not be covered by the public health service after the project period.

During the project period, the contact persons are paid by the project. In the longer term, the Allmannaverkið will take over responsibility for the contact persons. The implementation of contact persons for persons with dementia will probably not increase the health staff costs in the Allmannaverkið, but the service implies a reorganization of the service within the existing resources/salary budget.

#### *Benefits*

The test period demonstrates that the service may reduce the number of physical visits to persons with dementia, saving travel costs and travel time for home care staff. The participants in the RemoDem test lives 5-20 kilometres from home service headquarters, which indicates avoided car travels up to 40 kilometres per visit if the iPad substitutes a

<sup>3</sup> Føroya Tele: <http://www.ft.fo/Default.aspx?ID=1162> (29.08.14)

<sup>4</sup> Price information (August 2014): 5 Mbit: 385 DKK per month, 10 Mbit: 449 DKK per month, 20 Mbit: 499 DKK per month (Føroya Tele).

physical visit. In the test areas, the longest distance to a client is 38 kilometres. However, the number of saved travels has not been documented during the testing period.

It is also assumed that the service may contribute to enhancing the feeling of safety for persons with dementia and their family, possibly resulting in delayed admittance in nursing homes. However, this has not been possible to document during the short testing period. For the same reason, there may be a reduced demand for other home care services when ICT-services for easier contact and communication with dementia contact persons and home care staff are offered.

### A.3.1.4 Business Case

Table 6 shows the annual economic result per user for the Allmannaverkið if implementing iPad-visits. A three year lifetime for iPads is assumed and a discount rate of 3.5 is used to calculate annual capital costs. An annual maintenance cost of 10 % of purchase price is included in this cost. The result depends on the distance the user lives from the home care headquarters. It is assumed that one physical visit per week is substituted by a visit via iPad and that broadband costs are covered by the users or their family. Travel cost savings are calculated by employing a kilometre rate of 3.82 DKK (0.51€)<sup>5</sup>. Costs of home care staff are calculated by using the average salary for Danish municipal health- and care staff (2012) including additional employers' costs such as social security premiums. Costs are converted to 2013-prices by employing a discount rate of 3.5%. Hourly costs are estimated at 327 DKK (43.9€).

Costs of training health care staff and technical support are not included in these calculations, and neither are avoided costs from delayed nursing home admittance. Based on the assumptions presented above, break even (costs equal saved costs) is estimated at 1.4 kilometres.

Distance to HQ	Annual capital costs in DKK (€)	Saved travel costs in DKK (€)	Saved time costs in DKK (€) <sup>6</sup>	Result in DKK (€)
<b>5 kilometres</b>	1,232 (165€)	1,986 (267€)	2,508 (337€)	3,262 (438 €)
<b>10 kilometres</b>	1,232 (165€)	3,972 (533€)	5,016 (673€)	7,756 (1,041€)
<b>20 kilometres</b>	1,232 (165€)	7,944 (1,066€)	10,032 (1,347€)	16,744 (2,248€)

Table 7: Annual economic result (2013-prices) for the Allmannaverkið per user if users live 5, 10, and 20 kilometres from home care headquarters<sup>7</sup>.

<sup>5</sup> The Danish kilometre allowance in 2013.

<sup>6</sup> An average travel distance of 70 kilometres per hour is assumed.

<sup>7</sup> 7.45 DKK =1€

### A.3.2 Other services

This chapter describes other services which have been developed during the project period, but data for an economic evaluation and business case description is not available.

- Training and education for health staff. Evening courses are designed to improve the competence of health staff working with persons with dementia. Subjects discussed are pathology, communication, theories of dementia care, etc. The duration of the course is 16 hours (eight evenings).
- Dementia groups provide guidance and education for family of persons with dementia. Family of persons of dementia often suffer from stress and need medication. These groups aim to prevent stress and reduce medicating through education and psychosocial support. The groups also provide opportunities for exchange of experience between participants. The course content are tailored to the participants needs, but will typically include pathology, how to communicate with people with dementia, legal issues etc. The support of family of persons with dementia is new service in the Faroe Islands.
- Day Care Centre in area 3 (Eystoroy )
- Technical aids (memo planners, thing finders, GPSs, calendars, etc.) are tested for improved security for persons with dementia and their family.

## A.4 Deployment

### A.4.1 Value Web

The Value Web describes the iPad service and the stakeholders involved in offering and receiving the service. Links between stakeholders (technological, financial and organizational) are then identified and described.

#### A.4.1.1 Stakeholders

##### Users:

People with dementia who need assistance to be able to live in their own homes. Necessary services are received from the public home care service.

##### Relatives:

Family of people with dementia who need support from the public health and social services to care for their relatives.

##### Volunteers:

Volunteer organizations which offer services for people with dementia and their services. Examples are the Red Cross (visiting service), the Alzheimer Society and Lions' Club.

##### Service Provider:

Until the end of 2014 the Allmannaverkið, which is a governmental agency, is responsible for health and social services in the Faroe Islands. In 2015 the responsibility for these services will be transferred to the municipalities.

Menningardepilin is part of the Allmannaverkið and responsible for social services. Eldradepilin is responsible for home care services and is in 2014 a part of Menningardepilin. The Eldradepilin will in 2015 be transferred to the municipalities.

The Technical Aids Centre is a part of Menningardepilin.

Caregiver:

The caregivers are responsible for giving home care services to people with dementia. This group includes district nurses, healthcare staff as well as physiotherapists and occupational therapists.

Dementia contact persons are occupational therapists and dementia coordinators from the home care services.

Financial bodies:

Financial bodies are responsible for the financing and organization of dementia services. The responsibility for home care services will in 2015 be transferred from the Allmannaverkið to the municipalities.

**4.1.2 Value Chain**

*Products/technologies*

Figure 2 outlines possible ways of distributing iPads to all relevant stakeholders if the service is implemented into routine service. All links are described in the table below.

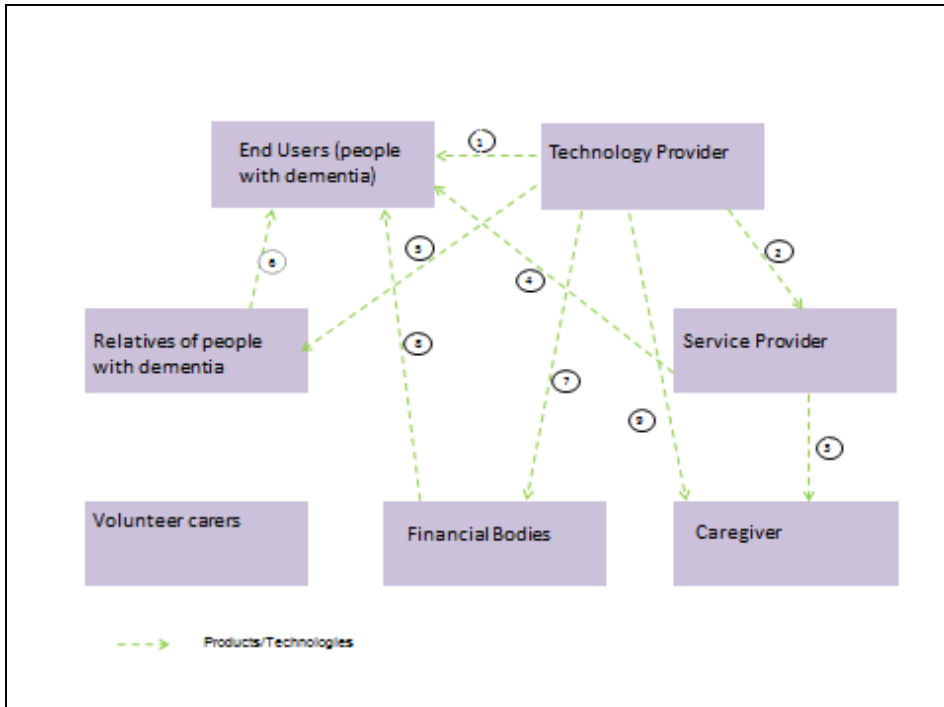


Figure 2: Possible distribution of iPads to stakeholders in the Faroe Islands

### Organizational and financial issues

Figure 3 describes the value chain within financial and organizational issues. All links are described in Table 7.

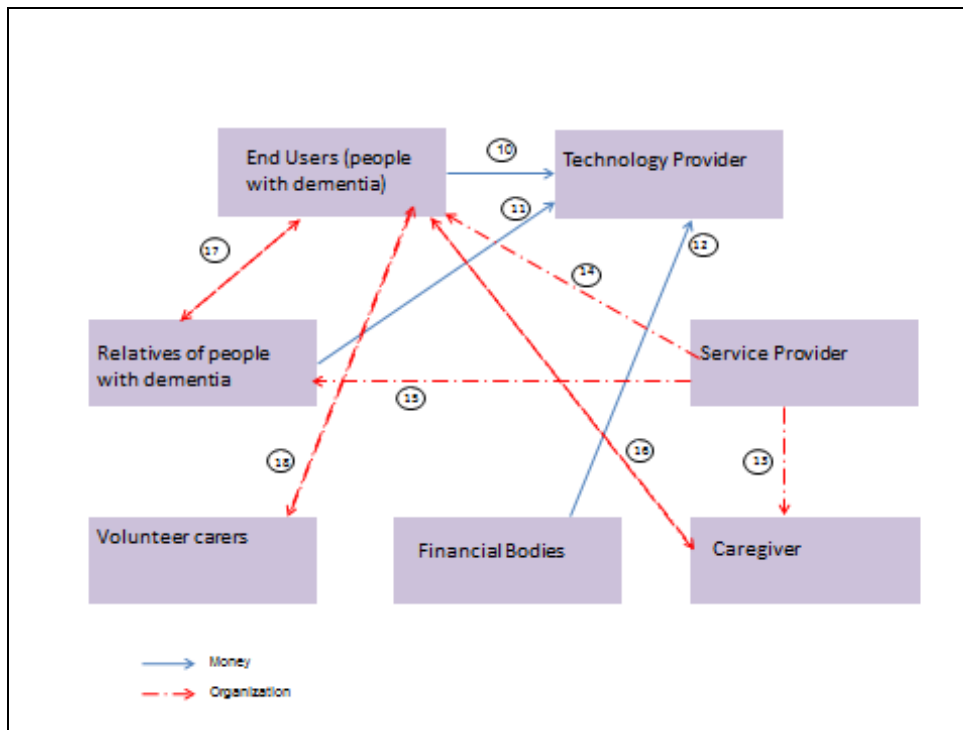


Figure 3: Financial and organizational links between stakeholders in the Faroe Islands

It is not clear which stakeholders will be responsible for distributing and financing the necessary technologies (iPads and broadband connection). The users may use their own iPad, or relatives may provide iPads for the users. It is possible that the public health service in the long run (Allmannaverkið or municipalities) will procure iPads for the users of the service. In the short run, the Technical Aids Centre will not purchase and distribute iPads as it is considered a utility article. However, if iPads are redefined as technical aids in the future, the Technical Aids Centre may be responsible for distribution.

The public health service (Allmannaverkið or municipalities) provides health staff to fill the role as contact persons for persons with dementia and their families.



Arrows	Description
1	There are several different scenarios for the organization of the services. One of these is that end user buys iPads directly from the supplier
2	It is also possible that Service provider delivers iPads to the Technical Aids Centre and;
3	Technical Aids Centre distributes iPads to caregivers, and;
4	Technical Aids Centre distributes iPads to end users
5	Another possible scenario is that relatives buys iPads, and;
6	Relatives give iPads to end users
7	Technology provider delivers iPads to Allmannaverkið/municipalities
8	Allmannaverkið/municipalities distributes iPads to end users
9	Caregivers (contact persons?) get iPads from technology provider
10	End users pay for iPads, or;
11	Relatives pay for iPads, or
12	Allmannaverkið/municipalities pay for iPads (and contact persons)
13	Service provider organizes training for care givers
14	Service provider organizes training for end users
15	Service provider organizes training for relatives
16	End users and care givers (contact persons?) uses iPads for communication
17	End users and relatives uses iPads for communication
18	End users and volunteer workers uses iPads for communication

Table 8: Description of links between stakeholders (Faroes)

#### A.4.2 Strategy for Deployment in the Region

The project group will recommend to the Allmannaverkið to implement contact persons for persons with dementia and their family in routine operation.

The use of iPads can be extended to support the daily life of persons with dementia in other ways, for instance taking photographs to document everyday activities which the user has difficulties remembering.

The iPads can also be used for replacing physical visit by the home health service also for other user groups, for instance for supervision visits as well as monitoring of blood glucose level and blood pressure or other monitoring issues.

## B. Appendix: Business Case Description for Norrbotten

### B.1 Introduction

RemoDem services are tested in two rural municipalities in Norrbotten: Pajala and Arvidsjaur. Framework conditions are similar in the two municipalities and similar services are tested. Therefore, business cases for both municipalities are included in this chapter.

This chapter focuses on services involving information- and communication technologies. The services iPads for improved support, night cameras and GPS watches will be described. All tested services build on already existing services, but new tools for delivering the services are introduced: Physical visits are replaced by virtual visits (iPads), night cameras also replace physical visits and the GPS wristband replace existing safety alarms.

The chapter starts with a brief description of the region and the municipalities, followed by a description of the health- and care services and dementia services. The RemoDem services will be described and economic results analysed before the potential for deployment of the services in routine operation will be examined.

### B.2 Market Analysis

#### B.2.1 General Characteristics

Norrbotten County is the northernmost county of Sweden. Norrbotten County covers almost one quarter of Sweden's surface, but is sparsely inhabited. The estimated population in 2012 was 250,000.

There are Finnish and Sami minorities living in the area, who have maintained their own culture and customs. Apart from Swedish, Sami, Meänkieli and Finnish may be used in dealing with government agencies, courts, municipalities, preschools and nursing homes in parts of Norrbotten County.

Common for all rural areas is an ageing population and therefore also a high prevalence of dementia. In these areas, a smaller part of the population is employable, contributing tax revenue to the community. Another characteristic feature of rural areas is long distances to neighbours, hospital and other public services.

##### B.2.1.1 Pajala

Pajala municipality had 6,279 inhabitants in 2012. Pajala is located 100 km north of the Arctic Circle. Development of the mining industry means that the population is expected to grow to 10,000 inhabitants the coming years. About 31 % of the population are older than 65 years. A high percentage of elderly people imply that there are many persons with dementia in the municipality.

Swedish, Finnish and Meänkieli are official languages. The municipality is one of Sweden's largest, geographically, at around 8,000 km<sup>2</sup>. The municipality of Pajala consists of several smaller and larger villages and the whole area can be viewed as rural settings.

### **B.2.1.2 Arvidsjaur**

The municipality had 6,467 inhabitants in 2012. Arvidsjaur is located about 110 km south of the Arctic Circle. The economy is dominated by forestry, tourism and the public sector. Swedish and Sami are official languages.

## **B.2.2 Health and Social Services in Sweden**

The responsibility of health care is divided between the state, counties and municipalities whereas the state is responsible for the overall health care policy. The law gives county councils and municipalities considerable freedom in organizing the way health care is delivered.

The county councils are responsible for organizing health care so that all citizens have access to good health care on equal terms. The county councils' activities are mainly financed by council tax and through grants from the government. Patient fees are a minor part of the County Council revenue.

The municipalities are responsible for the health of older people in residential care and for school health services.

A national health care guarantee was introduced in 2005. This means that the patient has the right to:

- get in contact with primary care same day,
- get a visit with a primary care physician within seven days,
- get a visit to specialist care within 90 days,
- start-up of treatment within 90 days.

Healthcare in Sweden is financed for the most part by taxes. The county councils' activities are mainly financed by council tax and the remainder is covered by general grants from the state. In addition, the county councils get income from patient fees and sales of services. Each county decides how large the council tax should be and how it should be distributed. County councils and municipalities also decide patient fees for doctor visits and other services in health care. The majority of the county council's budget goes to health care and dental care. A national cost ceiling for patient fees includes contacts with the health service and some medications.

## **B.2.3 Dementia Services**

### **B.2.3.1 National guidelines for dementia**

The current national guidelines for health and social services for people with dementia were published in 2010 [10]. The guidelines support decision makers in municipalities, counties and regions. The overall objective is to contribute to better quality of dementia services and more effective use of the available resources. The described recommendations prioritize measures by their degree of importance and their degree of cost-effectiveness. Research is recommended if measures have an insufficient scientific basis.

Some of the highest prioritized recommendations are:

- Prevention: Physical activity as well as mentally and socially stimulating activities may reduce the risk for dementia
- Specified procedures should be followed when investigating a person for dementia
- Persons with dementia should be offered services according to individual needs
- Multidisciplinary teams are vital in providing services for persons with dementia
- Increase competence for personnel working with people with dementia through training and education
- Undertake early social investigations of persons with dementia and annual follow-ups on social- and medical condition
- Offer medical treatment for patients with Alzheimer's disease
- Daily activities including physical activity should be provided for people with dementia
- Special housing adapted to personal needs should be provided for persons with dementia.
- Support of family: Respite services and training programs should be offered family of persons with dementia

### **B.2.3.2 Regional strategies for Dementia**

The regional guidelines/dementia program of the County of Norrbotten are based on the national guidelines, but are adjusted to the local context. Responsibilities and distribution of tasks between the county and the municipalities are described.

Identifying and diagnosing persons with dementia will be made from a holistic viewpoint by a team consisting of members of different professions. Making the diagnosis as well as treatments and medical follow-ups are the responsibilities of the primary health care. All care must be person-centered and provided according to individual needs. All persons diagnosed with dementia have the right to an annual follow-up on medical and social issues. Medical and social services have a mutual responsibility to collaborate. A care plan describing all needs should be documented in the common documentation system (Meddix).

### **B.2.3.3 Dementia services in Pajala**

Direct support of persons with dementia (most services are offered to all, not only persons with dementia):

- Dementia teams
- Special group housing for persons with dementia
- Technical aids: timer for stoves, safety alarms, door sensors.
- Nursing homes
- Respite services: short term institutional care
- Respite services in the homes of people with dementia

- Services offered by voluntary organisations (of which some get support from the municipality) as well as municipal organisations/village councils
- Home help services
- Meeting spots; one organised by the municipality, others supported by voluntary organisations
- Travel services
- Companion services for GP visits etc. These services are organised by voluntary organisations.

The general principle for this support system is that care is provided according to needs. Home care services are regulated by law and are provided by the municipality, but services offered vary between municipalities. The services are financed by taxes, and user payment depends on the recipients' available income.

Support of family and other informal carers:

- Support of family carers through special assigned staff (40% of full time)
- Family members employed as carers

Support to professionals:

- Web based information educational package developed by the National Association for Dementia
- Support from dementia teams
- Support from specialist care

Information exchange between organisations:

- Relevant information is available on the Internet

## B.2.4 Target Population

### B.2.4.1 Persons with Dementia in Sweden

There are approximately 148,000 persons with dementia in Sweden. Eight percent of all persons older than 65 years have dementia, whereas almost half of all persons older than 90 years suffer from dementia. The number of persons with dementia will increase drastically after 2020 due to an ageing population. In 2007 the costs for health and care services for persons with dementia was estimated at 50 billion SEK (5.6 billion €), of these falls 85 percent on the municipality, five percent on the counties and ten percent on families.

### B.2.4.2 Persons with dementia in Pajala

Table 8 shows the population in Pajala older than 60 years in 2011. The average age in the municipality is 48.8 years. 176 users got assistance from the municipal home service each month (2013). Long distances mean that home care staff drives the equivalent of two times around the globe monthly. There are eight residential and nursing homes in the municipality.

Age group	Male	Females	Total
60-64	328	249	577
65-69	284	242	526
70-74	257	233	490
75-79	214	208	422
80-84	146	179	325
85-89	78	102	180
90 and over	19	54	73
<b>Total</b>	<b>153</b>	<b>1276</b>	<b>2629</b>

Table 9: Population over 60 years in Pajala

Table 9 shows the number of people in Pajala diagnosed with dementia in 2011. These figures are low compared with estimates based on population figures, which indicates that dementia is underdiagnosed in the municipality.

Age group	Male	Females	Total
60-64	2	1	3
65-69	1	3	4
70-74	2	4	6
75-79	5	9	14
80-84	5	11	16
85-89	2	2	4
90 and over	0	0	0
<b>Total</b>	<b>17</b>	<b>30</b>	<b>47</b>

Table 10: People diagnosed with dementia in Pajala (2011)

Based on population figures, it is assumed that 81 persons between 65 and 79 years, 101 persons between 80 and 89 years and 29 persons above 90 years have dementia. In total, 8 % of all persons over 65 years are expected to suffer from dementia.

#### B.2.4.3 Persons with Dementia in Arvidsjaur

In Arvidsjaur, it is assumed that 69 persons between 65 and 79 years, 84 persons between 80 and 89 years and 30 persons above 90 years have dementia.

## B.2.5 Needs Assessments

Pajala:

- Many persons with dementia don't get sufficient support due to problems with accepting having dementia
- People with dementia wander and get lost. There is a need for preventive measures as well as tracking devices
- Sparsely populated areas cause social isolation. There is a need for meaningful daytime activities as well as physical activities
- There is a need for respite services
- People with dementia who are aggressive and have behavioural problems are challenging to their family. There is a need for more support for family carers
- Professionals as well as family members need more competence in dealing with people with dementia
- There is a need for assistive technology for memory support
- Cooperation between primary health care and municipal care needs to be improved

Challenges:

- Limited municipal resources
- Long travel distances in the municipality
- The newly opened mine have created new jobs in the municipality and make recruitment of staff to the municipal care service more difficult.
- Group housing targeted for people with dementia is costly

## B.3 Economic Evaluation

### B.3.1 iPads

#### B.3.1.1 Service description

iPads are tested in both municipalities as a tool for improved support for people with dementia (users) and their family. iPads have been used by the users and their family; the health care staff has used their computers. The video software solution Polycom CMA has been used for communication.

In Pajala, the iPads have been used for communication between family of persons with dementia and contact persons in home care, as well as between family and persons with dementia

In Arvidsjaur, the iPads are used by the users and their family to communicate with the home care services, home nursing services, and other health staff. Health staff uses PCs and web cameras. Healthcare staff is scheduled to call the users once per week for monitoring their general condition as well as clarifying of tasks. The users need to have broadband/mobile broadband connection installed in their homes to get access to the service.

### B.3.1.2 Description of tests

In Pajala, seven persons with dementia were recruited to participate in the test by health staff at the Pajala Health Centre. Initially, five users got iPads, but one did not complete the test. The users tested the iPads for five months. The test included one weekly meeting between the contact person from the home care service and family of the person with dementia. These meetings included support and counselling, as well as information about available municipal services. The iPads were also used by the users for listening to music, reading and communicating with family.

In Arvidsjaur it was difficult to recruit test persons who are diagnosed with early dementia. The test has been carried out for six months with one test person recruited by the health care staff. The iPad was used for scheduled meetings for supervision and activity support. The service has depended on support from the municipal ICT-department, but there were still technical problems.

The tests in both municipalities were delayed because the iPads arrived late, training was delayed and there were technical problems.

### B.3.1.3 Costs and benefits

#### *Costs*<sup>8</sup>

An iPad costs app. 4000 SEK (444€) in 2014. Broadband connection costs app. 300 SEK (33.3€) per month; annual costs are app. 3600 (400€) SEK.

#### *Benefits*

The test in Pajala point to saved travel costs and saved travel time for health staff when face-to-face meetings are replaced by meetings via iPads. This is specifically important in rural areas where health care staff drives long distances to offer home care services to the users. The municipal family contact person has monthly saved one travel by car to each user during the testing period. One of the users lives 102 kilometres from the home care headquarters; 204 kilometres saved per month. The other users live in the same village, 67 kilometres from headquarters, and are normally visited at the same time; 134 kilometres saved per month. At a kilometre rate of 2.90 SEK (0.32€) (2014-prices), monthly saved travel costs for all users are 980 SEK (109€). Assuming an avoided travel time of 4 hours and 50 minutes, an additional 1008 SEK (112€) is saved<sup>9</sup>. Annual saved costs are estimated at 23,856 SEK (2,651€) for these four users.

<sup>8</sup> 9 SEK = 1€

<sup>9</sup> An average travel distance of 70 kilometres per hour is assumed. Costs of home care staff are calculated by using the average salary for this group in Norrbotten including additional employers' costs such as social security premiums. Hourly costs are estimated at 210 SEK (23.3€).



In Arvidsjaur, the test person lives in the main village, and no travel costs or travel time was saved during the test period.

The tests have few participants and are too short to give conclusive evidence on saved costs and saved time for health staff. However, the longer the distances from the users to home care headquarters are, the greater are the savings for avoided travels.

It is reasonable to assume that investment costs and costs for training of staff are highest as the service is introduced. Later, the investment costs decrease, and as the service is included in normal routines, avoided costs or savings will increase [11]. The tests in Pajala and Arvidsjaur showed that iPad meetings are often shorter than face-to-face meetings, mainly because all participants are well prepared for the issues they want to discuss. An evaluation of four different home care e-services in Väserås, Sweden also showed that visits via ICT are often shorter than physical visits [11]. The RemoDem test did not provide sufficient data to quantify this benefit.

It is also assumed that the service may contribute to enhancing the feeling of safety for persons with dementia and their family, possibly resulting in delayed admittance in nursing homes. However, this has not been possible to document during the short testing period. The annual costs of a resident in a nursing home are 600 000 SEK (66,667€) and an average home care user costs annually 160 000 SEK (17,778€). A one year delay of admittance to nursing home means an average saved costs of 440,000 SEK (48,889€).

For the same reason, there may be a reduced demand for other home care services when ICT-services for easier contact and communication with home care staff are offered. A Swedish study points at an enhanced feeling of security and easy access to home care staff may not only reduce demand for home care services, but also for day care activities and other related services [11].

#### **B.3.1.4 Business Case**

Table 10 shows the annual economic result per user for the municipality/home care services when implementing iPad-visits. A three year lifetime for iPads is assumed and a discount rate of 3.5 is used to calculate annual capital costs. An annual maintenance cost of 10 % of purchase price is included in this cost.

The result depends on the distance the user lives from the home care headquarters. It is assumed that one physical visit per month is substituted by a visit via iPad and that broadband costs are covered by the users or their family. Costs of training health care staff and technical support are not included in these calculations and neither are avoided costs of shorter meetings and delayed nursing home admittance. Based on the assumptions presented above, break-even (costs equal saved costs) is estimated at 6.6 kilometres

If more than one physical visit per month is substituted by virtual visits, cost-effectiveness improves.

Distance to HQ	Annual capital costs in SEK (€)	Saved travel costs in SEK (€)	Saved time costs in SEK (€)	Result in SEK (€)
<b>5 kilometres</b>	1,828 (203€)	348 (39€)	360 (40€)	-1,120 (-124€)
<b>10 kilometres</b>	1,828 (203€)	696 (77€)	720 (80€)	412 (46€)
<b>20 kilometres</b>	1,828 (203€)	1,392 (155€)	1,440 (160€)	1,004 (112€)
<b>50 kilometres</b>	1,828 (203€)	3,480 (387€)	3,600 (400€)	5,252 (584€)

Table 11: Annual economic result (2014-prices) per user if users live 5, 10, 20 and 50 kilometres from home care headquarters.

During the tests in Pajala, the average distance saved per user is 42.25 kilometres (one way) per month. This result indicates that it is probable that investments in this service will be paid back during the first year after implementation. However, this conclusion depends heavily on where users live.

## B.3.2 Night cameras

### B.3.2.1 Service description

Many persons with dementia living in their own homes need supervision during the night. Home care staff is therefore scheduled to visit to check their condition at appointed times during the night. In Arvidsjaur, night cameras installed in the user's home make these visits redundant. Health staff are able to check the user's condition at scheduled times on their computers, without leaving their office. If the user needs assistance, health personnel will go to the user's house and offer support in the traditional way. Pictures are not recorded or saved. No voice-based communication is possible. Healthcare staff has to log on to use the system, and all logons are saved in the system. The users need to have broadband installed in their homes to get access to the service.

### B.3.2.2 Description of tests

In Arvidsjaur, the night camera was tested with two users for four months. One of the users was checked on twice each night: one physical visit and one "virtual" visit. The other user was checked on twice each night with the camera and expresses that these "virtual" visits made him/her feel safe. Both test persons live within one kilometre from the home care headquarter. The test will continue after the project has ended.

Night cameras were not tested in Pajala.

### B.3.2.3 Costs and benefits

Leasing costs of night cameras are 1200-1900 SEK(133€-211€) per month [12]. In addition, the users must have broadband installed in their homes. The staff needed about four hours of training to be able to operate the equipment, estimated at 840 SEK (93€) per person. Technical support was needed when installing the cameras in the users' homes.

The service is suitable for persons who are disturbed by the physical visits of the home care staff. However, the home care service in Arvidsjaur only offers nightly surveillance visits to persons who live close to the chief town and the home care headquarters. It is not possible for the staff to travel long distances to check the users' condition every night. For the same reason, night cameras will only be offered to persons living close to headquarters - the staff will not be able to travel to assist users if support is needed. The service will therefore probably not result in saved costs.

#### **B.3.2.4 Business case**

The test did not produce sufficient data to conclude on the cost-effectiveness of the service or draft a business case.

### **B.3.3 GPS Wrist Band**

#### **B.3.3.1 Service description**

GPS Wrist Band: In both Pajala and Arvidsjaur persons in the early stages of dementia have tested a GPS tool, the Posifon wrist band, to assist them to navigate when being outdoors. The wrist band contains a GPS, an alarm button and a mobile phone. It is possible to create a safety zone, and messages are transmitted to alarm recipients if the user moves outside the zone. When the user pushes the alarm button, the phone calls or sends messages to family or health staff. A map service informs of the user's position. The Posifon wristband is connected to the mobile network and the wristband can be used for communication with the person with dementia outside the home. The tool is suitable for persons with early dementia who likes being outdoors.

#### **B.3.3.2 Description of test**

In Arvidsjaur, the Posifon wristband has been tested by two persons with dementia. One lives in a sheltered housing with family 250 kilometres away, the other lives with the spouse. Both alarms are linked to the test persons' family. No alarms have been triggered during the test period. The wristband has been tested for four months and the test will continue after the end of the project.

In Pajala, four persons have tested the wristband. The alarms are linked to the user's family. During the test period, there have been some false alarms to the relatives about the user being outside the safety zone because the GPS doesn't function very well indoors. Real alarms have been answered by family who have been able to guide the user in the right direction.

#### **B.3.3.3 Costs and benefits**

##### *Costs*

In the municipalities the wristband is an alternative to the existing safety alarm. Posifon is a more expensive tool, about 9500 SEK (1,056€) per user the first year after implementation. This sum includes training of personnel as well as security centre [13].

Posifon must to be connected to the mobile network. Most persons in Sweden already have a mobile phone subscription.

### *Benefits*

Alarms triggered by the existing system are dispatched to the police, which is responsible for searching for missing persons. Alarms triggered by the wristband are dispatched to family during the test, but it is also possible for the home care service or the municipality to receive alarms. A cost-benefit analysis of the Posifon wristband indicates that costs for searching lost persons with dementia decreases if the alarm system is deployed to persons with dementia [13].

It is also assumed that the service may contribute to enhancing the feeling of safety for persons with dementia and their family, so that persons with dementia stay longer in their own homes. This argument was emphasized in an economic evaluation of the Posifon wristband in several municipalities in Sweden [13].

#### **B.3.3.4 Business case description**

The short testing period and the low number of participants in the test render it difficult to draw conclusions. However, an analysis of economic consequences for several Swedish municipalities shows that the wristband is profitable during the first year after implementation. Saved costs include decreased search costs, postponed admittance in sheltered housing/nursing homes, reduced costs due to reduced need for accompaniment and reduced costs for the existing alarm service. [13]

## **B.4 Deployment**

### **B.4.1 Value Web**

The Value Web describes the services and the stakeholders involved in offering and receiving the service. Links between stakeholders (technological, financial and organizational) are then identified and described. In chapter B.4.2 it is analysed whether it is possible to implement the services in large scale within the existing regulations. Other issues related to implementation will be also discussed. The Value Web is based on the iPad service, but stakeholders and links are similar for all services (iPad, GPS wristband and night camera).

#### **B.4.1.1. Stakeholders**

##### Users:

People with dementia who need assistance to be able to live in their own homes. Necessary services are received from the public home care service.

##### Relatives:

Family of people with dementia who need support from the public health and social services to care for their relatives.

##### Decision Makers (State, county councils and municipalities):

Allocate resources to the health and care sector. The state is responsible for the overall health care policy. The county councils are responsible for organizing health care to all citizens. The municipalities are responsible for the health of older people in residential care and for school health services.

Technology providers:

- iPads
- Broadband connection/ mobile connection

Municipal Service Provider:

The municipalities are responsible for home care services and nursing homes. This includes assessment of users' needs as well as planning and allocation of appropriate actions and support.

Technical support for the iPad service will be carried out by the municipalities.

Municipal Care Givers:

**Home Care services:** The municipal home care services are responsible for practical assistance in the home.

**Home nursing services:** The municipal home nursing services are responsible for home nursing services.

**Support for family:** Support for family who cares for persons with dementia/other illnesses at home.

County Council Care Givers:

The County councils are responsible for providing health care to all citizens. This includes services performed by physicians as well as occupational therapists, physiotherapists and nurses.

**B.4.1.2 Value Chain***Products/technologies and financial issues*

This figure describes possible ways of distributing iPads to all relevant stakeholders if the service is implemented into routine service. In addition, the value chain for financial issues is described. All links are described in table 11.

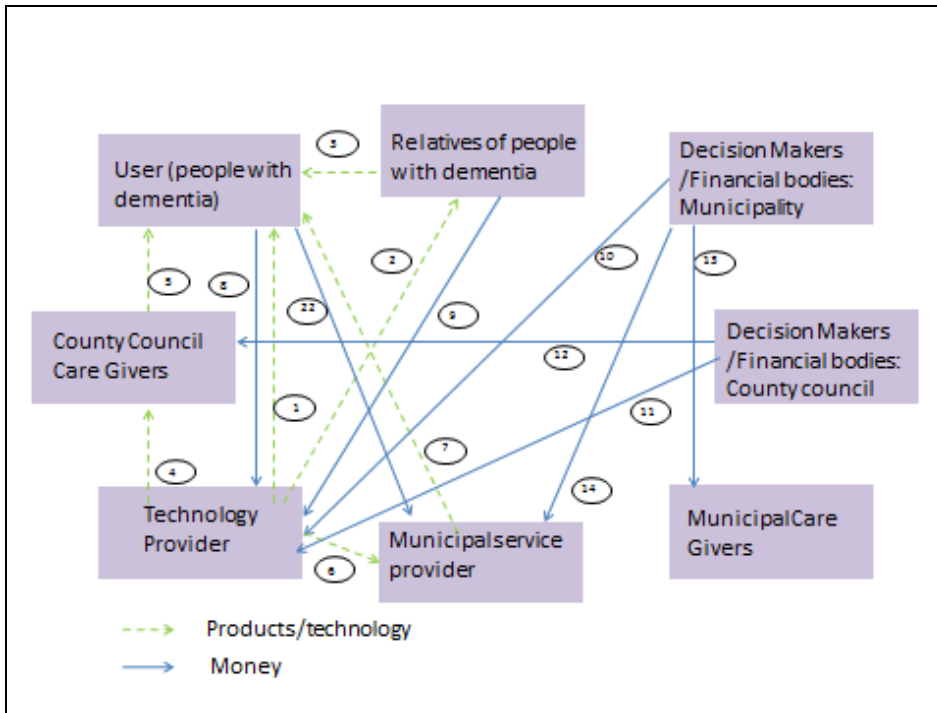


Figure 4: Possible distribution of iPads to stakeholders and financial links between stakeholders in Norrbotten

*Organizational issues*

The figure describes the value chain for organizational issues. All links are described in Table 11.

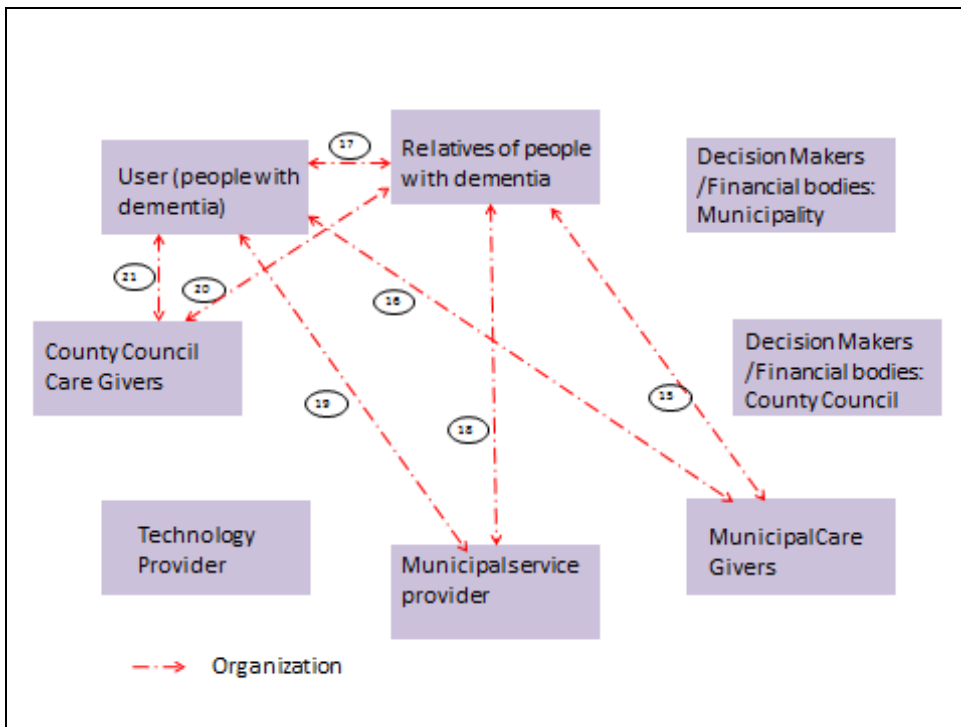


Figure 5: Organizational links between stakeholders in Norrbotten

Arrows	Description
1	There are several different scenarios for the organization of the services. One of these is that the user buys iPads directly from the supplier . The users is responsible for the broadband connection.
2	It is also possible that relatives provides iPads and;
3	Relatives give iPads to the users
4	It is possible that Technology Provider delivers iPads to the County Council and;
5	The County Council distribute iPads to end users
6	Another scenario is that Technology Provider delivers iPads to the municipality and;
7	The municipality distributes iPads to the users
8	Users pay for iPads and broadband, or;
9	Relatives pay for iPads and broadband, or;
10	The municipality pays for iPads, or;
11	The County Council pays for iPads
12	The County Council pays for training (use of video conference) for health staff
13	The municipality pays for training (use of video conference) for care givers
14	The municipality pays for possible training (use of video conference) of municipal service providers as well as technical support of users and care givers
15	Home care services and home nursing services may communicate with relatives
16	Home care services and home nursing services may communicate with users
17	Users and relatives may communicate
18	Municipal service provider (Occupational therapists, physiotherapists, service planners etc. may communicate with relatives
19	Municipal service provider may communicate with users
20	County Council service provider may communicate with relatives
21	County Council service provider (health staff) may communicate with users
22	Users pay fees to the municipality

Table 12: Description of technological, financial and organizational links between stakeholders (Norrbotten)

It is not completely clear which stakeholders will be responsible for distributing and financing the necessary technologies (iPads and broadband connection/mobile broadband). The users may use their own iPad, or relatives may provide iPads for the users. It is probable that the public health service (county council, or most probably the municipality,) will procure iPads

for the users of the service, but the user or relatives will most probably cover the broadband connection (Arrows 1-11).

Both municipal and County Council service providers may use the iPad to communicate with the user and the user's relatives. The municipality or the County Council may be responsible for training health- and social care workers in operating the service (video conferences).

Users pay fees to the municipality for receiving all home care services.

## **B.4.2 Opportunities and barriers**

In this chapter, important technical, organizational and economic issues raised during the project period will be discussed.

### **B.4.2.1 Technological Issues**

For the project, mobile broadband connection has been chosen because a fixed connection is not possible for all villages and households in the region. During the test period, there have been problems with mobile broadband connections. In some places, external antennas had to be installed to get connection, but still the connection has at times not been good enough.

The GPS wristband uses the mobile phone network for communication purposes. Pajala borders to Finland, and it is a problem that the Finnish mobile network often takes over.

During the test period in Pajala, the GPS transmitted several incorrect indications of the user's position. The system didn't always send warnings that the user had left the preselected security zone. These difficulties induce mistrust in the system for the users' family. The users think that the wristband is too big, and some doesn't understand what the wristband is as it neither looks like a watch, an alarm nor a mobile phone.

During the test period, the municipalities experienced technical difficulties. Technical support services needs to be further developed and access to these services must be improved. Responsibilities for offering technical support need to be clarified. For the Posifon wristband, the Posifon enterprise has carried out the technical support.

Both systems (iPads and Posifon) are used for the transmission and communication of sensitive patient information. The systems are secure, and the health care staff needs to log on with individual user names and passwords to gain access to the user.

### **B.4.2.2 Organizational issues**

It is important to give health care staff sufficient training in employing the new ICT-tools. Healthcare staff (occupational therapists and family contact persons) involved in the project has received training in using iPads and Polycom CMA. During the project period, a few health care staff were training by Polycom staff, these staff has in turn trained their colleagues. This model has worked well and is recommended for future use.

The tests in both municipalities showed that it is difficult to teach persons with dementia to use ICT-tools (especially iPads) with which they have had no prior experience, and as their disease progresses it becomes even more difficult.

In Pajala, the iPads have only been used between family and family contact persons from the home care service and the service has worked well. The home care service thinks there are



extensive possibilities for using iPads for communication between all stakeholders in the dementia value chain.

The GPS wristband raises ethical issues as the service includes monitoring of the user. It is important that these issues are discussed with users and their families before the service is implemented. It is also important that the staff is well trained in dealing with these sensitive issues. The recipients of the alarm (relatives during the test period) need to be trained in how to use the system to locate the missing person. If the user has no family living in the community/municipality, it needs to be decided whether the home care services can receive alarms.

All involved parties (Health care staff, ICT staff, suppliers etc.) must work together when designing solutions and new services. Methods, routines, manuals and training programmes must be developed.[11]

#### **B.4.2.3 Economic Issues**

The municipal service provider allocates home care services to the users according to their individual needs. If the tested services are implemented as a routine service, the service will be allocated based on the same principles.

The municipality will cover the service costs, but there are user fees for receiving all home care services. This principle will also apply for this service. The users will probably be required to cover costs of broadband connection themselves.

#### **B.4.2.4 Other Issues**

If the tested services are going to be a routine service within the health and social services, the requirements of the law for documentation must be complied. The existing Electronic Health Record is called Procapita.

### **B.4.3 Strategy for Deployment in the Region**

#### **B.4.3.1 Arvidsjaur**

##### *Deployment of tested services*

The implementation of the services demands investments in equipment and training. In most cases, a technical support service must also be available. Allocation of funds for this purpose must be decided by the municipalities. The present organization has the necessary competencies to handle the new services, but will have to rely on ICT-support from other municipal departments.

In Arvidsjaur, the iPad service did not work very well due to technical problems. The service will not be implemented between health care staff and users or their family. However, many users of municipal health and social services are allocated personal assistants to help them in their daily lives. The municipality plans to test iPads as a means for communication between the personal assistants and their supervisors, as well as between the assistants and their clients.

The test of the GPS wristband showed positive results, but the municipality must allocate funds for investment in equipment if the home care service is going to provide the service

permanently. The service has been easy to install without technical support from the ICT-department. It is not clear how many people with dementia in the municipality would benefit from the service.

The results from the tests of night cameras were also positive in Arvidsjaur. The service will only be offered to users living close to home care headquarters, so savings from avoided travels are not expected. The municipality wants to implement the service because it represents a quality improvement for many users. To implement the service, support from the municipal ICT-department is necessary. There are currently five potential users; one live outside the city centre.

#### **B.4.3.2 Pajala**

During the project period it has become evident that the project group in Pajala has had high ambitions for developing dementia services, but there are not enough resources available to carry out the plans and the organization has not been ready for development work. The development of dementia services demand close cooperation between the County Council and the municipalities, but the differences in how the organizations function render collaboration difficult. In addition, there are unsolved issues concerning the exchange of information between the two organizations.

However, there are plans for developing and formalizing continuous pathways for persons with dementia in the municipality (Lotsen). Some of the elements included in Lotsen are diagnosing and support after diagnosis, medical treatment and follow-up, municipal dementia contact persons, coordinated individual planning (study of the health and social services that dementia need), municipal dementia team. Technical aids such as security alarms are included in Lotsen.

Stakeholders involved are persons with dementia and their family, health care staff and other personnel in the municipality who through their work come in contact with persons with dementia and their family, as well as the rest of the community.

#### *Deployment of tested services*

The family contact persons think that the iPad service has worked well, but the decision whether to implement the service will be made by the municipality.

IPads can be used for many other purposes in the home care services. Physical supervision visits may be replaced by iPad visits. It is also possible for occupational therapists and physical therapists to follow-up the users via iPad. iPad services may also be suitable for other user groups. The more services the user's iPad is used for, the higher the possible cost-effectiveness of the investment will be.

If the Posifon wristband is going to be a routine service in the municipality, it should be included in the normal allocation system. Because there are ethical issues concerning this service, a special procedure including the dementia team may be introduced. It is not clear how many people with dementia in the municipality that would benefit from the service.

### *Framework*

The project has enabled the project group to continue working on good health and care services for persons with dementia in Pajala. The work builds especially on different projects carried out since 2006.

Continuous pathways for persons with dementia fit into both national and regional strategies, among other factors because these documents stress the importance of continuous care as well as cooperation between all professionals involved in assisting persons with dementia. The municipality will continue developing the concept, also by participating in other projects.

### *The Scottish concept*

Based on the experiences from Western Isles, Pajala municipality plans to create a “Dementia Friendly Community”. The concept may involve activities and self-help groups for persons with dementia and for their family. Pajala is also interested in adopting the Scottish Community Awareness initiative, where businesses in the community receive training in supporting persons with dementia.

## C. Appendix: Business Case Description for Western Isles

### C.1 Introduction

This chapter focuses on a service where physical visits are replaced by virtual visits, employing the Giraff, and assistive technology like sensor mats, radio calendar clocks, wander reminders and proximity voice memos

The chapter starts with a brief description of the region, followed by a description of the health- and care services and dementia services. The testing of the RemoDem services will be described before the potential for deployment of the services in routine operation will be examined. There are no available data for economic evaluations or business cases.

### C.2 Market Analysis

#### C.2.1 General Characteristics

Scotland is a constituent country of the United Kingdom with a population of around 5.2 million and occupies the northern third of Great Britain. Scotland's mainland shares a border with England to the south.

Western Isles<sup>10</sup> is an archipelago off the west coast of Scotland with a total population of 27,684 (2011). After declines in the 20th century the population has stabilised since 2003, although it is ageing.

The length of the archipelago is roughly 210 kilometres. Bridges and causeways are built so that all the inhabited islands are connected to at least one other island by a land transport route. Transportation to the mainland is made by ferry or plane.

The administrative centre is Stornoway with 8,100 inhabitants. Scottish Gaelic is the predominant spoken language, although in a few areas English speakers form a majority.

Modern commercial activities centre on tourism, crofting, fishing, and weaving. The economic position of the islands remains relatively precarious. Overall, the area is relatively reliant on primary industries and the public sector, and fishing and fish farming in particular are vulnerable to environmental impacts, changing market pressures and European legislation.

#### C.2.2 Health and Social Services

##### C.2.2.1 Health and Social services in Scotland [14]

NHS Scotland is the publicly funded healthcare system in Scotland. Healthcare policy and funding is the responsibility of the Scottish Government's Health Directorates.

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<sup>10</sup> The description of Western Isles is based on:  
[http://en.wikipedia.org/wiki/Outer\\_Hebrides](http://en.wikipedia.org/wiki/Outer_Hebrides) (14.03.14)

NHS Scotland currently employs approximately 140,000 staff who work across 14 regional NHS Boards, seven Special NHS Boards and one public health body. Each NHS Board is accountable to Scottish Ministers, supported by the Scottish Government Health and Social Care Directorates.

NHS Scotland had an operating budget of £11.35 billion in 2010–11, funding the employment of approximately 140,000 staff, including more than 47,500 nurses, midwives and health visitors and over 3,800 consultants. In addition, there are also more than 12,000 doctors, family practitioners and allied health professionals, including dentists, opticians and community pharmacists, who operate as independent contractors providing a range of services within the NHS in return for fees and allowances.

### **C.2.2.2 Health and Social Services in Western Isles [15]**

NHS Western Isles is the organisation responsible for providing healthcare to the population of the Western Isles with around 1030 staff. There are three hospitals run by NHS Western Isles. The largest is the Western Isles Hospital, a Rural General Hospital located in Stornoway which offers a range of hospital acute specialities and psychiatry. The hospital also includes diagnostic facilities, day hospital, laboratory, Allied Health Professionals and other services. Uist and Barra Hospital is located in Benbecula. The hospital has 29 beds, and provides care of the elderly, GP Acute and Midwifery led maternity services. St Brendan's Hospital, with 5 beds, on the Isle of Barra is supported by the local GP Practice to provide care of the elderly and other services.

## **C.2.3 Dementia Services**

### **C2.3.1 National Dementia Strategy[16]**

Scotland's National Dementia Strategy: 2013-2016 is Scotland's second National Dementia Strategy. The first was published in 2010 and focused on improving the quality of dementia services through more timely diagnosis and on better care and treatment, particularly in hospital settings. It began the process of the transformation of care across all sectors in anticipation of the growing number of people with dementia.

The key outcomes for this Strategy are:

- More people with dementia living a good quality life at home for longer.
- Dementia-enabled and dementia-friendly local communities, that contribute to greater awareness of dementia and reduce stigma.
- Timely, accurate diagnosis of dementia.
- Better post-diagnostic support for people with dementia and their families.
- More people with dementia and their families and carers being involved as equal partners in care throughout the journey of the illness.
- Better respect and promotion of rights in all settings, together with improved compliance with the legal requirements in respect of treatment.

- People with dementia in hospitals or other institutional settings always being treated with dignity and respect

#### Commitments:

- Supporting timely and accurate diagnosis: We will sustain and, where appropriate improve further, dementia diagnosis rates.
- Providing post-diagnostic support: all people newly diagnosed with dementia will have a minimum of a year's worth of post-diagnostic support coordinated by a Link Worker, including the building of a person-centred support plan.
- Strengthening integrated support: we need to move more towards a system of care which maximises and promotes resilience and independence and which supports and promotes the capabilities of the person with dementia at home during the moderate to severe stages of the illness, as they move from self-managing the illness with support to needing more intensive support. We will test and evaluate a range of approaches to providing better integrated care and support on the basis of the 8 Pillars model, centred on a Dementia Practice Coordinator role.
- Right-based care: In the first Dementia Strategy, we made a commitment to the production of Standards of Care for Dementia in Scotland. The standards are designed to inform care providers of their responsibilities and to help them self-audit services and to empower people with dementia and their carers.
- Workforce skills and competencies: the work on a strategic approach to improve staff skills and knowledge on dementia in both health and social care settings continues.
- Service responses in hospitals: Our challenge remains to ensure that, when admission to acute general hospitals is unavoidable for people with dementia, they experience, on every occasion, safe, effective, dignified and person-centred care.
- Care homes: there are challenges around the provision of care for people with dementia in care homes and in the future care homes will increasingly be concerned with providing specialist care, including end-of life care, for people with dementia
- Reducing inappropriate prescribing of psychoactive medicaments: a key driver to ensure care and treatment is always safe, effective and appropriate is working with partners to reduce the inappropriate prescribing of psychoactive medication for people with dementia.
- Integration outcomes: National outcomes are being developed as part of the work to integrate adult health and social care.
- Research: Supporting world-class research into dementia, including treatments and the delivery of care, remains a key part of our strategic approach to dementia.
- Early onset dementia, dementia as co-morbid condition and equality issues: The needs of these groups of people are different and services need to understand and work with that difference in the context of diagnosis, support, care and treatment

- Support activity: Since 2008 we have provided national improvement support and expertise to help local services improve dementia services
- Monitoring implementation of the strategy

### **C.2.3.2 Dementia services in Western Isles**

#### Community nursing service

The aim of the Community Nursing Service is to help you and your family or carer cope with the effects of your illness, particularly when your illness stops you from being independent and being able to look after yourself (not specifically for dementia)

#### Dementia Champions

#### Care- and nursing homes for persons suffering from dementia

Alzheimer Scotland is a non-governmental organization and provides advice and support for people with a diagnosis of Dementia and their carers/families in the Lewis and Harris area. Services available include [17]:

- Dementia-specific home support and day activities;
- A dementia café where people with dementia and carers can access information, advice and peer support;
- Carer support groups (and other carer resources);
- A Dementia Link Worker who supports people with dementia and their families for the first year after diagnosis (covering diagnoses made from the start of April 2013 onwards);
- A weekly singing group.
- In addition, there is a dedicated Alzheimer Scotland Dementia Nurse Consultant who works at NHS board level to improve standards of care for people with dementia undergoing health treatment in hospital and beyond.

## C.2.4 Target Population

Table 12 shows the estimated population over 60 years (2011) in the Western Isles.

Age group	Male	Females	Total
60-64	1050	967	2017
65-69	784	815	1599
70-74	649	778	1427
75-79	498	647	1145
80-84	289	491	780
85-89	161	357	518
90 and over	56	206	262
<b>Total</b>	<b>3487</b>	<b>4261</b>	<b>7748</b>

Table 13: Population in Western Isles over 60 years (2011 Western Isles Population Estimate)

274 persons had a dementia diagnosis in the Western Isles [18] in 2012, but many living with the disease are probably not diagnosed. It is predicted that 500-542 persons in Western Isles will suffer from dementia in 2024 [19].

## C. 3 Economic Evaluation

### C.3.1 The Giraff

#### C.3.1.1. Service description

The Giraff robots are just under five feet tall, with wheels and a TV screen instead of a head [20]. The screen will allow for two-way conversations in a video-call system. The robot uses a Skype-like interface [21].

The software program that communicates with the Giraffe can be downloaded free of charge and can be used by any PC that has Internet connection and a webcam. The Giraff is run by rechargeable batteries and it is parked in a charging station after use. The Giraff needs broadband to work, either a fixed broadband or a fast mobile.

The Giraff is kept in the home of the person with dementia, and the controls for the robot are with the person's relative or carer. The relative can call up the robot from a computer to effectively waken it up, and the person with dementia will not have to do anything at all. The caller's face will appear on the screen, and the caller can then navigate the robot through the home of the person with dementia to check that all is well, check medication has been taken, food has been eaten, the person has washed and dressed, or just to provide reassurance or have a chat. The machines will allow relatives and carers to check on them, potentially from hundreds of miles away.



### C.3.1.2 Description of tests

The test was carried out as a one-day trial at a day care centre in August 2013. Present were eight persons with dementia, two carers, four Alzheimer Scotland staff, two IT staff and two public health staff.

Prior to the test, the Giraff got negative publicity in the local press and there was much hostility from both carers and staff regarding the Giraff, specifically the use of a ‘Robot’ and pictures of the Giraff with a jacket on were seen as derogatory. Staff were concerned that they would lose their jobs and be replaced by robots doing manual tasks. The cost was another issue ‘are you going to be putting them into everyone’s home who has dementia’ ‘It will cost too much to use the internet all day’

On the day of the test, the sound was not working and the head of the Giraff did not tip down, however as the Giraff was being controlled from another room, by leaving the door open the person controlling the Giraff could be clearly heard.

All eight people with dementia received the Giraff well. The member of staff being seen on the Giraff screen was met with smiles from all the people with dementia as Giraff approached, the Giraff was responded to as the member of staff and not as equipment or something strange.

The staff thinks that the Giraff will be an excellent aid for those in early stages of dementia and provides a good way of communication when it might otherwise not be possible – they felt that perhaps it would be good for being able to do additional checks, particularly at times when the relative cannot be reached by telephone.

Problems with the Internet connection on the Western Isles have made it difficult to carry out a trial of any length. However, the project team is now working closely together with the Shetland partners to test the Giraff in an area with good Internet connections.

### C.3.1.3 Costs and benefits

The Giraff costs £ 7,500 (9,146€)<sup>11</sup>. A broadband connection is necessary to employ the Giraff.

The Giraff was not tested in users’ homes, but it is possible that replacing physical visits with visits via the Giraff will result in saved travel costs and health care staff time, as well as delayed admittance to sheltered housing or nursing homes. There is not enough data available to perform an economic evaluation or develop a business case.

## C.3.2 Assistive technology

### C.3.2.1 Service description

Different types of assistive technology have been tested. Sensor mats, radio calendar clocks, wander reminders and proximity voice memos have been deployed with users.

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<sup>11</sup> £ 0.82 = 1€

### C.3.2.2. Description of test

The test participants were recruited through Alzheimer Scotland, who issued the equipment. Approximately 35 items of equipment have been given out. The day date time clocks proved very helpful to many people and more were ordered during the trial.

### C.3.2.3 Costs and benefits

The assistive technology tested during the project is all low-cost technology. The table shows the costs of the different items.

Item	Costs in £ (€)
Sensor mat	£ 84 (102€)
Radio Calendar Clock	£ 32 (39€)
Wander Reminder	£ 60 (73€)
Proximity Voice Memo	£ 30 (37€)

Table 14: Costs of assistive technology in £ (€)<sup>14</sup>.

Training was not necessary neither for users, family nor health care staff.

Benefits experienced during the test period are increased confidence, better communication and reduced fear.

In some cases, the assistive technology may reduce the stress of carers. It is possible that decreased carer stress can delay admission to a care home.

## C.3.3 Dementia Friendly Community

### C.3.3.1 Service description

NHS Western Isles is currently working in partnership with local businesses across the Western Isles that have an ambition to become Dementia Friendly. The Dementia Friendly initiative aims to give public recognition and support to shops, businesses and towns across the Western Isles that are taking steps towards being more inclusive towards people with dementia. Staff receives cards in how to best to communicate with people with memory problems. Further education tailored to each business is offered. Small cards with advice on how to manage situations as they arise are distributed to staff. At present, 15 businesses have signed up.

The Dementia Friendly Communities programme focuses on improving the inclusion and quality of life of people with dementia. In these communities, people will be aware of and understand more about dementia; people with dementia and their carers will be encouraged to seek help and support; and people with dementia will feel included in their community, be more independent and have more choice and control over their lives.

It is envisaged that a Dementia Friendly Community is one that shows a high level of public awareness and understanding so that people with dementia and their carers are encouraged to seek help and are supported by their community. Such communities are therefore more

inclusive of people with dementia, and improve their ability to remain independent and have choice and control over their lives.

It is intended to continue to roll out this initiative to the rest of the island chain.

Economic assessments have not been conducted on this service.

## C.4 Deployment

### C.4.1 Value Web

The Value Web describes the services and the stakeholders involved in offering and receiving the service. Links between stakeholders (technological, financial and organizational) are then identified and described. In chapter C.4.2, it will be analysed whether it is possible to implement the services in large scale within the existing regulations. Other issues related to implementation are also discussed. The Value Web is based on the Giraff service, but stakeholders and links are similar for all assistive technologies

#### B.4.1.1 Stakeholders

##### Users

Persons with dementia who need support to cope with the ordinary tasks of daily life.

##### Family Carers

Family of people with dementia who need support from the public health and social services to care for their relatives.

##### Professional Carers

##### Home Care Services:

The purpose of the Home Care Service is to provide care to people in their own homes. The level of care will be decided following an assessment by a Care Assessor or a Social Worker to ensure that the care being provided is sufficient to meet individual eligible needs.

##### Care Homes:

A care home is a place where people can live in a homely setting and have their needs met by trained staff. Care homes may be owned and run by local authorities, private individuals, companies or the voluntary sector.

##### Local Service Provider

The regional NHS Board is responsible for delivering health services.

##### Corporate Funder

##### Scottish Government

Healthcare policy and funding is the responsibility of the Scottish Government's Health Directorates.

##### Infrastructure Providers

Enterprises providing broadband connections.

Technology Provider

Enterprise providing the Giraff.

**B.4.1.2 Value Chain**

*Products/technologies and financial issues*

Figure 6 describes possible ways of distributing technology (Giraff and broadband connections) to all relevant stakeholders if the service is implemented into routine service. In addition, the value chain for financial issues is described. All links are described in table 14.

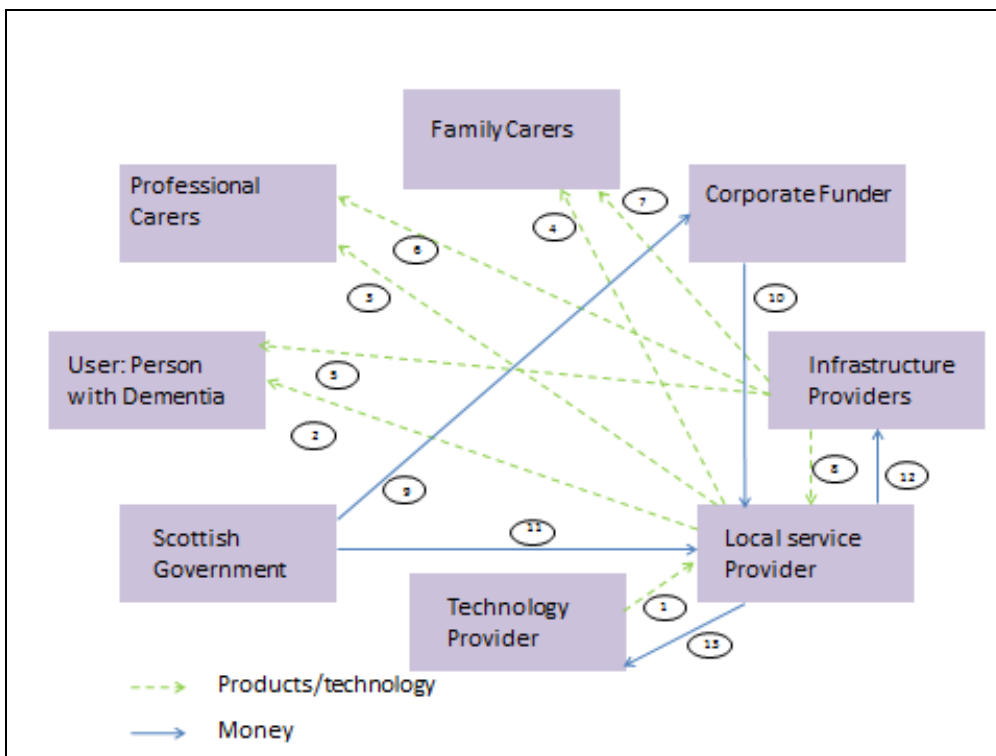


Figure 6: Possible distribution of Giraff to stakeholders and financial links between stakeholders in Western Isles

*Organizational issues*

The figure describes the value chain for organizational issues. All links are described in Table 14.

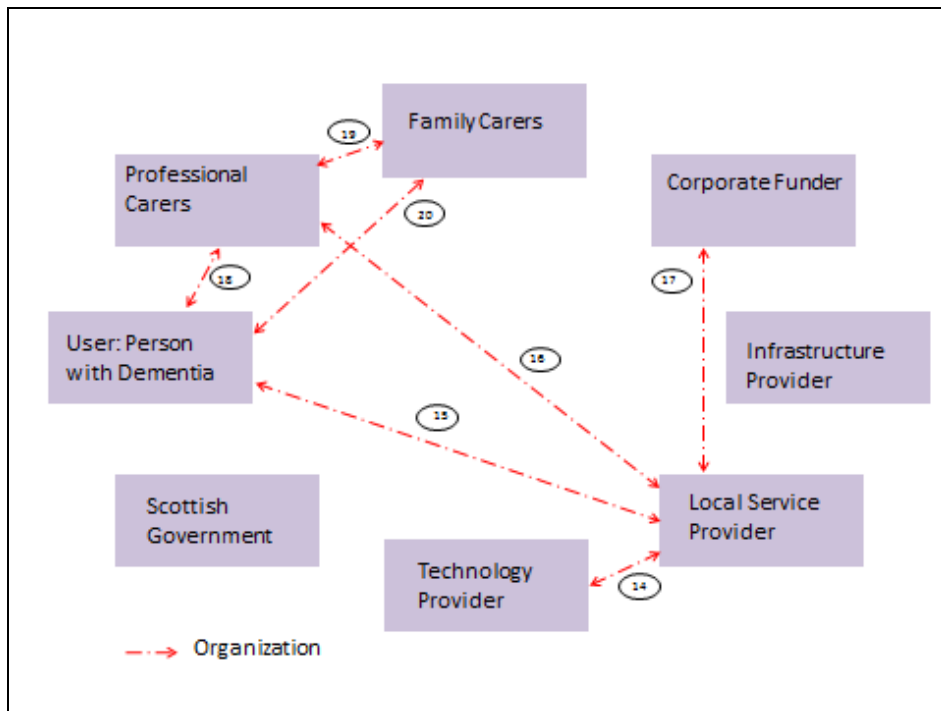


Figure 7: Organizational links between stakeholders in Western Isles

The analysis indicates that it is likely that The Local Service Provider (NHS Board) provides Giraff to professional carers as well as persons with dementia and their family. The Scottish Government finances the service (Giraffe, broadband and personnel) through the Corporate Funder and Local Services Provider. The level of support via the Giraff will be adapted by Local Service Provider and Professional Carers according to the needs of the individual users.

Arrows	Description
1	Technology Provider provides Giraff to local Service Provider
2	Local Service Provider provides necessary technology to Persons with Dementia
3	Local Service Provider provides technology (Giraff) to Professional Carers
4	Local Service Provider provides technology (Giraff) to family Carers
5	Infrastructure Provider provides connectivity to Persons with Dementia
6	Infrastructure Provider provides connectivity to Professional Carers
7	Infrastructure Provider provides connectivity to Family Carers
8	Infrastructure Provider provides connectivity to Local Service Provider
9	Scottish Government provides funding to Corporate Funder
10	Corporate Funder provides financing to Local Service Provider
11	Scottish Government provides funding for infrastructure (to Local Service Provider)
12	Local Service Provider pays Infrastructure Providers
13	Local Service Provider pays Technology Provider for Giraff
14	Communication about requirement issues between Technology Provider and Local Service Provider
15	Local Service Provider and person with dementia decide on level of appropriate care via Giraff. Training and feedback on experience and outcomes. Alerting service.
16	Local Service Provider and Professional Carers decide on level of appropriate care via Giraff. Training and feedback on experience and outcomes.
17	Local Service Provider and Corporate Funders decide on level of appropriate care via Giraff.
18	Professional Carers provide support and education to persons with Dementia via Giraff
19	Professional Carers provide support and education to Family Carers
20	Family carers provide support to Person with Dementia

Table 15: Description of technological, financial and organizational links between stakeholders (Western Isles)

## **C.4.2 Opportunities and barriers**

In this chapter, important technical, organizational and economic issues raised during the project period will be discussed.

### **C.4.2.1 Technological issues**

There is a lack of infrastructure in the Islands. Broadband is necessary for using the Giraff and similar technologies which could be introduced to assist people in isolated situations. Broadband speed is not consistent even in the better serviced areas. In some areas it is so weak as to be unusable. This is detrimental to the use of technology and creates inequity of service provision.

There are standards in light of Giraff technologies, such as Health and Safety Legislation, Data Protection, British Kite Standards, which need to be complied.

People are increasing using Facetime/Skype. Introducing Giraff was an entirely new concept for most people. Giraff has the added advantage of being mobile.

The service does not produce information about the patient, but the issue, use and benefits of the equipment would be recorded in patients' notes. Integration with other systems is not envisaged.

Technological support is needed initially, particularly with new more complex equipment to ensure most effective and efficient use, but after once established support should no longer be required. However, some ongoing technical support for any servicing or repair issues may be necessary. Less complex assistive technology will remain in people's homes as long as required and would not require technical backup. The use of Jabber/ Skype /Facetime is a personal choice and would not require support from public bodies. Equipment such as Giraff may require to be serviced when returned from the service user. This type of equipment we would only envisage using for short periods, times of crisis, absence of a carer etc. If someone purchased a Giraff independently technical support would be provided by the supplier.

### **C.4.2.2 Organizational issues**

Parts of the service provided are completely new but other parts are a new way of offering existing services, for example the Giraff. The level of supervision via the Giraff will be adapted according to the needs of the individual users.

Qualifications, knowledge base, experience and competencies needed to offer the service are in place across the health and social care sectors.

There may be issues regarding responsibilities and privacy (including transfer of sensitive information where this might apply). The short term nature of the programme has not given time to consider these in any great detail.

Some equipment is simple to use and requires little or no training. Some assistive technology can be demonstrated and support given by personnel in the local patient alarm system which has been established for many years. Training in more complex equipment such as Giraff

support would come from the suppliers, and could be supported by local personnel, if necessary.

#### **C.4.2.3 Economic issues**

**Investments:** Some of this equipment is supplied by health and social care authorities, some may be supplied by charitable organisations or, where this is not the case, the service user and or their families may choose to pay for this equipment. In this case, health and social care staff should be able to direct them to the most effective and cost efficient piece of equipment suitable to their needs.

**Running costs:** All health and social care services are funded by central government in the form of budget allocations separately to health authorities and local authorities. Allocations for 'dementia services' will come from both of these authorities, the distribution dependent on the nature of the service and subject to national and local guidelines and standards.

Consequently, the activity generated by Remodem is not regarded as a separate service, but as enhancing existing services or as ongoing modernisation of services. In time it will become integrated with existing services. Consequently it is and will remain, largely, government funded. There are no user fees for these services.

The flow of money presented in the Value Web is possible within existing organization, but the cost of equipment may have to be borne by service users or possibly charitable organizations. Complete evaluation has not been possible due to time constraints and circumstances. In the longer term and with more time to for trial and evaluation, the cost of supplying Giraff could be measured against the cost of admitting someone into hospital or residential care.

#### **C.4.3 Strategy for Deployment in the Region**

Decisions on the implementation of any new services would be taken at the highest level of Health and Local Authority services. However new ways of working inherent within the Remodem Project have not been regarded as entirely new services but a way of enhancing and improving existing services.

The project has not been long enough to effectively evaluate any aspect of this project. However, there has been significant progress in highlighting dementia, the needs of service users and their carers and generating interest in professional and public circles. The Remodem Project has served to focus attention on dementia and services for people with dementia in this area.

The RemoDem services fit with a number of national strategies, for example, 'Shifting the Balance of Care', 'E health Strategy', 'National Dementia Strategy' and '20/20 Vision'. Given some additional funding the services could be routinely implemented.

The development of a Dementia Care Team for the community has been possible by dovetailing aspects of the Remodem Project with another local initiative. This is an exciting future development of a community team linked by technology.

Even during the short timescale of this project, the Western Isles have managed to dovetail it into other projects (Dementia Care Team and the modernisation of mental health services in



the Western Isles). If they are able to continue, there is no doubt that it could have further synchrony with these and other projects.

The potential benefits of the tested services are for the 315 people currently diagnosed with dementia their families informal carers and professional health and social care staff.

The Giraff type technology is not only suitable for persons with dementia. It is also viewed as the way ahead for people with any long term condition, living in remote and rural areas and who require support in self-managing their condition or when health and social care staff require daily contact (possibly during a temporary exacerbation or another short term condition worsening the situation or in the temporary absence of a carer) and travelling would be an issue. Additionally, it could allow family, living at a distance, the reassurance of multiple daily contacts, if required or desired. This is particularly pertinent to island communities. There is huge potential for this type of technology in both rural and urban areas.

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