Project Title	Virtual and memory adaptable spaces creating stimuli for the senses in ageing people with dementia
Project Acronym	SENSE-GARDEN
Project No	AAL-CALL-2016-054
Funding Programme:	Active and Assisted Living (AAL) programme
Call	CALL 2016 – Living Well With Dementia
Start Date of Project	01.06.2017
Duration of Project	36 Months
Project Website	www.sense-garden.eu

D5.2 Intermediate Business Plan and Business Model

www.SENSE-GARDEN.eu

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Dissemination Level		
PU	Public	**X**
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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0.2	09-10-2018	Ronny Broekx	2. Canvas Model	SG Lean Business Model
0.3	18-10-2018	Ronny Broekx	All	second version
1.0	21-11-2018	Ronny Broekx	All	Corrections after internal review. Inclusion of tables and graphs
1.1	22-11-2018	Catalina Anghelache-Tutulan	All	Comments and contributions, Tables and graphs
1.2	24-11-2018	Artur Serrano	All	Update structure and harmonize contents

Contents

Deliverable Summary

Creating a lean business plan is a growing process. It starts with many assumptions but by going into detail for every block, the business plan will get progressively more mature so that it will eventually be ready to be tested in a first attempt to enter the market.

The Business Model Canvas has been validated in multiple projects under the AAL Programme. For this reason, and for the flexibility and readability it offers from initial to more advances stages of a project, it has been chosen as the main tool for the Business Planning in SENSE-GARDEN.

This intermediate business plan presents the results of the many interactions between Consortium partners to define the approach to the market and the strategy to follow by the interested partners once the project ends. The discussions took in consideration the needs in every country represented in SENSE-GARDEN. The geographic distribution of the Consortium guarantees a coverage of the north, the south, east and central Europe. This Business Model Canvas, as presented in this deliverable, will be further developed to help produce the final business model to be delivered in month 36 of the project.

The first insights extracted from the analysis done, show that approaches using media are getting more and more visible in the AAL market with a growing number of companies. However, potential competitors are not focusing on the key aspects of SENSE-GARDEN, as the personalization of the experience, for example. This has direct implications in the creation of personalized and continuously adjustable care plans in chronic conditions as dementia. This deliverable must be considered in the light of an exploitation plan, which had an initial version developed and is presented in deliverable D5.3.

1   Introduction

The innovative idea and the visual characteristics of the SENSE-GARDEN offer interesting opportunities for the media. This includes photos, videos and interviews. Such ingredients are attractive to the media, such as TV and newspapers. Two local television interviews and over 10 newspaper articles have been already published about SENSE-GARDEN. When results start to come out with proven impact on the quality of life of end-users, other care organizations should be interested to get on board and present SENSE-GARDEN to their clients. This is expected to generate a "market-pull". Three SMEs in the Consortium are already interested in up taking the commercialization of SENSE-GARDEN. Also, the care organizations involved have a strong push to support innovation in care and new ways of working. They are willing to be ambassadors for SENSE-GARDEN and act as real life showrooms for other organizations. With a conservative projection of 5% market penetration to care facilities in Europe, the number of installed SENSE-GARDENs could easily reach a hundred in a couple of years. Eventually, all care organisations specialised in dementia will have to contemplate the acquisition of SENSE-GARDEN. A success in Europe would most certainly open doors to other markets as well, such as the US, Australia, Asia, places where the market for IT supported care and assistive technologies is growing at a fast pace. A procurement-ready version of the SENSE-GARDEN KIT is planned and expected just after the end of the project. A business model for a project like SENSE-GARDEN is in essence, a description of the foreseen plan for the Consortium's value creation. What we propose to supply, how, to whom and how the money flows. A popular template in use to describe the business model is the Osterwalder's Canvas model (see figure below). As mentioned above, it has been used as a reference tool for the preparation of the project's intermediate business model that is presented hereafter.
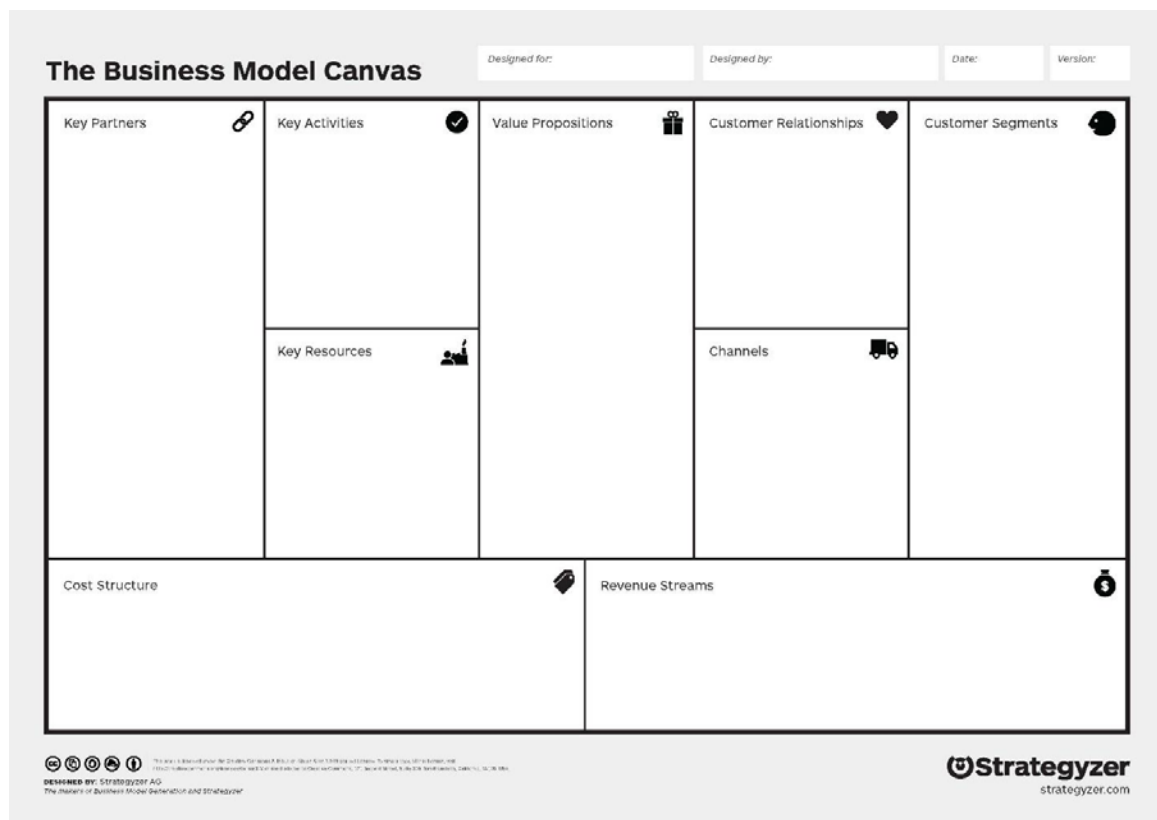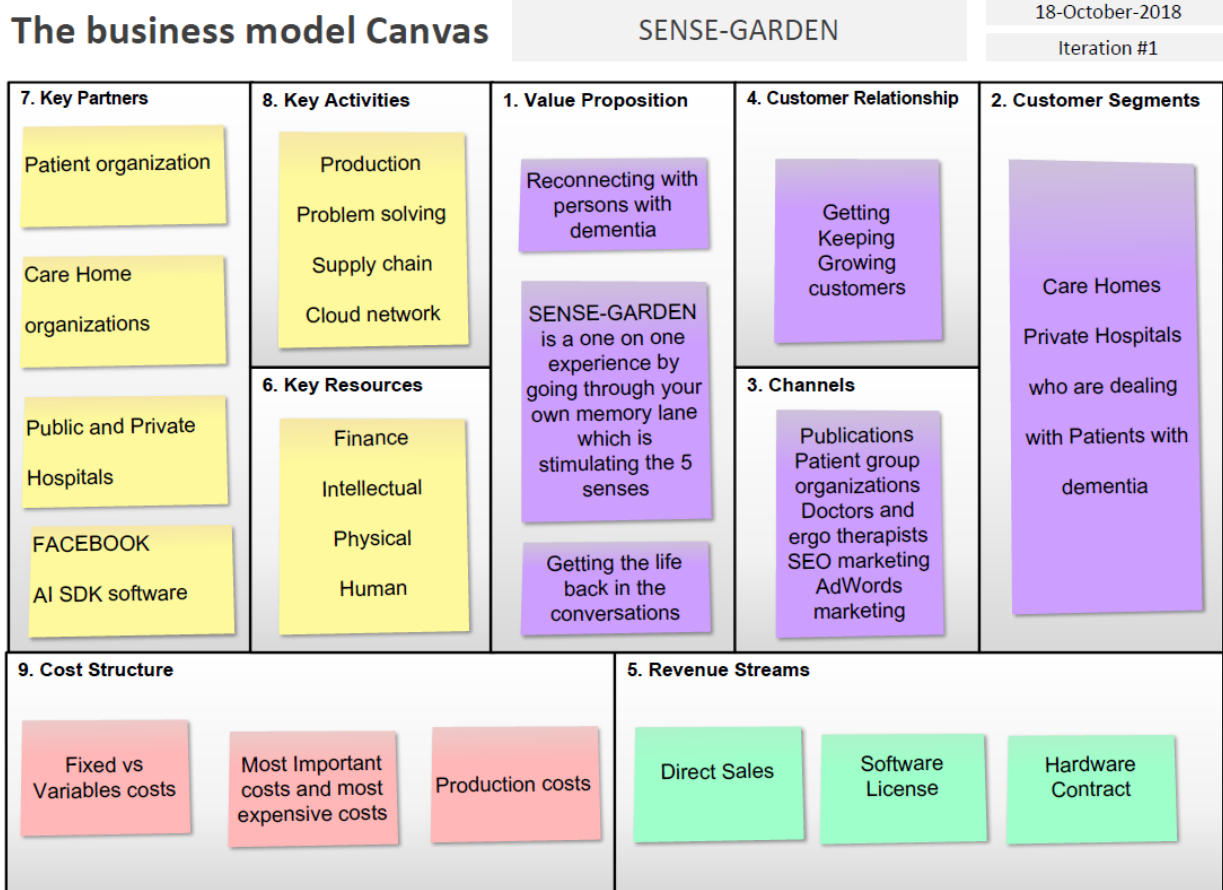

Figure 1.   Lean business model canvas [source strategyzer]

The Business Model Canvas template shown in Figure 1, structures the business model into nine basic areas. Below we flesh out these sections in order to show how SENSE-GARDEN responds to these nine areas.

2 The Canvas Model for SENSE-GARDEN

Below are included the additional considerations regarding the various areas of the model.

2.1 Value Proposition

- What value do we deliver to the customer? Which one of our customer's problems are we helping to solve? Which customer needs are we satisfying?
- Improving care
- Promoting well-being of PWD
- Increasing quality of life for PWD - Stimulating confidence, Restoring dignity, Improving socialization, Improving physical abilities, Improving memory, Reducing decay rate of other cognitive abilities
- Increasing quality of life for informal caregiver - Reducing the stress and care burden, Facilitating states of peace of mind, Feeling of being useful

- Leveraging activity of professional carers - Increasing of efficiency of provided care, Increasing job satisfaction, Improving communication with PWD, Better use of own resources
- SENSE-GARDEN unique propositions

  - An immersive adaptable space that recognizes the visitor and adjusts stimuli to different senses based on the person's profile of memories, history, preferences, etc.; Innovative sense technology; Installable in most care facilities (only an area of 30 to 50 square meters is required); Trials in four countries will test effectiveness

  - Reduced time to market due to incorporation of existing hardware components; Open source license; Public APIs for third-party services and components integration; Use of many components of mainstream technology reduces cost; Possibility of extending solution to support other user groups (e.g. autism and other neurological disorders)

2.2   Customer Segments

For whom are we creating value? Who are our most important customers?

- Care organizations: Care facilities with focus on dementia, public or private, with assisted living technology
- Hospitals: Private and public, which offered dementia targeted services
- Insurance companies

2.3   Channels

Through which channels do we reach our customers? - Care organizations, Insurance companies, Marketing campaigns, Media organisations and companies.

- Publications
- Patient groups' organizations
- Doctors and ergo-therapists
- SEO marketing and ADWords marketing e.g. bidding on the word dementia

2.4   Customer Relationships

How do we maintain the relationship with our customer segments over time? Two systems will be running together within the Customer Relationship plan: Helpline for personal assistance – service mostly concerned with the care and therapy aspects, System and technical support – a service defined to assist the customer in all issues related to the use of the system from a technical perspective, reported problems will be handled through an online ticketing system.

Getting customers: sometimes called demand creation, drives customers into your chosen sales channel. In SENSE-GARDEN this will be done by leveraging the interest already expressed by the media (newspapers, TV and magazines focusing in popular science)

Keeping customers or retention: gives customers reasons to stick with the company

and product. In SENSE-GARDEN a loyalty programme based on a monthly statistic overview of SENSE-GARDEN sessions where the cost of servicing contract disappears by using it more than 25 times a month.

Growing customers: involves selling them more of what they've brought as well as new and different products and encourages them to refer new customers. In SENSE-GARDEN an Up-selling strategy - promote the purchase of higher-end products – will be put in place by promoting: acquisition of hardware, e.g. a 4K immersive reality wall or a 180 degrees projection system; upgrading of software, e.g. a more advanced A.I. system; contracting of advanced services. E.g. customized video contents based on localization or meaningful pictures based on historical, political or artistic events.

2.5   Revenue Streams

Direct sales: 45% margin on the SENSE-GARDEN Room

Direct sales: 10% margin 011 devices and projectors

Direct sales 80% margin on mini computers and NFC technology

Software license: 195 € fixed amount per month for using the software

Service contract: 10% of the total value of hardware and software

2.6   Key Resources

Finance: Line of credit each business partner invests 25.000 euro

Finance: New funding from Canada and UAE

Physical Offices: in Romania, Norway, Portugal and Belgium

Intellectual capital: Universities in Norway and Bucharest and the Elias hospital

Human resources: Software engineers from Compexin and ePoint

2.7   Key Partners

Patient organization: Paid awareness and articles through their website

Care Home organizations: Fixed 5 year contract with these organizations

Hospitals: Mini SENSE-GARDENS rooms at the entrance for 25% of the price

FACEBOOK® (through service subscription): Connection with Facebook and Instagram

A.I.: Software SDK (like the robot NAO® project, trail kits and API to experiment with)

DHL® (through service subscription): Partnership for door-to-door shipment

2.8   Key Activities

Production: Creating SENSE-GARDEN Rooms and building Mini PC kits

Problem solving: Investing in automation by AI software development

Supply chain management: Using DHL as a door to door transport partner

Cloud network management: Renting protected cloud servers in each country

2.9 Cost Structure

Production costs: Manpower associated with SENSE-GARDEN development and maintenance costs

Fixed costs: Infrastructure costs

Variables costs: SENSE-GARDEN equipment and connection costs

High costs: SENSE-GARDEN room building costs
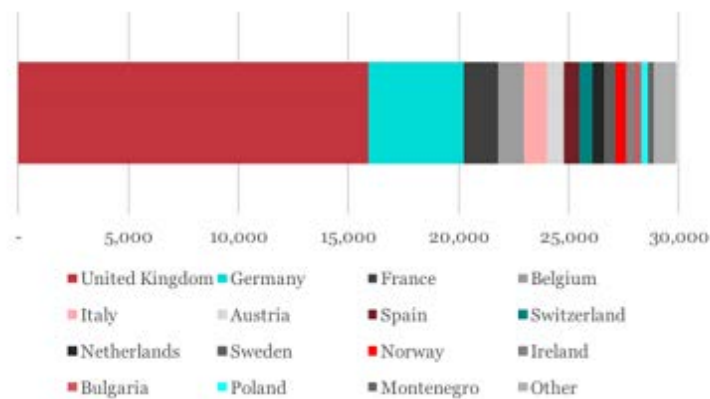
3 The AAL market

Figure 2.   Media count AAL sectors and technologies by geography (2009-2016)

How does the EU AAL market compare with the global AAL market?

"In 2017, the EU market represents 21% of the global AAL market, and by 2021 the EU market size is expected to increase to 26% of the global market. The country with the largest market share is the US, accounting for 60% of total (€539m) in 2017 and an expected 40% of total (€2,132m) in 2021.

The penetration of AAL technologies in the US is substantially higher than it is across the EU. In comparison to the US market, the EU market is relatively diverse. EU countries have different health systems, policy systems and legal rules, and a wider range of consumer expectation and cultural differences. This means that expanding internationally is more challenging in the EU and there is a need to find local distribution partners.

It is difficult to gain international exposure – going from a small scale local market to an international one can be very hard. There are very different socio-cultural expectations towards technology across Europe and more needs to be done to find international partners for AAL businesses. Focus in this area needs to be sensitive to cultural experience whilst actively finding distributors and intermediary customers internationally.– Roel Smolders, CEO of Activ84Health

Some EU countries (i.e. Denmark, Estonia, Iceland, Finland, Norway, Sweden and also the Netherlands and Spain) a larger proportion of GPs have adopted such electronic networks, making eHealth/telehealth

systems more accessible to the relevant consumer groups. AAL market penetration in some EU countries has potential to rapidly reach the level of market penetration in the US."

Source: Data from Technopolis analysis

Figure 3.   EU 24 AAL market and related sectors[1]
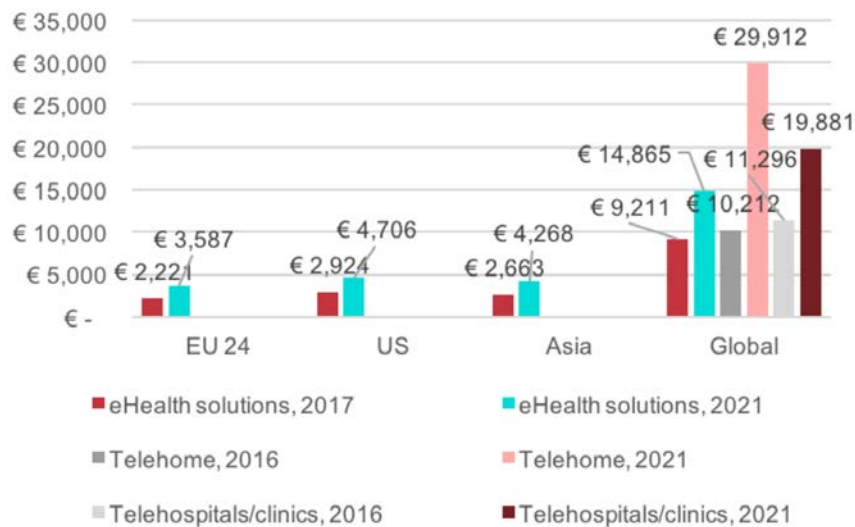

Figure 4.   EHealth solutions market size[2]

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[1] Source: *AAL Market and Investment Report - A study prepared for the AAL Programme (Active and Assisted Living) by Technopolis Group, issued in May 2018*

[2] Source: *AAL Market and Investment Report - A study prepared for the AAL Programme (Active and Assisted Living) by Technopolis Group, issued in May 2018*

4   TAM: Total addressable market

"A specific challenge to old age is dementia and almost 6% of the EU population over 60 years of age suffer from dementia. Alzheimer's Disease is the most common disorder which causes dementia, accounting for about 65% of all cases[3]. It is estimated that the number of people with dementia will increase from 10m in 2015 to 13m in 2030 and 19m in 2050[4]. Prevalence of dementia increases exponentially with age, doubling with every 6-year increment in age, peaking among those aged 85+ in Europe[5]."

We have identified the Total addressable market of our SENSE-GARDEN solution, as the eHealth solutions market in Europe, which according to the AAL Market report issued in May this year and the sources used for the report using data on ICT solutions for health care monitoring from BBC (2016) and data on eHealth solutions from Statista, is determined at 2.221k euro in 2017 and is predicted to grow up till 3.587 k euro in 2024, giving our solution a potential penetration perspective on this upgrowing market.

Out of this addressable market, we have identified a series of selection criteria that define our addressable market out of this total eHealth solution market. One of the most defining criteria is the fact that SENSE-GARDEN's addressed usage is for PwD, limiting the addressable market to customers that provide care and support for such patients, like Care homes, care institutions and hospitals. As a starting point and other selection criteria, we will target at the beginning only such institutions placed in the countries where we have the testing sites and research of the current project prototype in order to heave an easy product launch and adoption.

From this determined addressable market, we project a stake of 20% that can bring profits and success on the SG solution. A figure of 20% of the market may seem an optimistic estimate. However, at the time of writing this deliverable, the SENSE-GARDEN has no competitors. Being the first, creates a window of opportunity to create a unique and identifiable branding campaign that places the SENSE-GARDEN in the lead position in the market of technologies for dementia in intermediate and advanced stages. More details on profit analysis you can check out in deliverable D5.3 Exploitation plan.

4.1   Initial country analysis – the Belgium case

Care homes in Belgium are in the great majority privately owned and managed by large groups. A typical care group could own several tens of care homes. In a first market analysis, the following groups have been identified (see Figure 2). It is important to note that Vulpia, a care group with 33 care homes, is already part of the SENSE-GARDEN Consortium and plans to install additional SENSE-GARDENs in more care homes in the group have already been considered at the level of Board of Directors. Further investigation together with the institutions below, will be performed in the scope of the project to target the final version of the Business Plan.

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[3] Prince, M., Wimo, A., Guerchet, M., Ali, G. & Prina, M. (2015). World Alzheimer Report 2015, Alzheimer's Disease International, London
[4] Alzheimer's disease. Alzheimer Europe. Available at: http://www.alzheimer-europe.org/Dementia/Alzheimer-s-disease
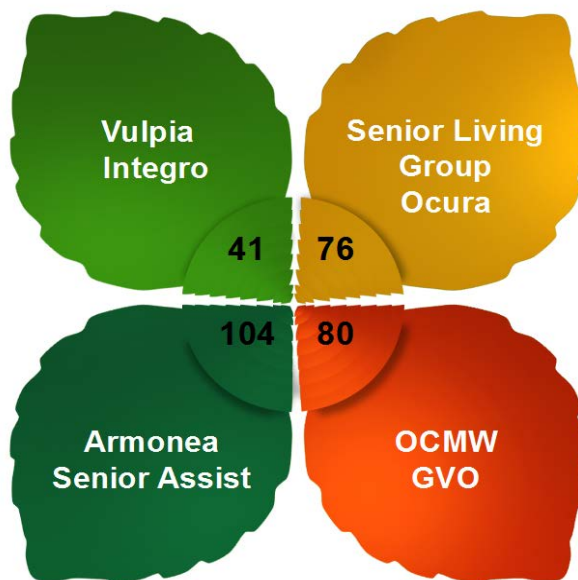[5] Ibid.

Figure 5.   Care homes in the market segment in Belgium
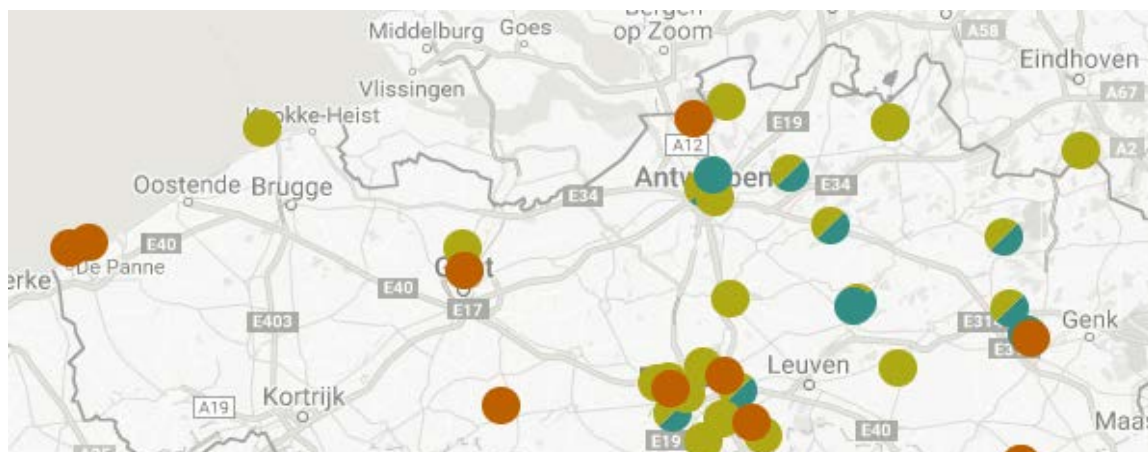
Figure 6.   Vulpia care homes[6]

Integro[7] is a group of 8 care homes formerly known as Rusthuizen ZA

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[6] **http://www.vulpia.be/woonzorgcentra/**
[7] https://www.integrozorg.eu/nl/news

RUSTHUIZEN

Antwerpen

→ **Dageraad** Antwerpen
→ **Gravenkasteel** Sint-Amands
→ **Groenveld** Wilrijk
→ **Heydehof** Hoboken
→ **Millegem** Ranst
→ **Plantijn** Kapellen
→ **Regatta** Antwerpen
→ **Salve** Brasschaat
→ **Wommelgheem** Wommelgem

Limburg

→ **Gaerveld** Hasselt
→ **Huize Lieve Moenssens** Dilsen-Stokkem
→ **Ter Meeuwen** Meeuwen-Gruitrode

Luxemburg

→ **La Douce Quiétude** Marche-en-Famenne
→ **Mathelin** Messancy

Vlaams-Brabant

→ **De Klinckaert** Haacht
→ **De Lelie** Rotselaar
→ **De Stichel** Vilvoorde
→ **De Wyngaert** Rotselaar
→ **Eyckenborch** Gooik
→ **Hestia** Wemmel
→ **Home Select** Meise
→ **Keymolen** Lennik
→ **Koning Albert I** Dilbeek
→ **Leonardo Da Vinci** Tervuren
→ **Quietas** Dilbeek
→ **Rietdijk** Vilvoorde
→ **Spanjeberg** Zellik
→ **Vondelhof** Boutersem
→ **Voortberg** Testelt

Brussel

→ **De Wand** Laken
→ **Henri Dunant** Evere
→ **Home Castel** Jette
→ **La Petite Île** Anderlecht
→ **Les Floralies** Sint-Lambrechts-Woluwe
→ **Les Terrasses du Bois** Bruxelles
→ **Melkriek** Uccle
→ **Pagode** Neder-over-Heembeek
→ **Sebrechts** Sint-Jans-Molenbeek
→ **Tillens** Ukkel

Luik

→ **Les Trois Couronnes** Esneux
→ **Val Mosan** Luik

Namen

→ **Charmes en Famenne** Mesnil-Saint-Blaise
→ **La Pairelle** Wépion
→ **Pont d'Amour** Dinant

Waals-Brabant

→ **L'Orchidée** Ittre
→ **Le Lothier** Genappe
→ **Le Ménil** Braine l'Alleud
→ **Résidence du Parc** Grez-Doiceau

Henegouwen

→ **L'Orée du Bois - La Clairière** Warneton
→ **Les Orchidées** Mouscron

Kempen

→ **Binnenhof** Merksplas
→ **De Notelaar** Olen
→ **Den Brem** Rijkevorsel
→ **Heiberg** Beerse
→ **Hemelrijck** Mol
→ **Hof Ter Dennen** Vosselaar
→ **Laarsveld** Geel
→ **Nethehof** Balen
→ **Perwijshof** Zoerle-Parwijs
→ **Smeedeshof** Oud-Turnhout
→ **Vogelzang** Herentals

Oost-Vlaanderen

→ **De Vlamme** Zottegem
→ **Lakendal** Aalst
→ **Larenshof** Laarne
→ **Overbeke** Wetteren
→ **Rodenbach** Denderleeuw
→ **Ter Bake** Denderleeuw
→ **Ter Venne** Sint-Martens-Latem

West-Vlaanderen

→ **De Hovenier** Rumbeke
→ **Noordduin** Koksijde
→ **Westduin** Westende

Figure 7.   Armonea care homes[8]

OCMW[9] and GVO[10] have combined 80 care homes.

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[8] https://armonea.be/
[9] http://www.ocmw-info-cpas.be/fiche_FV_nl/le_cpas
[10] http://www.gvo.be/

Overzicht woonzorgcentra

Zonnetij
Woonzorgcentrum
Kortverblijf & herstelverblijf
Aartselaar

Zonnewende
Woonzorgcentrum
Assistentiewoningen
Kortverblijf & herstelverblijf
Aartselaar

Ten Prins
Woonzorgcentrum
Anderlecht

Tuinen van Herinnering
Woonzorgcentrum
Anderlecht

Sint-Jozef
Woonzorgcentrum
Kortverblijf & herstelverblijf
Antwerpen

Wielant
Woonzorgcentrum
Anzegem

Beerzelhof
Woonzorgcentrum
Assistentiewoningen
Beerzel

Edelweis
Woonzorgcentrum
Kortverblijf & herstelverblijf
Begijnendijk

Sporenpark
Woonzorgcentrum
Assistentiewoningen
Kortverblijf & herstelverblijf
Beringen

Le Richemont
Woonzorgcentrum
Kortverblijf & herstelverblijf
Bioul-Anhée

Eksterveld
Woonzorgcentrum
Bonheiden

Zonneweelde
Woonzorgcentrum
Assistentiewoningen
Kortverblijf & herstelverblijf
Bonheiden

De Ravestein
Woonzorgcentrum
Assistentiewoningen
Boortmeerbeek

Sint-Lenaartshof
Woonzorgcentrum
Assistentiewoningen
Kortverblijf & herstelverblijf
Dagverzorging & crisisopvang
Brecht

Residentie Boneput
Woonzorgcentrum
Kortverblijf & herstelverblijf
Bree

Mélopée
Woonzorgcentrum
Kortverblijf & herstelverblijf
Brussel

Romana
Woonzorgcentrum
Kortverblijf & herstelverblijf
Brussel

Résidence L'Air du Temps
Woonzorgcentrum
Chenée

Zorgdorp De Pastorij
Woonzorgcentrum
Assistentiewoningen
Kortverblijf & herstelverblijf
Denderhoutem

Kasteelhof
Woonzorgcentrum
Dendermonde

Kempenerf
Woonzorgcentrum
Kortverblijf & herstelverblijf
Dessel

Ezeldijk
Woonzorgcentrum
Assistentiewoningen
Kortverblijf & herstelverblijf
Diest

Ry du Chevreuil
Woonzorgcentrum
Assistentiewoningen
Kortverblijf & herstelverblijf
Eghezée

Résidence Exclusiv
Woonzorgcentrum
Kortverblijf & herstelverblijf
Evere

Residentie Prinsenpark
Woonzorgcentrum
Assistentiewoningen
Kortverblijf & herstelverblijf
Genk

Uilenspiegel
Woonzorgcentrum
Genk

Hof Van Gan
Woonzorgcentrum
Assistentiewoningen
Kortverblijf & herstelverblijf
Genk

Seniorie de Maretak
Woonzorgcentrum
Kortverblijf & herstelverblijf
Halle

Coham
Woonzorgcentrum
Ham

Clarenhof
Woonzorgcentrum
Assistentiewoningen
Kortverblijf & herstelverblijf
Hasselt

Berkenhof
Woonzorgcentrum
Heers

Berckenbosch
Woonzorgcentrum
Kortverblijf & herstelverblijf
Heusden

Ter Hulst
Woonzorgcentrum
Hoeselt

De Vlaamse Ardennen
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Dagverzorging & crisisopvang
Horebeke

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Jette

De Nootelaer
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Seniorenresidentie Keerbergen
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Keerbergen

Vinkenbosch
Woonzorgcentrum
Assistentiewoningen
Dagverzorging & crisisopvang
Kermt

Dellebron
Woonzorgcentrum
Kortverblijf & herstelverblijf
Dagverzorging & crisisopvang
Kortenaken

't Hoge
Woonzorgcentrum
Assistentiewoningen
Kortrijk

Le Progrès
Woonzorgcentrum
Assistentiewoningen
Kortverblijf & herstelverblijf
La Louvière Haine-Saint-Paul

Drie Eiken
Woonzorgcentrum
Assistentiewoningen
Lanaken

De Witte Bergen
Woonzorgcentrum
Assistentiewoningen
Lichtaart

Sorgvliet
Woonzorgcentrum
Linter

Golden Morgen
Woonzorgcentrum
Kortverblijf & herstelverblijf
Lontzen

Maasmeander
Woonzorgcentrum
Assistentiewoningen
Kortverblijf & herstelverblijf
Maasmechelen

Milsenhof
Woonzorgcentrum
Dagverzorging & crisisopvang
Mechelen

Helianthus
Woonzorgcentrum
Assistentiewoningen
Melle

Seigneurie Du Val
Woonzorgcentrum
Moeskroen

Au Bon Vieux Temps
Woonzorgcentrum
Assistentiewoningen
Kortverblijf & herstelverblijf
Mont-Saint-Guibert

De Muze
Woonzorgcentrum
Kortverblijf & herstelverblijf
Dagverzorging & crisisopvang
Muizen

Béthanie
Woonzorgcentrum
Kortverblijf & herstelverblijf
Namur Saint Servais

Het Prieelshof
Woonzorgcentrum
Assistentiewoningen
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Oordegem-Lede

Anemoon
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Puurs

De Vaeren
Woonzorgcentrum
Kortverblijf & herstelverblijf
Reet

Annadal
Woonzorgcentrum
Retie

Arcus
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Dagverzorging & crisisopvang
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Sint-Jans-Molenbeek

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Veerle-Laakdal

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Kortverblijf & herstelverblijf
Watermaal Bosvoorde

Résidence Du Plateau
Woonzorgcentrum
Assistentiewoningen
Kortverblijf & herstelverblijf
Wavre

Wijgmaalbroek
Woonzorgcentrum
Assistentiewoningen
Wijgmaal

Sint-Lambertus'Buren
Woonzorgcentrum
Assistentiewoningen
Kortverblijf & herstelverblijf
Zelem/Halen

Bruggenpark
Woonzorgcentrum
Assistentiewoningen
Kortverblijf & herstelverblijf
Dagverzorging & crisisopvang
Zottegem

Oosterzonne
Woonzorgcentrum
Assistentiewoningen
Kortverblijf & herstelverblijf
Zutendaal

Figure 8.   Senior living group care homes[11]

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[11] https://www.seniorliving.org/lifestyles/group-home/

5   Business model analysis

In order to determine the bestselling model for the SENSE-GARDEN solution, we have analysed a number of models and assessed impact implications and levels of impact implicated by each model:

	One Time payment	Leasing Model	Freemium	Free forever
Type:	Paying Package including: Installation of SENSE-GARDEN room within an in-house dedicated space with all ICT equipment and dedicated software, including installation cost. Plus an additional monthly contract base fee for technical support, customer service, training and system updates	Leasing contract with Care homes/Care institutions/Hospitals with in-room installation and leasing contract on IT infrastructure and electronics Price includes pre-configuration costs, configuration costs, installation costs, technical support, customer service, training and system updates	Giving the SENSE-GARDEN software for free, the care institution should buy all the equipment themselves + paying just for technical support	Free for everyone: primary users, secondary users and companies.
Benefits:	Highest value	Lower cost sale	Viral adoption	Easy adoption
Challenges	High budget on marketing and sales for advertising the SENSE-GARDEN solution to care homes, care institutions and other similar entities	Risk of closing contract without amortizing the equipment costs, installation etc.	Lower profits Risk of counterfeit Lower profits, higher profits could be reached only through volume	Need to get a high usage in order to monetize it

Comments	High need of establishing a network of care institutions The most complete solution: personalized physical space with a garden like wooden design which includes all the ICT infrastructure and dedicated software solutions.	Easy to implement as there is no cost of building the space, just adding the ICT infrastructure in the dedicated room.	Requires a large number of users in order to amortize the investment Usually sought out model chosen by Software companies launching a product, would not be so adaptable for our solution which consists in both hardware and software components	Not so many companies go for this model High investment to increase usage and user base which could not prove out so profitable at the end
Impact	**Short term:** Reduce overburden and stress for professional carers Reducing time spent for carers formal/ informal to reconnect with the PwD and help them remember moments, experiences and sense from their past. **Long term:** Budget reductions for care organizations spent on different solutions for treatment and care of PwD	**Short term:** Increase PWD interaction with family and loves. Short term: Reducing time spent for carers formal/ informal to reconnect with the PwD and help them remember moments, experiences and sense from their past. **Long term:** Budget reductions for care organizations spent on different solutions for treatment and care of PwD	**Short term:** Increase PWD safety, autonomy, and participation in social life.	**Short term:** increase PWD interaction with family and loves ones, **Long term:** As it is free, could reach a higher number of patients and carer proving a positive impact for society at large
Impact assessment	High	High	Medium	Low

Table 1. SENSE-GARDEN Business model analysis

We ranked these outcomes to the best fit and found that the freemium and free forever solution would not fit our business model due to the hardware component of the SENSE-GARDEN that has to be sold.

The only two models that would fit are the one time payment and leasing based model. The leasing model is a way to sell the idea to the care home and professional caregivers, if they like it, they don't have to invest a big part of their budget, just a monthly payment will be enough to start with the SG. The price includes pre-configuration costs, configuration costs, installation costs, technical support, customer service, training and system updates.

The one time payment is also a possible model. It does need a one time engagement of the care home but this does not need a big marketing investment as the care home may pay only the equipment. Every time a PwD will enter the SENSE-GARDEN room, the automatic counter will make a registration of this visit and add it to the automatic monthly invoice for the service component.

This model is our favorite because it will prove the engagement of the professional and formal caregivers and family members of the PwD.

This model starts making money from day one and can be monitored by the SENSE-GARDEN team so if the engagement is decreasing we can put messages out in that community or directly to the caregivers to advertise new possibilities and features, the same as Amazon Alexa is doing when they see decreasing interest of the Alexa homepod.

A concrete estimate of profits from the one time payment and leasing based models is given in deliverable D5.3 V1 Exploitation Plan.

6 The SENSE-GARDEN

Virtual and memory adaptable spaces creating stimuli for the senses in ageing people with dementia.

6.1 The SENSE-GARDEN KIT

In order to explore the different services offered in the SENSE-GARDEN KIT, we consider the End-user View   ,   the Caregiver View and the Back-end View (see figure architecture in Annex), and the SENSE-GARDEN space.

The End-User View – The main interaction services and devices for the Patient and Caregiver

The Caregiver View – The Configuration service integrated with the ERBS and the SPICE app used by the Caregiver to set the Flows, Manage Patients, Run the Live SENSE-GARDEN

The Back-end View – The APIs, User Profile, Data Mining, Data Storage that will run on the Local Cloud

Figure 9.   Overview of possible SENSE-GARDEN rooms

The SENSE-GARDEN Space will include 6 different modules of interaction with the user, based on the different senses accessed: Memory Lane, Reality Wall, Scent to Memories, Surround me, Keep my balance and Life road and Stationary bicycles.

Memory lane

This service consists of a personal story interactive screen. A medium-sized touchscreen dedicated to show more personal media, such as family or hobby related videos or images that reacts to user input through touch.

Reality wall

This consists in a high-definition projection in a full white-wall of the room. The wall, if possible, will have a round shape and a projector will placed in the ceiling. This round panorama wall gives the feeling of immersion in a given environment, such as a forest park, the beach, a football stadium, or a village.

Scent to memories

This service will integrate, if possible, commercially available solutions – the scent delivery systems. Open interfaces are being investigated for the integration with the platform. In this case, the scents dispersion would be automatically combined with the videos and images shown in the environment screen. For example, the forest shown in the reality wall will be combined with pine scent for example. Alternatively, if the reality wall is showing the users' house, a scent that the user associates to home or makes her/him feel calm can be used, such as a lavender, or the scent of candles.

Surround me

This service provides a surround sound system, which plays music/sounds selection based on the life history of the end-users. For this service, a number of loudspeakers will be placed, in a concealed fashion, around the garden to promote the feeling of being surrounded by sounds, like waves, or wind on the trees, or kids playing in a schoolyard.

Life road and Stationary bicycles

The service provides a combination of physical and mental (cognitive) exercise for the person's well-being. Two or one stationary bicycles will be installed in each SENSE-GARDEN. The Life Road solution consists of a projection of a film, in front of the bicycles, showing a route leading to known places, such as the house of the user, or the local shop, or even public buildings recognizable by the user, such as the city hall or the local church. The film starts when the user starts to pedal and pauses when the user stops, for example to look and talk about a particular spot or building on the way.

Keep my balance

This service consists of balance training. One of the physiological senses is considered to be the sense of balance (or equilibrioception). Impaired coordination or balance is commonly observed in PWD. For this module we are investigating the possibility of generating a personalized balance training game for the users of SENSE-GARDEN making use of a Kinect camera or even of an interactive projector.

7   Unique Selling Proposition

USP: The SENSE-GARDEN spaces associate technology with an innovative reminiscence therapy to create stimuli to the senses to recall memories allowing a reconnection with oneself, the family and the world around

Value for carers/family: SENSE-GARDEN supports and promotes the relationship with the loved ones suffering from dementia

Value for the care institution: better services, visibility, dedicated and personalised activities for their customers

Validation: testing sites in 4 countries: Norway, Belgium, Portugal, Romania, 12 months of testing with scientific and medical follow-up

8   Competitors

Snoezel rooms (not personalized and not adaptable)

Dementia villages: (not personalised and much higher investment)

Tovertafel: Hard to adapt to personal content

Music therapy: generic sound and music files (not personalized)

Competitor	SENSE-GARDEN Complete space solution (including all 6 modules)	Memory lane module	Reality wall module	Scent to memories module	Surround me module	Life road and Stationary bicycles module	Keep my balance module
Snoezel rooms	missing	missing	With projection	Using etheric oils	Sound system with vibrations	missing	missing
Dementia villages	missing	With objects	With projection	Using etheric oils	missing	missing	serious gaming
Tovertafel	missing	missing	Aquarium projection	missing	Only one speaker	missing	Balance games

Music therapy	missing	Old music files	missing	missing	Good sound system	missing	missing
Myro	missing	missing	missing	missing	missing	missing	Games included

Table 2. Competitors analysis compared to the SENSE-GARDEN solution
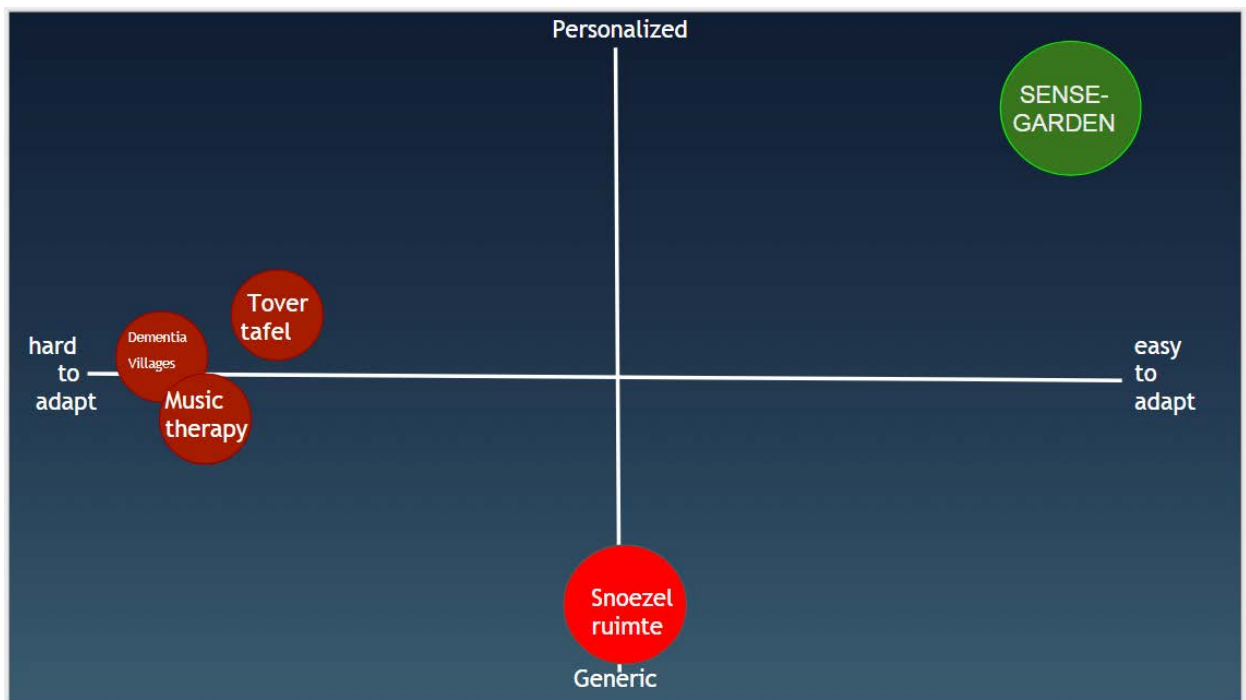

Figure 10. Simple business comparison graph

9   SWOT

In the below table we have analysed the different internal and external positive and negative aspects related to the SENSE-GARDEN solution.

STRENGTHS (+)		
Personalized system	uniqueness of the solution, possibility for PwD to reconnect with their own	Easy to adapt

	self and their memories: improved self-awareness and mindfulness.	
therapeutic benefits for PwD: mood, behavior, cognitive functioning improvement, participation, improved self esteem and sense of coherence and self utility	Summary of the PwD's likes and dislikes	support for the carer, family and loved ones of PwD for reconnecting with them, legacy of knowledge and emotions from their beloved one, improved family cohesion and sense of coherence.

WEAKNESSES (–)

Time consuming	price range (limiting the addressable market that can afford such a solution)	one to one system
it doesn't address sense of touch too much, nor taste. Maybe a voice command control will be a better solution than bracelets and tablets	privacy protection of content	we need to find solutions for a better and deeper immersion, like 4 walls projection, without affecting the feeling of here and now.

OPPORTUNITIES (+)

World is changing to one to one systems	lack of solutions dedicated to PwD on the market currently;	queste of care homes to find innovative solutions
predicted increase in E-health solutions market (up to 3,587 k euro predicted for 2021 for EU, from 2,221 k euro in 2017- according to the *AAL Market Report Technopolis, issued in May 2018*)	social economy business models are booming	care homes for PwD - clinics of geriatrics-gerontology - maybe hotels and other tourism facilities - facilities for psychiatric disorders

		- airports and railway stations (general content) - corporations, other institutions (for staff in hospitals, airports)? - for team building, burnout avoidance, restrooms

THREATS (–)		
Similar very personalized systems exists like Gallery memories, facebook, google	- lack of awareness of the benefits - lack of financial support - lack of interest of policymakers - lack of space for SG installation - concurrency? not at the moment	New GDPR rules changes in laws and regulations;
Research for SENSE-GARDEN might prove socially or ethically unacceptable;	AI systems Alexa, Archos Hello evolving towards our model	new ethics regulations regarding treatment and therapy for PwD

Table 3.   Detailed SWOT analysis of the SENSE-GARDEN solution