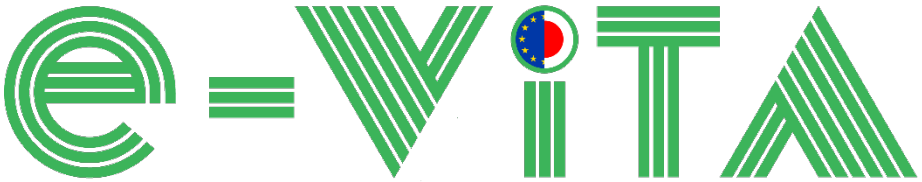

EU-JAPAN VIRTUAL COACH FOR SMART AGEING

D9.9 Final Socio-economic survey and Stakeholder analysis report

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Ministry of Internal Affairs and Communications, JAPAN

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E-VITA – European-Japanese Virtual Coach for Smart Ageing

E-VITA (EU PROJECT NUMBER 101016453)

WP9 – Dissemination & Exploitation

D9.9 Final Socio-economic survey and Stakeholder analysis report

Editors: R. Bevilacqua (INRCA), V. Stara (INRCA), Marine Luc (AGE), Francesco Pillitteri (ENG), Asako Ohara (MISAWA), R. Wieching (USI), T. Ogawa (TOHOKU)

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Executive Summary

The aim of D9.9 “Final Socio-economic survey and Stakeholder analysis report is to map an overall picture of EU Member States and Japan about society and culture about ageing: demography, healthcare situation, legal framework, key actors, key economic facts, policies, age-friendly environment policies, etc. The outcomes will be used to update the international collaboration actions between Europe and Japan with regard to AHA, related to the technology development and social sciences previously defined in D9.8 First Socio-economic survey and Stakeholder analysis report.

The document shares an overview of the EU Member States and Japan society and culture about Active and Healthy Ageing, related technology development and social sciences. society and culture of the EU Member States and Japan regarding Active and Healthy Aging, related technology development. This overview is discussed using the SWOT analysis framework. The aim is to detect the strengths, weaknesses, opportunities, and threats and use such information as foundation to develop a new battery of questions for the final online survey with stakeholders around EU and Japan.

Finally, a model was developed and reported into this deliverable to estimate the economic benefits of the e-VITA solution for the healthcare systems of Japan and Europe. Having identified the healthcare and social costs related to the management of certain diseases, the model would be able to express savings, in terms of reduced healthcare expenditures and social costs, given by users' adoption of the e-VITA solution.

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Acronyms and Abbreviations

Table 1 Acronyms and abbreviations

ESS	European social survey
ISCED	International Standard Classification of Education
PESTEL	Political, Economic, Social, Technological, Environmental and Legal factors
DD	Depressive Disorder
PPF	Physical Pre-Frailty
SPPB	Short Physical Performance Battery
UCLA	UCLA Loneliness Scale

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1 Introduction

Within this document, an overall picture of EU Member States and Japan society and culture about Active and Healthy Ageing, related technology development and social sciences is provided: demography, healthcare situation, legal framework, key actors, key economic facts, policies, age-friendly environment policies, etc, are reported in the main sections and related sub-sections.

In the previous version, the PESTEL framework was used to guide this overall picture across countries. As shown in Figure 1, PESTEL is broken down into six categories referencing factors.

- Political factors refer to both local and national politics, political policy, government and related laws. Whitin this category taxation policies, trade traffics, labour regulations, health & safety as well as education laws can be mapped.
- Economic factors refer to the general economic environment and the effects that this might have on the business and its customers, distributors and suppliers.
- Social factors focus on the buying behavior and how consumer needs can affect the value and necessity of a product or service. The category maps how the societal and cultural aspects of a chosen market might affect business (i.e., age demographics, ethnicities, and cultural differences).
- Technological factors play a crucial factor in business analysis. In PESTLE analysis, they can refer to the development of new technologies or the infrastructure for and access to established ones.
- Environmental factors that may influence the deployment of products or policies.
- Legal factors deal with how particular laws may affect business, idea, or concepts.

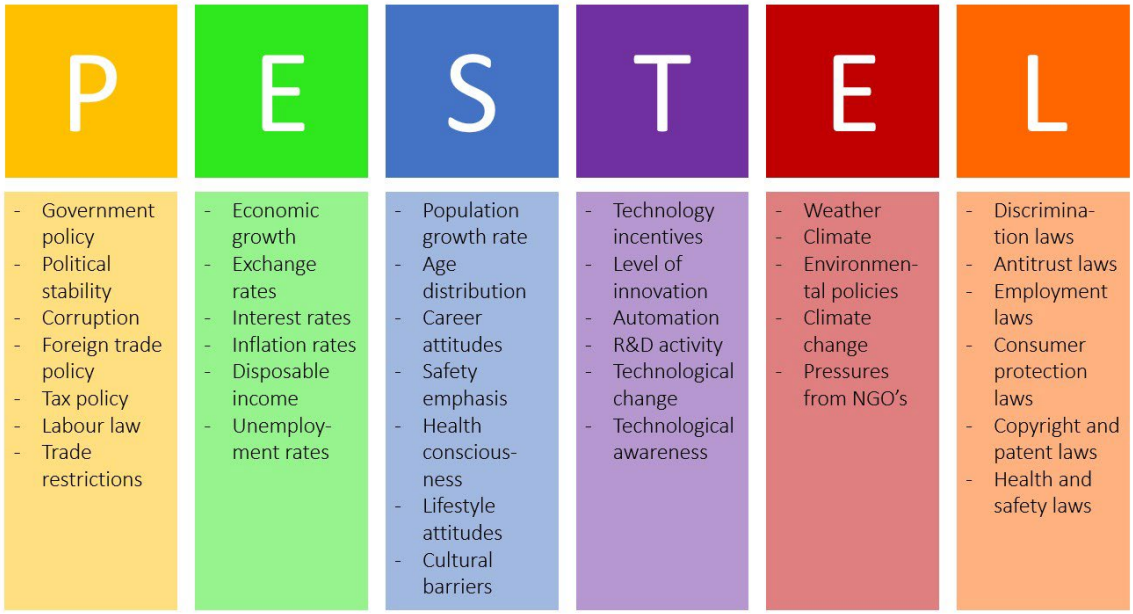

Figure 1 The PESTEL framework

The next step was to analysis data collect through this framework by using the SWOT method and develop new questions for an online survey.

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2 Socioeconomic Survey

2.1 Background

The SWOT matrix is an analytical tool for assessing strengths and weaknesses as well as analyzing opportunities available or threats faced by a specific type of business.

In this framework the following definitions are used:

- Strengths: attributes, characteristics and factors that give competitive advantage to the business;
- Weaknesses: attributes, characteristics and factors that weaken competitiveness of the business in the marketplace;
- Opportunities: favorable situations and factors that can strengthen competitive advantage of the business or provide the business with new sources of competitive advantage;
- Threats: unfavorable situations and factors that could create problems for the business compromising its competitive advantage to a certain extent.

These four areas can be categorized into internal factors (strengths and weaknesses) and external factors (opportunities and threats) as reported in Figure 2.

Figure 2 The SWOT matrix

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2.2 SWOT analysis of the e-VITA stakeholders survey

Data reported in D9.8 were processed using the SWOT analysis.

2.2.1 Strengths

- Support interactions, promotes sharing
- Take into consideration the sphere of spirituality
- Help older people with tasks and activities
- Facilitate the connection with the outside
- Promote and inform about healthy lifestyles
- Internet use has a positive influence on the lives of older people
- Present the user with all the benefits and risks in an honest way
- Connection between doctors and patients
- Bring older people closer to technology
- Help them learn more about their own health
- Support for the senior and family
- Motivate the person to better cope with aging

2.2.2 Weakenss

- Offliners trust the virtual coach less than onliners
- Lack of ease in understanding procedures
- Data security
- Robot appearance (not too human, not toy-like)
- Cost not sustainable by users
- Intended for only a portion of the population
- Not everyone is comfortable with new technologies
- Many apps detect important health status information
- Integrating eVita into existing systems requires a lot of work
- Older people are afraid to learn something new

2.2.3 Opportunities

- Increasing elderly population as potential users of technologies
- Understanding the special needs of older immigrants (coach bilingualism)
- Voice interface

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- Recognize users' emotions
- Reproduce events that the person cannot attend (e.g., conferences)
- Meet needs to overcome distrust of technology
- Make the user choose for themselves what data to share with the system
- Funded by public resources/cost related to income/possibility of leasing or subscription
- A value, a benefit, should be created to receive funds from health insurance companies
- Provide information on booking procedures in the health service
- Medicine reminder
- Integrate into the home in a smart way (connected to heating, stove, phone, etc.)
- Be a link between organizations and members
- Process medical records for each person
- Support the initiatives promoted by the municipality
- Detection of cognitive and physical disorders
- Ability to have the coach in two different forms/supports
- Prioritizing the most important interventions
- Convey information, activities, appointments to people
- Focus more on safety than intelligence
- Make older people recipients of digital education programs
- Efforts to find support could be focused locally or regionally, rather than nationally
- Changing mindsets and the educational system

2.2.4 Threats

- Lack of interest/fear in technology and Internet
- High costs
- Gender stereotypes
- Language barriers
- Lack of public funding for commercialization
- Substitution of the human being
- Low acceptance by the older person
- Digital divide

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- Inequalities in health or social conditions
- Providing the senior with too much information all at once
- Confusion between e-VITA coach and physician
- Low computer literacy of users and staff (Japan)
- Lack of funding to support ownership of technology skills for disadvantaged users (Japan)
- Prevention programs are not adequately funded
- Few policy debate on healthy aging
- Wifi, G5 and G6 are not available in the homes of all end-users

These results are used to develop a new battery of questions for an online survey described in the following section.

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3 Materials and Method

3.1 Context analysis: country background information

In the next paragraph, we collect the following information for each country in order to picture the context analysis with the country background information.

Social	General population
	Older Population
	Life expectancy at birth
	households
	Population for age group
	Age trend
Technology use	Use of PC
	Tech penetration rate
	Use of Internet
	Use of social media?
	Use of wearables, medical device
	Attitude toward technology/learning
Health	Health condition and chronic disease
	Health expenditure
	Assistance expenditure for age group
	Availability of services
	Insurance
	Cost of X disease that can be counteract with the system
Welfare system	Description of what is granted by the Public health system (i.e. First Aid, Primary medical care, hospital care, disability pension, care allowance, chash benefit)
Organization of health and social provision	i.e. ADI , Residential facilities, Nr. Of people in residential facilities

Figure 3 Context analysis guide

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3.1.1 Italy

<table>
<tr><td>Social</td><td>General population

Total: 58.997.201 [ISTAT 1 January 2023]
https://esploradati.istat.it/databrowser/#/it/dw/categories/IT1,POP,1.0/POP_POPULATION/DCIS_POPRES1/IT1,22_289_DF_DCIS_POPRES1_1,1.0</td></tr>
<tr><td></td><td>Older Population

The population over 65 years old amounts to 14 million 177 thousand individuals as of January 1 2023, and constitutes 24.1 percent of the total population. Among people over the age of 80 however, an increase is noted, bringing them to 4 million 529 thousand and accounting for 7.7 percent of the total population. […] The Center and the North have a slightly higher proportion of over-65-year-olds than the national proportion, at 24.7 percent and 24.6 percent, respectively. In the South however, that proportion is 23.0 percent. Those over the age of 80 make up 8.2 percent of the total population in the North and the Center and 6.8 percent in the “Mezzogiorno” [South]. The estimated number of ultracentenarians reaches its highest historical level, touching, as of January 1, 2023, the 22,000 mark, more than 2,000 more than the previous year. [pagg. 37-38 Annual Report 2023 ISTAT 7 July 2023]
https://www.istat.it/storage/rapporto-annuale/2023/Rapporto-Annuale-2023.pdf</td></tr>
<tr><td></td><td>Life expectancy at birth

In 2022, the estimated life expectancy at birth is 80.5 years for men and 84.8 years for women [pag. 36 Annual Report 2023 ISTAT 7 July 2023]
https://www.istat.it/storage/rapporto-annuale/2023/Rapporto-Annuale-2023.pdf</td></tr>
<tr><td></td><td>Households 26.206.246 [31 December 2021]

https://esploradati.istat.it/databrowser/#/it/dw/dashboards</td></tr>
<tr><td></td><td>Population for age group

<table>
<tr><th>Time [1 January 2023]
Sex
Age</th><th>Male</th><th>Female</th><th>Total</th></tr>
<tr><td>65</td><td>363.931</td><td>395.446</td><td>759.377</td></tr>
<tr><td>66</td><td>354.269</td><td>386.248</td><td>740.517</td></tr>
<tr><td>67</td><td>344.662</td><td>378.252</td><td>722.914</td></tr>
<tr><td>68</td><td>335.934</td><td>371.628</td><td>707.562</td></tr>
<tr><td>69</td><td>318.955</td><td>352.187</td><td>671.142</td></tr>
<tr><td>70</td><td>309.188</td><td>346.323</td><td>655.511</td></tr>
<tr><td>71</td><td>304.607</td><td>343.361</td><td>647.968</td></tr>
<tr><td>72</td><td>311.434</td><td>353.764</td><td>665.198</td></tr>
<tr><td>73</td><td>308.691</td><td>353.143</td><td>661.834</td></tr>
<tr><td>74</td><td>315.600</td><td>366.069</td><td>681.669</td></tr>
<tr><td>75</td><td>302.476</td><td>354.023</td><td>656.499</td></tr>
</table>
</td></tr>
</table>

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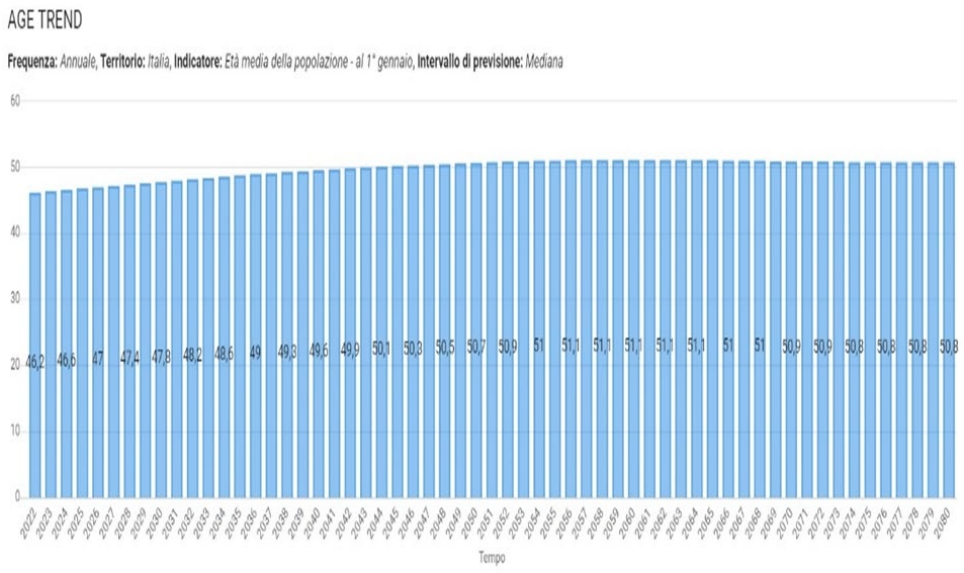
76	294.157	350.711	644.868
77	219.562	267.324	486.886
78	218.972	271.655	490.627
79	211.468	270.587	482.055
80	201.754	263.597	465.351
81	193.892	259.877	453.769
82	201.752	277.832	479.584
83	187.379	263.599	450.978
84	167.906	245.636	413.542
85	142.357	215.951	358.308
86	119.118	190.900	310.018
87	108.115	180.952	289.067
88	90.989	160.844	251.833
89	74.831	140.419	215.250
90	59.756	121.773	181.529
91	48.855	104.919	153.774
92	39.332	92.832	132.164
93	27.464	70.257	97.721
94	19.574	55.020	74.594
95	13.952	42.500	56.452
96	9.180	31.452	40.632
97	5.879	22.541	28.420
98	4.000	15.836	19.836
99	2.528	10.875	13.403
100 and over	3.454	16.991	20.445
Total	6.235.973	7.945.324	14.181.297

Age trend

https://esploradati.istat.it/databrowser/#/it/dw/categories/IT1,POP,1.0/POP_DEMOPROJ/DCIS_PREVDEM1/IT1,165_889_DF_DCIS_PREVDEM1_3,1.0



https://www.istat.it/it/files//2023/09/Previsioni-popolazione-e-famiglie.pdf

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	The population structure has been undergoing an increasingly profound imbalance for years, due to the typically Italian combination of increasing longevity and consistently low fertility. Stably on the world podium of aging, today the country presents the following age breakdown: 12.7 percent of individuals are up to 14 years of age; 63.5 percent between 15 and 64 years of age; 23.8 percent 65 years of age and older. The average age, meanwhile, has risen to 46.2 years, making the country, along with a few other examples in the world (Spain and Greece in Europe; South Korea and Japan in Asia) one of the cases in the world's attention for demographers as well as for experts in economic and sustainable growth. In 2050, people aged 65 and older could account for 34.5 percent of the total. [pag. 4 ISTAT, PREVISIONI DELLA POPOLAZIONE RESIDENTE E DELLE FAMIGLIE | BASE 1/1/2022, SEPTEMBER 2023] Demographic scenarios predict a substantial increase in the so-called "great elderly [? "grandi anziani"]." In 2041 the population over 80 will increase by 35.2 percent over 2021, exceeding 6 million; that of the over-80s will even reach 1.4 million (+69.4 percent over 2021). [pag. 39 Annual Report 2023 ISTAT 7 July 2023] https://www.istat.it/storage/rapporto-annuale/2023/Rapporto-Annuale-2023.pdf
Technology use	Use of PC Last computer use within last 12 months; Individuals 65 to 74 years old [2017] 26.27% [2017] 75 years old or more: 8.12% [2017] [see graph] Source data: EUROSTAT 2017
	Tech penetration rate Digital intensity level (but in businesses, not regarding individuals and/or households), 2022 As % of large businesses: Very Low: 2.9% Low: 15% High: 49.8% Very High: 32.3% As % of SMEs: Very Low: 30.1% Low: 43.2% High: 24.6% Very High: 2.2% Source data: EUROSTAT 2022
	Use of Internet Last 12 months, % of individuals, 65 to 74 years old: 62.28% [2023] 75 years old or more: 25.66% [2023] Source data: EUROSTAT 2023

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<table>
<tr><td></td><td>Internet use: participating in social networks (creating user profile, posting messages or other contributions to facebook, twitter, etc.)
Annual , % of individuals, 65 to 74 years old: 21.09% [2023]

75 years old or more: 6.04% [2023]

Source data: EUROSTAT 2023</td></tr>
<tr><td></td><td>Use of wearables, medical device [not specific data to mention]</td></tr>
<tr><td></td><td>Attitude toward technology/learning/Digital Skills
Individuals with basic or above basic overall digital skills, % of individuals, 65 to 74 years old: 19.33% [2023]

75 years old or more: 4.58%

Source data: EUROSTAT 2023</td></tr>
<tr><td>Health</td><td>Health condition and chronic disease

Source data: EUROSTAT 2019

65 to 74 years old
<table>
<tr><td>Arthrosis</td><td>39,8%</td></tr>
<tr><td>Low back disorder or other chronic back defect</td><td></td></tr>
<tr><td>Neck disorder or other chronic neck defect</td><td>29,1%</td></tr>
<tr><td>Asthma</td><td>27,0%</td></tr>
<tr><td>Chronic lower respiratory diseases (excluding asthma)</td><td>4,8%</td></tr>
<tr><td>Heart attack or chronic consequences of heart attack</td><td>8,3%</td></tr>
<tr><td>Coronary heart disease or angina pectoris</td><td>4,0%</td></tr>
<tr><td>High blood pressure</td><td>4,1%</td></tr>
<tr><td>High blood lipids</td><td>43,3%</td></tr>
<tr><td>Stroke or chronic consequences of stroke</td><td>25,4%</td></tr>
<tr><td>Cirrhosis of the liver</td><td>1,9%</td></tr>
<tr><td>Urinary incontinence, problems in controlling the bladder</td><td>0,5%</td></tr>
<tr><td>Kidney problems</td><td>6,3%</td></tr>
<tr><td>Diabetes</td><td>5,2%</td></tr>
<tr><td>Allergy</td><td>14,4%</td></tr>
<tr><td>Chronic depression</td><td>13,5%</td></tr>
</table></td></tr>
</table>

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	8,9%

75 years old or more

Arthrosis	56,5%
Low back disorder or other chronic back defect	35,0%
Neck disorder or other chronic neck defect	31,3%
Asthma	6,7%
Chronic lower respiratory diseases (excluding asthma)	14,1%
Heart attack or chronic consequences of heart attack	6,4%
Coronary heart disease or angina pectoris	8,3%
High blood pressure	52,3%
High blood lipids	25,2%
Stroke or chronic consequences of stroke	5,5%
Cirrhosis of the liver	0,6%
Urinary incontinence, problems in controlling the bladder	19,8%
Kidney problems	10,9%
Diabetes	19,8%
Allergy	11,7%
Chronic depression	14,1%

[spreadsheets attached]

Health expenditure [source EUROSTAT 2013-2022, 14 December 2023]

Current health care expenditure (all financing schemes: 171.867,00 million euros (provisional data, 2022); 167.761,00 million euros (2021) [Sheet 1 , detailed data in extended spreadsheet attached EUROSTAT 2013-2022, 14 December 2023]

YEAR	MILLION EUROS
2013	141.526,00
2014	144.317,00
2015	146.613,00
2016	147.963,00
2017	150.697,00
2018	153.790,00
2019	155.524,00 (break in time series)
2020	159.880,00
2021	167.761,00
2022	171.867,00 (provisional)

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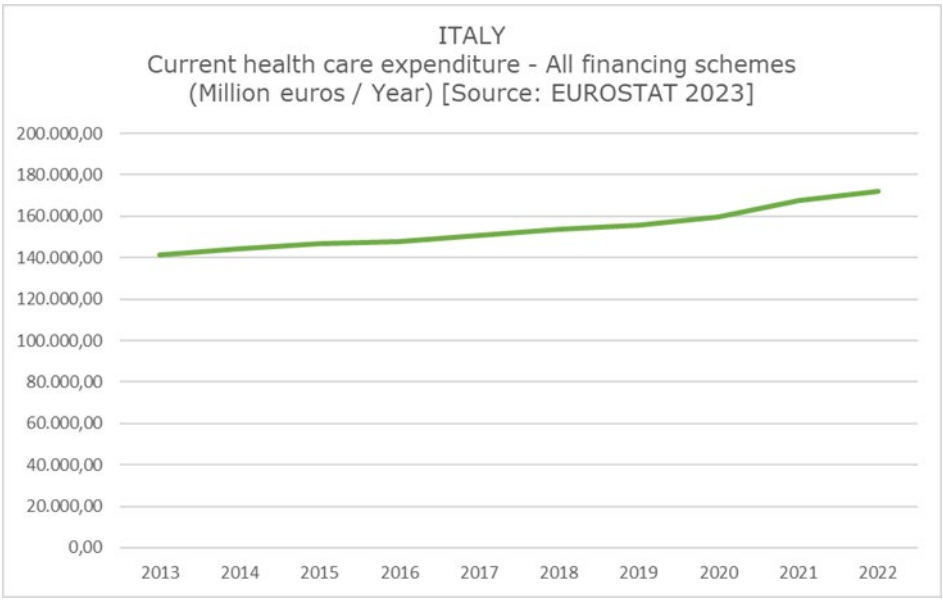

[graph by personal elaboration]

In 2020, Italy's current public health spending amounts to 121 billion 868 million euros, or 7.3 percent of GDP and 2,050 euros per inhabitant per year.
In 2021, Italian households contributed 24.4 percent to total healthcare spending (public and private) with their own resources, an increase of 0.7 percentage points from 2004. Household spending on health care accounts for 2.3 percent of national GDP. [ISTAT 2023]

https://noi-italia.istat.it/pagina.php?id=3&categoria=6&action=show&L=0

Assistance expenditure for age group

The 13 billion in health care spending by the over-65s corresponds to nearly 40% of total private health care spending by Italians [Report Censis 2023]

https://www.censis.it/7?shadow_comunicato_stampa=121032

Insurance

[branch of insurance companies]

Advantage of a health insurance, in emergency situations, you will be able to get your medical expenses reimbursed by the insurance company

Welfare system	Description of what is granted by the Public health system (i.e. First Aid, Primary medical care, hospital care, disability pension, care allowance, chash benefit) [Mainly Public health system with increased use of private health care services due to long waiting lists] Citizens must have access to NHS services without any distinction of individual, social and economic conditions. Citizens, who do not belong to exempt categories, are

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	required to pay a co-payment (ticket) that varies for each individual service under the LEAs (essential levels of care). https://www.salute.gov.it/portale/lea/dettaglioContenutiLea.jsp?lingua=italiano&id=5073&area=Lea&menu=vuoto Constitutional Law No. 3 of 2001 redesigned the competences of State and regions in the field of health care. The "protection of health" (much broader than the term "hospital care" in the previous system) falls within the scope of matters subject to concurrent legislation between the State and the regions; pursuant to subparagraph (m) of Article 117(2) of the Constitution, the State is assigned the task of defining the essential levels of services concerning civil and social rights throughout the national territory. http://leg15.camera.it/cartellecomuni/leg14/RapportoAttivitaCommissioni/testi/12/12_cap01.htm [disability pension VS. Law 104] Indennità di accompagnamento – also called accompaniment allowance – is a financial benefit given by the Italian state, through INPS, to those who are found to be totally disabled and/or unable to walk without the help of a companion or unable to perform actions of daily living. A total invalid-that is, with 100 percent disability-is a person who has been found to be unable to walk independently and perform actions of normal daily living. He or she is therefore entitled to file an application for accompaniment. The definitions contained in Article 3 of Law 104 clarify that "a handicapped person is one who has a physical, mental or sensory impairment, whether stabilized or progressive, which is the cause of learning, relationship or work integration difficulties and such as to lead to a process of social disadvantage or marginalization" and that "there exists a situation of seriousness so as to require permanent, continuous and comprehensive welfare intervention in the individual sphere or in the sphere of relationships." The term "nvalid, on the other hand, refers to a person who for physical or health reasons affects his or her ability to work. As the distinction between the two terminologies suggests, the two situations require two specific assessment visits that are different from each other. In fact, one who is found to be 100 percent disabled is not automatically a grantee of Law 104.
Organization of health and social provision	i.e. ADI , Residential facilities, Nr. Of people in residential facilities In Italy, as of December 31, 2021, there were 12,576 active residential care facilities 75% of guests are over 65 years old The management of residential facilities is mainly entrusted to organizations of a private nature (75%), mainly non profit (51%); 12% of residences are managed by entities of a religious nature and about 13% by the public sector.

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	[p.2-3 LE STRUTTURE RESIDENZIALI SOCIO-ASSISTENZIALI E SOCIO-SANITARIE | ISTAT 1 GENNAIO 2022] In Italy, there are more than 255,000 older people over the age of 64 living in residential facilities, just over more than 18 per 1,000 older residents; of these, more than 14 are in a non-self-sufficient condition (for a total of 202,174 non-self-sufficient older people). The female component clearly prevails over that of men: out of every four older residents, three are women. More than two-thirds of the older adults cared for in residential facilities (76 percent) are over 80 years of age, a share that stands at 77 percent for the non-self-sufficient and decreases to 70 percent for the older adults self-sufficient. The over-80s thus constitute the overwhelming share of older guests, with a rate of hospitalization of 63 guests per 1,000 residents, more than 14 times higher than that recorded for the older people under 75 years of age, for whom the rate is reduced to 4.4 inpatients per 1,000 residents [p.6 ISTAT REPORT_PRESIDI_SOCIO-ASSISTENZIALI 2020] https://www.istat.it/it/files//2022/11/REPORT_PRESIDI_SOCIO-ASSISTENZIALI_2020.pdf

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3.1.2 Germany

<table>
<tr><td>Social</td><td>General population
Total: 84.607.016 (30.09.2023)
https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Bevoelkerungsstand/Tabellen/liste-zensus-geschlecht-staatsangehoerigkeit.html#651186</td></tr>
<tr><td></td><td>Older Population
Total
18.749.279 from 60 to 80
6.112.952 over 80
(2022)
In Percent
22,2 % from 60 to 80
7,2 % over 80
(2022)
It can also be seen that over the last 10 years, the rate of change in the population over 80 has always been positive compared to the previous year.

-> Growth of the older population

https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Bevoelkerungsstand/Tabellen/liste-altersgruppen.html#474508</td></tr>
<tr><td></td><td>Life expectancy at birth
Male 78,33 years
Female 83,18 years
2020/2022
https://www-genesis.destatis.de/genesis/online?sequenz=tabelleErgebnis&selectionname=12621-0002&zeitscheiben=16&sachmerkmal=ALT577&sachschluessel=ALTVOLL000,ALTVOLL020,ALTVOLL040,ALTVOLL060,ALTVOLL065,ALTVOLL080#abreadcrumb</td></tr>
<tr><td></td><td>Households
41,33 million, the most of them (41,1%) Is a one-person household.
https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Haushalte-Familien/Tabellen/1-1-privathaushalte-haushaltsmitglieder.html</td></tr>
<tr><td></td><td>Population for age group

<table><tr><td>Age</td><td>Total</td></tr><tr><td>65 (1958)</td><td>1.062.000</td></tr><tr><td>66</td><td>1.020.000</td></tr><tr><td>67</td><td>992.000</td></tr></table></td></tr>
</table>

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68	952.000
69	942.000
70	913.000
71	903.000
72	862.000
73	776.000
74	719.000
75	614.000
76	530.000
77	695.000
78	691.000
79	653.000
80	769.000
81	778.000
82	733.000
83	645.000
84	562.000
85	501.000
86	438.000
87	364.000
88	257.000
89	221.000
90	192.000
91	168.000
92	132.000
93	103.000
94	75.000
95	56.000
96	40.000
97	27.000
98	18.000
99	12.000

(2021)
Proportion of women always higher than men.
https://service.destatis.de/bevoelkerungspyramide/#!y=2021&a=9,98&v=2

In 2007, the youth dependency ratio was below the old-age dependency ratio for the first time, i.e. the population recorded an increase in older people at the same time as the number of births decreased. The overall dependency ratio has also been rising since the 1990s – in 2013, 100 people of working age (20 to 64 years) had to support 65 younger and older people in purely mathematical terms, and this figure is expected to rise to over 87 people by 2060.

Age trend

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	https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Bevoelkerungsvorausberechnung/begleitheft.html?nn=238640
Technology use	Use of PC 65.912.000 Germans using a PC, 79,9% almost every day. (2020) https://www-genesis.destatis.de/genesis//online?operation=table&code=12231-9003&bypass=true&levelindex=0&levelid=1712337361337#abreadcrumb Ownership of PC in older age groups (2021): - 60 to 69 years: 87% - 70 to 79 years: 77% - Over 80 years: 48% https://www.iwd.de/artikel/wie-digital-sind-die-bundesbuerger-im-alter-543079/
	Tech penetration rate No exact and reliable information found. There are statistics from 2014 which say that the Tech penetration rate was 76,8% in 2014. In addition, a forecast was made that suggests growth of 80,3% in 2019 is possible. https://de.statista.com/statistik/daten/studie/182620/umfrage/penetrationsrate-der-internetnutzung-in-deutschland-bis-2015/
	Use of Internet 67.953.000 Germans using the internet, 91,9% of them almost every day https://www-genesis.destatis.de/genesis//online?operation=table&code=12231-9006&bypass=true&levelindex=0&levelid=1712337483620#abreadcrumb - Proportion of people with access to the Internet by age group and education (2017, in percent) - Separated in low, medium and high education. https://www.bmfsfj.de/resource/blob/159704/3dab099fb5eb39d9fba72f6810676387/achter-altersbericht-aeltere-menschen-und-digitalisierung-data.pdf
	Use of social media Use of social media apps in percent: https://www.ard-zdf-onlinestudie.de/tabellen-onlinenutzung/social-media-und-messenger/social-media/
	Use of wearables, medical device In the first quarter of 2020 3,4 million people using smart medical devices used to monitor blood pressure, blood sugar, body weight or other health and medical devices. As the Federal Statistical Office (Destatis) reports based on the data collected for the first time in 2020 from the survey on the use of

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	information and communication technologies (ICT) in private households, this corresponds to almost 5% of the population aged 10 and over in Germany. While 4% of 10 to 24 year olds and 6% of 25 to 54 year olds used smart health devices, the figure was just under 3% of those 55 and older. While internet-enabled health devices have so far been rarely used, smart watches, fitness bracelets and the like are much more common. These were used by 15.5 million people in Q1 2020. This corresponds to 21% of the population aged 10 and over. Info: For these statistics, only people up to the age of 74 were surveyed. https://www.destatis.de/DE/Presse/Pressemitteilungen/2021/02/PD21_078_639.html
	Attitude toward technology/learning 21,8 % using computer-assisted learning 10,4 % between 55 and 64 https://ec.europa.eu/eurostat/databrowser/view/trng_inf6/default/table?lang=de
Health	Health condition and chronic disease Sick people in percent: From 65 to 70 years: 10,7 From 70 to 75 years: 13,3 Over 75 years: 19,1 (2021) https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Gesundheit/Gesundheitszustand-Relevantes-Verhalten/Tabellen/liste-kranke-unfallverletzte.html#51230 Some facts: - Almost one in three Germans has hypertension. - There are around 8 million diabetics in Germany. - Around 15.5 percent of Germans have chronic back pain. There is no official list of typical diseases associated with aging, but the Federal Ministry of Education and Research (BMBF) lists certain diseases that occur more frequently in old age. This includes the clinical pictures: Old age depression Arthrosis Dementia Cardiovascular diseases Infectious diseases Cancer Osteoporosis Parkinson's https://www.pflege.de/krankheiten/
	Health expenditure 474.134 million expenditure in year 2021

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Of that:
255.162 million expenditures for health insurance
51.661 million expenditures for care insurance
So 5.699 Euro average per person in year 2021
The figure shows the constant increase in healthcare costs in Germany.

Disease	Health expenditure (in Million Euro)	Health expenditure over 65 years
Diseases of the respiratory system	18816	
Dementia	20396	20046
Depression	9453	1946
Diabetes	7402	4427
Diseases of the cardiovascular system	56727	
Obesity	1046	400
General health expenditure	431805	222540

(2020)
https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Gesundheit/Krankheitskosten/_inhalt.html#250402
https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Gesundheit/Gesundheitsausgaben/Tabellen/ausgabentraeger.html

Medical costs increased significantly with advancing age. Around half were incurred by the population aged 65 and over alone. The lowest per capita costs were incurred in the 15 to 29 age group at 1,670 euros, while the highest costs were incurred by those aged 85 and over at 19,790 euros, which was 4.8 times the average. (2015)

https://www.destatis.de/DE/Presse/Pressemitteilungen/2017/09/PD17_347_236.html#:~:text=Etwa%20die%20Hälfte%20entstand%20allein,hoch%20wie%20der%20Durchschnitt%20waren

Assistance expenditure for age group
Long-term care rate by age group 2021

Share of the respective population group in %

Cost of care in euros per inhabitant:
- Outpatient care: 210
- Inpatient/partial inpatient facility: 370
- Total: 4140
https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Gesundheit/Krankheitskosten/Tabellen/einrichtungen-geschlecht.html

Care for people with dementia in a nursing home is almost twice as expensive as care at home. This was reported by health economists at Witten/Herdecke

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	University following a study in Estonia, Germany, Finland, France, the UK, the Netherlands, Spain and Sweden. According to the study, the average cost of care in inpatient long-term care facilities in these countries is 4,491 euros compared to 2,491 euros when relatives and professional carers look after dementia patients at home. https://www.aerzteblatt.de/nachrichten/59370/Kosten-der-Demenzpflege-im-Heim-oder-zu-Hause-im-Vergleich
	Availability of services In year 2021 we have in nursing homes 984688 available Places and 930970 people in need of care. In the areas of short-term care and part-time care, demand even exceeds supply. https://www-genesis.destatis.de/genesis//online?operation=table&code=22412-0001&bypass=true&levelindex=0&levelid=1712414574733#abreadcrumb Another point is the staff shortage. But there are no exact figures for the current shortage. While the nursing employers' association assumes 30,000 unfilled positions, according to the ver.di union there are 70,000 open jobs. The German Nursing Council, in turn, estimates the acute shortage at 100,000 nursing staff who were missing in hospitals alone. https://www.zeit.de/wirtschaft/2017-04/pflegekraefte-mangel-zuverlaessliche-zahlen-studien/seite-2#
	Insurance In 2024, the general social insurance contributions will be 14.6 percent in health insurance, 18.6 percent in pension insurance, 3.4 percent in nursing care insurance and 2.6 percent in unemployment insurance. These contributions are deducted from gross wages. https://www.tk.de/firmenkunden/versicherung/beitraege-faq/beitragssaetze/aktuelle-beitragssaetze-in-der-sozialversicherung-2031554?tkcm=ab In year 2019, 61.000 person in Germany were not insured. Since 2015 the number decreased by 23%. https://www.destatis.de/DE/Presse/Pressemitteilungen/2020/09/PD20_365_23.html
	Cost of X disease that can be counteract with the system One of the aims of the project is to improve fall prevention on a technological basis. However, no precise information could be found on the costs incurred. Every fall is individual in terms of its severity and consequences. Different medical and care costs can arise. Nevertheless, the following information provides an approximate indication of the costs incurred as a result of falls: International studies show that falls in hospital are associated with a high use of resources. The care costs of the most common DRGs are twice as high for fallers compared to patients who have not fallen. The costs of serious falls in

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	hospital are estimated at US$ 4,233. In Germany, there has been a quantitative increase in the provision of ICD10 S00-T98 (injuries, poisoning and certain other consequences of external causes including falls) for over 65-year-olds, which is reflected in a 38% increase in hospital medical costs to €6,674 million between 2002-2008. https://www.thieme-connect.com/products/ejournals/abstract/10.1055/s-0032-1322064 According to international studies, 10%-20% of falls cause injuries that require treatment. An estimated 5% of falls lead to bone fractures caused by falls and around 1-2% to hip fractures caused by falls (proximal femur fractures, "femoral neck fractures"). Every year, around 130,000 people in Germany suffer at least one hip fracture. 90% of those affected are over 60 years old. What are the consequences of falls and fall-related injuries have? The individual and social consequences of falls are considerable. One third of very old people die within a year of inpatient treatment for a hip fracture. Around 50 % of patients do not regain their original mobility and around 20 % of patients require permanent care. It is estimated that hip fractures incur direct costs of 2.77 billion euros per year in Germany, not including long-term costs and non-medical costs. (2014) https://www.aekno.de/fileadmin/user_upload/aekno/downloads/2019/Gesund-und-mobil-im-Alter.pdf
Welfare system	Description of what is granted by the Public health system (i.e. First Aid, Primary medical care, hospital care, disability pension, care allowance, chash benefit) There is no real "catalog" in the sense of a list. The catalog of benefits is only specified in the Fifth Social Code (SGB V) as a framework law: The law states that the insured person is entitled to adequate, needs-based medical treatment that corresponds to the generally recognized state of medical science. This includes, in particular, medical, dental and psychotherapeutic treatment, the supply of medicines, bandages, remedies and aids, home nursing care, hospital treatment as well as medical rehabilitation services and other services. It is also regulated that the services must meet the cost-effectiveness requirement. This means that they must be sufficient, appropriate and economical and must not exceed what is necessary. The contracted doctors are obliged to provide these services as part of their security mandate. The entitlement of those with statutory health insurance to certain treatments or examinations in statutory health care is not regulated in detail by the Social Security Code, but is specified in more detail by the Federal Joint Committee (G-BA) in binding guidelines within the framework of the self-administration principle. The G-BA is the highest decision-making body of joint self-

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	government. It is made up of representatives of contracted doctors, contracted dentists, hospitals and health insurance companies, although representatives of patient organizations also have the right to consult. The G-BA issues guidelines in the various service areas that are binding for the health insurance companies involved, service providers and the insured. The medical services that can be billed to the statutory health insurance and their remuneration are determined in the uniform assessment standard (EBM) by the assessment committee. For new diagnostic and therapeutic procedures, the Federal Joint Committee decides whether they meet the requirements mentioned and can therefore be covered by statutory health insurance. The remuneration for the new diagnostic and therapeutic procedures recognized by the G-BA is then also determined in the uniform assessment standard (EBM). According to a decision of the Federal Constitutional Court (Decision of the First Senate of December 6, 2005 – 1 BvR 347/98), insured persons with a life-threatening or regularly fatal illness or with an illness that is at least comparable in terms of evaluation can receive a generally recognized benefit that corresponds to the medical standard is not available, you can also use an examination or treatment method not recognized by the G-BA. The prerequisite is a not entirely remote prospect of healing or of a noticeable positive effect on the course of the disease. This was made legally clear with the GKV Care Structure Act in Section 2 Paragraph 1a SGB V for the benefit law of the GKV. In addition, the GKV Care Structure Act has expanded the range of statutory benefits offered by health insurance companies. Additional statutory services can now be offered in the following areas: preventive and rehabilitation measures, services provided by midwives during pregnancy and maternity, artificial insemination, dental treatment (without dentures), non-prescription pharmacy-only medicines, medicinal products and aids, home nursing, household help as well unauthorized service providers. Insured persons can find out from their health insurance company which services are covered by statutory health insurance in individual cases. If the local office of a statutory health insurance company is unable to do this, it is their task to seek clarification by asking questions within the health insurance company or within the association to which the health insurance company belongs. https://www.bundesgesundheitsministerium.de/service/begriffe-von-a-z/l/leistungskatalog#:~:text=Hierzu%20zählen%20insbesondere%20die%20ärztliche,medizinischen%20Rehabilitation%20und%20sonstige%20Leistungen
Organization of health	i.e. ADI , Residential facilities, Nr. Of people in residential facilities

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and social provision	In Germans are 5 million people in need of cares. 84% of them are cared for at home. Of these, more than half are cared for by relatives. 16% receive full inpatient care in nursing homes. There were 16115 care facilities in 2021, of which 11358 provided full inpatient long-term care. https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Gesundheit/Pflege/Tabellen/pflegeeinrichtungen-deutschland.html https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Gesundheit/Pflege/Tabellen/pflegebeduerftige-pflegestufe.html

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3.1.3 France

Social	General population 68071000 (2023) https://www.destatis.de/Europa/DE/Staat/EU-Staaten/Frankreich.html
	Older Population 65 – 74 year: 14725470 (21,5%) 75 year or over: 7106175 (10,4%) https://www.insee.fr/en/statistiques/7748118?sommaire=7751503
	Life expectancy at birth Women: 85,2 Men: 79,2 (2022) https://www.destatis.de/Europa/DE/Staat/EU-Staaten/Frankreich.html
	Age trend In 2023, the average age in France is 42.36 years. (2023) In 2000, it was still 38.55. https://www.insee.fr/en/statistiques/7748118?sommaire=7751503
Technology use	Use of PC More and more homes are equipped with electronic devices. In 2019, 83% of households own a computer and 96% a mobile phone. Young people were the first to adopt these new tools and services, but older people are now embracing them. Thus, 82% of 60-74 year old and 47% of 75 years or older have a computer in 2019, i.e. 8 and 15 points more in five years. However, inequalities persist in electronic equipment according to standard of living. In 2019, among the 10% of the poorest households, 68% have a computer and 75% have Internet access, compared to 95% and 96% of the 10% of the richest households respectively. https://www.insee.fr/en/statistiques/5346284
	Use of Internet https://www.insee.fr/fr/statistiques/6204457?sommaire=6049348 92,8 percent of the French's between 16 and 74 years using the internet. (2023) 88,1 percent of the households having a broadband connection. (2021) https://www.destatis.de/Europa/DE/Staat/EU-Staaten/Frankreich.html
	Use of wearables, medical device

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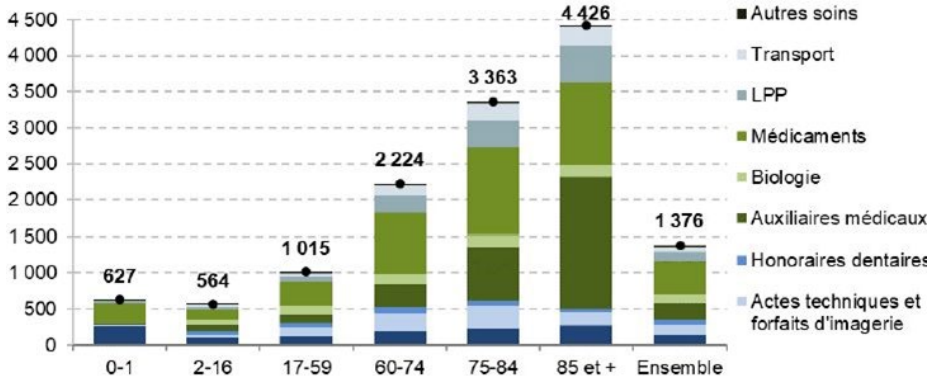
	40% of French are equipped with at least one connected object at home 24% of the connected objects are related to health https ://www.arcep.fr/uploads/tx_gspublication/rapport-barometre-numerique-edition-2022-Infographie.pdf In 2022, 59% of the patients treated for hypertension possessed an automatic 31mprovement. https ://frhta.org/wp-content/uploads/2022/12/CHIFFRES-DEC2022_final.pdf It is admitted that auto measurement of arterial gives more reliable data than when performed by professional. Évaluation des impacts de l'utilisation d'un tensiomètre connecté sur la prise en charge de l'HTA en médecine générale. Marine Dessaint, 2020
Health	Health expenditure: 308 billion euros in 2021 This is equivalent to 12.3% of gross domestic product (GDP) Source: Healthcare expenditure statistics – overview – Statistics Explained (europa.eu)
	Assistance expenditure for age group  Source: https://evaluation.securite-sociale.fr/home/maladie/1.6.3.%20Recours%20aux%20soins%20et%20cons.html
Welfare system	Use of community care increases with age for most expenditure items In 2021, 81% of consumer policyholders covered by the general scheme used a general practitioner (liberal or in a health center) at least once. This high use varies relatively little with age: **from 75% for 2 to 16 year olds to 93% for 75 to 84 year olds**. On the other hand, regarding the other professionals considered, recourse increases significantly with age, in particular for medical assistants (masseurs-physiotherapists and even more nurses). **Thus, 75% of policyholders**

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aged 75 to 84 benefited from at least one nursing procedure during the year, which is 1.4 times more than patients aged 17 to 59.
The rate of use of other community healthcare services varies first of all depending on the positions. Thus, in 2021 among people who had at least one use of community or private clinic care reimbursed by the general scheme during the year, 91% had medication dispensed, but only 8% used transports.
If for the "medications" position this recourse varies relatively little according to age (between 87% for 2-16 year olds and 96% for 75-84 year olds), for other positions it generally tends to increase with age. . For example, the rate of use of biological 32mprovem which is on average (all ages combined) 72%, increases from 17% among those under 2 years old to 89% among people aged 75 to 84 years. Likewise, the rate of use of products from the list of reimbursable products and services (including glasses, hearing aids, etc.) increases from 37% among 2-16 year olds to 73% among policyholders aged over 84 years old (the exception being those under 2 years old for whom the rate is 51%).
The reduction in the use rate observed for certain community care positions (specialist care and dental fees in particular) among those aged 85 and over compared to that observed among those aged 75-84 must however be interpreted with caution. Indeed, those aged 85 and over are more frequently hospitalized or in accommodation establishments for dependent elderly people (EHPAD) than those aged 75-84, which could explain, at least in part, less use of community care (the care being provided and/or financed directly by these establishments).
https://evaluation.securite-sociale.fr/home/maladie/1.6.3.%20Recours%20aux%20soins%20et%20cons.html

Senior health: reimbursement by health insurance
Although the health expenses of seniors are – on average – higher than those of the rest of the population, the elderly benefit from the same care as the rest of the insured. To supplement the reimbursement of Health Insurance for the health expenses of seniors, a mutual pension fund is therefore essential. Health of seniors: what reimbursements by Health Insurance? Health Insurance reimbursement for health expenses for seniors is identical to that granted to the rest of the population, for all positions. Reimbursement of hospitalization for a senior In the event of hospitalization in a public hospital or an approved private clinic, Social Security covers 80% of seniors' health expenses. In the absence of mutual insurance for the elderly, several costs generally remain your responsibility: the co-payment, namely 20% of hospitalization costs; the daily rate, the amount of which is €20 per day in a hospital or clinic, €15 per day in the psychiatric department of a health establishment; comfort expenses (single room, television, etc.); possible excess medical fees.

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	Support for senior consultations Provided you respect the coordinated care pathway, reimbursement for medical consultations for seniors by Health Insurance is 70%. For example, this represents support for: €16.50 for consultation with a sector 1 general practitioner or member of OPTAM (Controlled practical pricing option); €15.10 for a sector 2 general practitioner; €16.50 for a sector 1 specialist or OPTAM member (dentist, dermatologist, ophthalmologist, etc.); €15.10 for a sector 2 specialist. If you do not have a treating doctor or you consult directly without being referred by your treating doctor, you are considered outside the coordinated care pathway (Provided you have declared a treating doctor, you are still reimbursed at 70 % if you directly consult certain specialists within the framework of specific direct access (ophthalmologist, stomatologist, etc.)). In this case, reimbursement of consultations for seniors by Social Security is only 30%. Regarding consultations with medical assistants, such as a nurse, a masseur-physiotherapist or a chiropodist-podiatrist, you are reimbursed at 60% of the BRSS (Social Security reimbursement base) by Health Insurance . This represents a cost of €9.68, provided that you respect the coordinated care pathway. Support for senior equipment As part of the “100% Health” reform, your optical, hearing and dental equipment is now fully reimbursed under two conditions: this is “100% Health” equipment; you have complementary health insurance. In the absence of senior mutual insurance, Social Security reimbursement will generally be lower, including for “100% Health” equipment. For example, it represents: €5.40 for your frames; between €8.91 and €40 for lenses depending on the degree of correction; €84 for a dental crown (e.g. a monolithic ceramic tooth-supported dental crown other than zirconia on incisors, canines and first premolars); €195.65 for a bridge (e.g. a plural prosthesis comprising 2 metal anchoring pillars and 1 metal intermediate element);

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€210 in 2020, €240 in 2021 for a hearing aid (the "100% Health" system for hearing equipment is in force from January 1, 2021).

As for equipment not belonging to the "100% Health" basket, their coverage by Health Insurance is anecdotal. For example, the reimbursement for your spectacle frames will only be €0.03 in the absence of complementary senior health insurance.
Reimbursement of seniors for alternative medicine

The terms of reimbursement of alternative medicine for seniors by Social Security will mainly depend on the care provided and the professional who provides it.

Consultation with a registered doctor: certain alternative medicine disciplines can be covered by Health Insurance, provided they are provided by a registered doctor. This is particularly the case for homeopathy, hypnosis and acupuncture. You will then be reimbursed between €15.10 and €16.50 for the consultation depending on the practitioner's sector, provided you respect the coordinated care pathway. For example, this treatment is possible if you consult a general practitioner who, in addition to his basic discipline, offers homeopathy or hypnosis.

Consultation of a non-approved doctor or non-recognized discipline: if you consult a non-approved doctor for the previously mentioned disciplines (homeopathy, acupuncture and hypnosis), you will not be entitled to any reimbursement. This is also the case for alternative or complementary medicine practices that are not recognized by the medical order, such as osteopathy, naturopathy and sophrology.

Thermal treatment: provided that various conditions are respected and that a medical prescription is available, reimbursement of seniors for a thermal treatment by Health Insurance is possible up to 65% of the conventional rate for the thermal package. Accommodation and transport can be partially covered, provided you respect a certain resource ceiling (variable depending on the composition of your household). So-called "comfort" costs are never covered.

How much do seniors spend on healthcare?
The reimbursement of seniors' health expenses by Health Insurance poses an obvious problem: while older people have greater needs on average, their care is identical to that of younger insured persons. A situation that is all the more delicate as the main expenditure items for seniors are often more expensive and less well reimbursed (medical devices, spa treatment, etc.).
Result ?
The remaining costs for seniors after reimbursement from Health Insurance are, on average, greater than for the rest of the population. For example, it

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represents around 48% of health expenditure for 50-54 year olds, compared to around 32% for 25-29 year olds (in the case of policyholders who do not have Long-Term Illness status).
The cost of health care for seniors is all the more significant as complementary health insurance for an elderly person is, as a general rule, more expensive than for the rest of the population. An even more problematic situation for retirees, to the extent that – unlike employees – they no longer have collective company mutual insurance, the cost of which is covered at least half by the employer.
Result ?
Health expenses for seniors aged 56-65 represent 4.5% of their disposable income and 6.6% for those over 75, compared to only 2.7% for those aged 26-44.

Health reimbursement: which senior mutual insurance to choose?

To supplement Social Security reimbursements, senior mutual insurance is therefore essential, at the risk of having to assume increasingly significant out-of-pocket costs.

This is why Alptis offers you senior mutual insurance offering the choice between several levels of guarantee. Supplementary health insurance for the elderly which also guarantees you undeniable advantages:

payment of the daily hospital fee;
zero remaining charge for all your “100% Health” optical, dental and hearing equipment;
reimbursement for medical and hearing aids
reimbursement of dental expenses
reimbursement of your complementary medicine sessions (acupuncturist, osteopath, chiropodist-podiatrist, etc.) up to €55 per session within the limit of 4 sessions per year
coverage of thermal cures up to 100% of the BRSS + €350 for medical fees, establishment costs, transport and accommodation.
Covering your dental costs
coverage of excess fees, private room and stay of the accompanying person in the event of hospitalization
https://www.alptis.org/complementaire-sante/remboursement/remboursement-sante-senior-2/

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3.1.4 Japan

Social

General population
124 million (2023)

Older Population 65 over
36 million (2023) male 15.6million, female 20.4million

Life expectancy at birth
84.5 years (2021), Men 81.5 years, Women 87.6 years

Households
58 million (2022)

Population for age group (2022)

sex	male	female	total
age	every 5 years old		
0～4	2130887	2032375	4163262
5～9	2492060	2373351	4865411
10～14	2684286	2554619	5238905
15～19	2781421	2637067	5418488
20～24	2987209	2850024	5837233
25～29	3027798	2909773	5937571
30～34	3097922	2975642	6073564
35～39	3529471	3405478	6934949
40～44	3922780	3789566	7712346
45～49	4712106	4563811	9275917
50～54	4685081	4571937	9257018
55～59	3980251	3954837	7935088
60～64	3643562	3703871	7347433
65～69	3633808	3829389	7463197
70～74	4380766	4903187	9283953
75～79	3135568	3858330	6993898
80～84	2383231	3335659	5718890
85～89	1425087	2517064	3942151
90～94	559000	1425000	1984000
95～99	111000	449000	560000
100 and over	10000	77000	87000
total	59313678	62716845	122030523

Age trend
Japan's population has entered a phase of decline in recent years, and in 2023 the elderly population declined for the first time since 1950. Meanwhile, the elderly population as a percentage of the total population reached a record high of 29.1%, and the population over 75 years old exceeded 20 million for the first time; one out of every 10 people will be 80 years old or older. It is estimated that by 2070 the total population will fall below 90 million and the aging rate will be at the 39% level.
https://www.stat.go.jp/data/topics/topi1380.html

Technology use

Use of PC
48.5% (Information communication statistical database /MIC,2022)

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	Tech penetration rate 85.6% (Information communication statistical database /MIC,2022)
	Use of Internet 84.9% (Information communication statistical database /MIC,2022)
	Use of social media? 102 million statista(2022)
	Use of wearables, medical device There is no 37mprovem list.
	Attitude toward technology/learning According to the "Public Opinion Poll on the Use of Information and Communication Devices," 77.8% of respondents who answered "yes" to the question of whether they use smartphones and tablets were between the ages of 18 and 29 and in their 50s. On the other hand, the 21.6% breakdown of those who answered "do not use" was higher among those in their 60s and 70s and older, respectively. The top three reasons "or not usi"g the service for those in their 60s and 70s were "I don't think it is necessary for my life," "I don't know how to use it," and "I think my family can handle it if necessary. When asked what would lead them to use the service, the top three responses were: "Lower equipment prices and communication fees," "Easier operation and settings," "Opportunities to learn about fun and convenience," "More opportunities to communicate with family and friends through use," "A support desk where they can easily ask for help," and "Familiar places There are classes and other facilities nearby that teach operation and settings in an easy-to-understand manner. r02-it_kikig.pdf (gov-online.go.jp) Cabinet Office
Health	Health condition and chronic disease There is no 37mprovem list.
	Health expenditure National healthcare expenditure in FY2021 is 45,359.9 billion yen, an increase of 2,069.4 billion yen, or 4.8%, compared to 42,966.5 billion yen in the previous fiscal year. Per capita national medical care expenditure was 358,800 yen, an increase of 18,200 yen, or 5.3%, from the previous year's 340,600 yen. The ratio of national healthcare expenditure to gross domestic product (GDP) was 8.18% (7.99% in the previous year). 令和３(2021)年度 国民医療費の概況｜厚生労働省 (mhlw.go.jp)
	Assistance expenditure for age group Although the cost of long-term care varies depending on a number of factors, a general average of approximately 5 million yen per person is required. However, specific costs vary from person to person. When providing care at home, it is necessary to purchase a nursing bed, wheelchair, and diapers. You will also need to remodel your home to make it barrier-free. In addition, if you are admitted to a nursing home or private nursing home, you will have to pay an upfront payment, living expenses, food expenses, and other expenses.

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	According to the "FY2021 National Survey on Life Insurance" conducted by the Life Insurance Cultural Center of Japan, the following expenses were incurred for nursing care. One-time expenses (purchase of nursing care beds, home improvements, etc.): 740,000 yen on average Monthly nursing care expenses (e.g., fees for using nursing care services): ¥83,000 on average Expenses by location of care Monthly cost of home care: average 48,000 yen Monthly cost for institutional care: 122,000 yen on average The average duration of care was 61.1 months (5 years and 1 month). When we estimate the average cost of nursing care and the average length of nursing care, the average total cost of nursing care is as follows. One-time cost 740,000 yen + (monthly cost 83,000 yen x 12 months x 5 years) = 5,720,000 yen Considering the average cost and the length of nursing care, the total cost of nursing care would easily exceed 5,000,000 yen. The most common response for the length of care was "4 to less than 10 years," while the second most common response was "more than 10 years. 介護費用は平均でいくらかかる？期間や自己負担額を軽減する制度もくわしく解説！｜三菱ＵＦＪ銀行 (mufg.jp)
	Availability of services A My Number card is a card with a photo of the applicant's face on which the applicant's My Number is written. The My Number Card is a plastic card with an IC chip that displays the name, address, date of birth, gender, My Number, and the person's photo on the face of the card. The card can be used as an identification card for personal identification, and can also be used for various services such as local government services and e-applications using electronic certificates such as e-Tax. For those who have returned their driver's license due to old age, it not only serves as a photo identification card, but also has the following advantages. Health Insurance Card: The My Number Card can also be used as a health insurance card. This facilitates procedures at hospitals and pharmacies. It also allows you to view your own health information. Application for long-term care insurance: It is also useful for applying for long-term care insurance. By using your My Number Card to complete the procedures, you can receive services more efficiently. Simplify your tax return: Using your My Number Card will simplify your tax return. Obtaining various certificates: You can obtain various certificates such as resident certificates at convenience stores. You can obtain the necessary documents without any hassle. Pension Procedures: Pension procedures can also be easily completed. マイナンバーカードについて－マイナンバーカード総合サイト (kojinbango-card.go.jp)
	Insurance

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	There is a public system that allows people to use long-term care services from the time they are certified as needing long-term care, with payment of a co-payment percentage. This is called the long-term care insurance system ("long-term care insurance"). In Japan, it is mandatory to enroll in long-term care insurance at the age of 40. People between the ages of 40 and 64 can receive long-term care services only if they suffer from 16 specified diseases and are deemed to need long-term care. On the other hand, those aged 65 and over can receive long-term care services if they are deemed to need long-term care regardless of the cause. Under the long-term care insurance, long-term care services are available at a co-payment ratio of 10-30%. The co-payment ratio is determined by the total income of the person receiving long-term care services and the spouse or relatives aged 65 or older in the same household.
	Cost of X disease that can be counteract with the system Among elderly fallers, 21.2% of males and 15.9% of females are seriously ill, including 7.6% of fractures, and 10.1% of fractures, respectively. The medical cost for the approximately 148,000 patients with proximal femur fractures that occur nationwide is 1.32 million yen per person, of which 13.6% are bedridden. The annual medical cost for falls is about 195.5 billion yen, and the annual medical and nursing care cost is about 914.1 billion yen. 骨粗鬆症を取り巻く医療経済　Ⅱ．骨粗鬆症の医療経済 転倒の医療経済に及ぼす影響｜M-Review
Welfare system	Description of what is granted by the Public health system (i.e. First Aid, Primary medical care, hospital care, disability pension, care allowance, chash benefit) Public medical insurance includes health insurance, national health insurance, and late-stage medical care system for the elderly, which all people must be enrolled in. The co-payment varies from 10-30% depending on age and income. Public medical insurance benefits cover general medical care, treatment, drug prescriptions, tests, procedures, and surgery. There is also a high-cost medical care reimbursement system. This is a system whereby if the amount paid over the counter at a medical institution or pharmacy exceeds the maximum amount in a month, the excess amount is reimbursed. The maximum amount per month is determined according to age and income, and the burden may be further reduced if certain conditions are met. For those 65 years of age or older, the system also provides benefits for daily living medical care at the time of hospitalization. The system provides benefits for the cost of daily living medical care, and the co-payment amount for the general public receiving benefits is 460 yen for meals (per meal) and 370 yen for living expenses (per day). Late-stage medical insurance for the elderly refers to medical insurance for persons aged 75 or older or persons with disabilities aged 65 to 74.

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	我が国の医療保険について ｜厚生労働省 (mhlw.go.jp)
Organization of health and social provision	i.e. ADI , Residential facilities, Nr. Of people in residential facilities There are 11 types of residences/facilities for the elderly in Japan, and their total number is 68,455. The total number of users is 2,724,900. The unit is the number of beds. スライド 1 (yurokyo.or.jp) mhlw (2019)

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3.2 Stakeholder Interviews

To explore the field of secondary stakeholders regarding e-VITA, we used quantitative and qualitative data and an ad hoc online survey. To do this, we developed a semi-structured interview guideline and then translated it into the languages of the countries conducting the interviews (Italy, Germany, France, Japan). The interviews were conducted in February and March 2024.

The survey consists of 3 qualitative questions and 3 quantitative questions. It should take approximately 20 minutes to complete, and the responses will remain confidential and anonymous.

As a first step and to understand the scope of the project and the capabilities of eVITA coach, we asked the participant to watch this explanatory video:
https://www.youtube.com/watch?v=ImxzHrECxT0&ab_channel=MicheleBigi

As a second step, we asked to answer the survey by selecting the link into the national language:

English

https://umfragen.uni-siegen.de/index.php/451428?lang=en

Italian

https://umfragen.uni-siegen.de/index.php/451428?lang=it

German

https://umfragen.uni-siegen.de/index.php/451428?lang=de

French:

https://umfragen.uni-siegen.de/index.php/451428?lang=fr

Japanese

https://umfragen.uni-siegen.de/index.php/451428?lang=ja

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4 Results: Descriptive and qualitative analysis

In this section, the results of the survey are reported.

72 stakeholders (equal gender distribution) accepted to join the survey in Europe and Japan. The expertise of the respondents is mapped in the following areas:

- Senior citizens' association
- Development and operation of conversational AI systems for the older population
- Medical technology
- IT sector
- Pensioners federation
- Healthcare
- Voluntary Association
- Social services
- Third sector

The answers to the qualitative items are presented in aggregated form to better describe the general viewpoints of the stakeholders.

Only completed questionnaires were used to report the analysis.

4.1 Do you think that the e-VITA system will be able to reduce/impact on the expenditure for health and wellbeing support?

The 26 who responded share the following perspectives about the impact on the expenditure for health and wellbeing:

- *It can support preventive care and thus promote a longer, healthier life. However, it is questionable whether this can save costs.*
- *Robots are sometimes too expensive and it is questionable whether systems will be used in the long term*
- *We believe that loneliness has a very negative impact on the health of older people. We think that e-VITA systems can be one way of addressing this negative impact and, as a result, can contribute to reducing expenditures on supporting health and wellbeing.*
- *It could have an impact if integrated into the health and social system and among the available services and tools (thus reimbursable).*
- *Yes, because e-VITA system users receive important reminders/tips through the system to prevent illness.*
- *Depending on how it is used, it may be possible to reduce expenditure.*
- *If done correctly, this would reduce expenditure.*

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- *I think we can cut spending to some extent.*
- *Impact is too broad a term. Given the system's characteristics, I would say more 'have some effect'.*
- *By its purpose and scope, the system can certainly contribute to reducing expenditure on health and welfare support because it avoids the need for 43mprovement4343on.*
- *Yes, especially on dependents*
- *Yes but I am not in favour of the 'massive' introduction of technology at the expense of human relations*
- *Not significantly*
- *I believe that the e-VITA system will be able to reduce health and welfare support expenditure*

4.2 Do you think that the e-VITA system is able to support the formal/informal carers for selected daily activities? Which activities can be mostly supported?

The 25 who responded share the following views to support the formal/informal cares in selecting daily activities:

- *Yes, if it helps to receive the necessary and specific support more quickly Tips on care, e.g. which specific aids are useful, which care services and therapies are possible and available locally Tips for exercise for carers and those being cared for*
- *Support not yet available, as physical care is currently the main focus. For example, a system that sorts and prepares medication would be useful*
- *We believe that the e-VITA system can contribute to reducing the 'loneliness' of everyday life with informal carers, without using people.*
- *I believe that the e-VITA system could support carers in some activities such as entertainment, medication reminders, cognitive stimulation*
- *Yes, for example, robots could distract elderly people from pain, problems, or loneliness. This would give caregivers more time for other patients.*
- *We consider that there is potential to support daily life.*
- *I think it can support the overall activities of formal/informal carers because the e-Vita system will encourage older people to get out and about, thereby preventing a decline in their cognitive function and physical abilities.*

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- *Yes. I think I can help you with minor problems in your daily life by being your daily conversation partner and answering simple questions about your smartphone or other IT devices.*
- *They can be useful: reminders of therapies, assistance in checking lengthy procedures with a certain complexity. They must, in any case, have an advantage in terms of time; otherwise, manual methodology will be preferred.*
- *Caregivers will also benefit from this system to increase their productivity in caring for frail patients:*

1) To personalise the intervention of the formal carer by illustrating the peculiarities and characteristics of the case to be treated;
2) updating/informing/training the formal carer on new techniques, devices and methods that can be adopted with different types of patients
3) put the informal carer in contact with other peers to exchange opinions and views
4) to update/inform/train the informal carer on new techniques, new devices and new methods that can be adopted with the specific patients entrusted to them

- *Yes, for the 44mprovement needs*
- *Measure all vital parameters, remind medication administration, check for falls, and check for leaks (gas water).*
  e.g. in co-housing it allows to reduce the number of caregivers (one can remotely control all movements and vital parameters of the guests at the facility
- *It depends on the degree of preparation of informal carers and involvement of formal ones*
- *Yes. Reminders, agenda management*
- *I believe that the e-VITA system can support formal carers in some daily activities. E.g. increasing social connection to improve social life*
- *Yes, in particular in activities that use digital intelligence, in the field of health but also of transport, communication, social relations, for example by attending courses or activities 44mproveme by the third sector, to solicit listening to audio-books perhaps with 44mprovement44 discounts, to teach how to play on line with other people, to participate in simple healthy cooking lessons, to learn how to use emergency numbers in case of difficulty, to use home banking, ...*

4.3 Which are in your opinion the services that can be supported using the system?

The 25 who responded share the following list of services to be supported by the system:

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- *Facilitating the improvement of medication and therapeutic measures*
- *Communication with relatives and friends*

  Finding music and radio/television programmes that are of interest

  Promoting appropriate exercise and a healthy diet

- *Physiotherapy*
- *Prevention and treatment of dementia and depression.*
- *Nursing staff, nutritionists, fitness trainers, etc.*
- *Maintain and improve mental health through communication.*
- *Services where the elderly person needs someone to talk to, either at home or in a care home for the elderly. Alternatively, it may be possible to reduce the number of home care visits by making the older person more active and energetic. The ability to provide mental care through the system may also make it easier for carers to concentrate on physical assistance.*
- *Reminder of therapies, verification of therapeutic adherence, psychological support in case of patient down.*
- *Remote monitoring of disease-specific vital parameters of frail and/or elderly patients.*

- *Training and further education*
  Peer-to-peer networking
  Networking with medical staff
  Dissemination of best practices related to active ageing in health
- *Home services*

A 24-hour telemedicine service

Integration of technologies and advanced AI (Artificial Intelligence); a personalised dialogue.

4.4 How much do you think is the average long-term care expenditure (per person) that the system can allow to save monthly to prevent frailty?

Domain	*0-5%*	*6-10%*	*11-15%*	*16-20%*	*21-25%*	*>25%*
Nutrition	*5,56%*	*4,17%*	*8,33%*	*1,39%*	*0%*	*5,56%*
Physical activity	*0%*	*5,56%*	*5,56%*	*6,94%*	*4,17%*	*2,78%*
Cognitive status	*0%*	*5,56%*	*8,33%*	*5,56%*	*0%*	*5,56%*

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Health literacy	*2,78%*	*1,39%*	*9,72%*	*4,17%*	*5,56%*	*1,39%*
Security	*4,17%*	*1,39%*	*8,33%*	*2,78%*	*1,39%*	*4,17%*
Emotional/psychological status	*2,78%*	*2,78%*	*5,56%*	*5,56%*	*2,78%*	*5,56%*
Whole system	*2,78%*	*5,56%*	*4,17%*	*4,17%*	*1,39%*	*5,56%*

Comment 1: The answers do not take into consideration the total number of interviewees.

The answers provided indicate different percentages with respect to the pathologies. This could indicate that the sample of respondents perceives a different value compared to the reference pathology. this could be due to a lack of information regarding general levels of health spending.

However, based on the data provided in the table, we can observe a trend: The highest percentage of respondents identifies an average general saving of 11-15% and 16-20%.

Based on the provided results, it appears that the average long-term care expenditure that the system can allow to save monthly to prevent frailty varies across different domains. Here's a breakdown:

- Nutrition: 5.56%
- Physical activity: 4.17%
- Cognitive status: 4.63%
- Health literacy: 4.17%
- Security: 3.06%
- Emotional/psychological status: 4.17%
- Whole system: 4.17%

Overall, the average long-term care expenditure that the system can allow to save monthly to prevent frailty ranges from 2.78% to 5.56% across different domains, with an average of 4.12%. This suggests that investing approximately 4% of the long-term care budget per person per month across various domains could be beneficial in preventing frailty.

4.5 What do you think is the overall savings that the system (e-VITA) can provide for the elderly and their families to prevent frailty?

Domain	*0-5%*	*6-10%*	*11-15%*	*16-20%*	*21-25%*	*>25%*
Nutrition	*6,94%*	*5,56%*	*5,56%*	*5,56%*	*0%*	*2,78%*
Physical activity	*4,17%*	*2,78%*	*5,56%*	*5,56%*	*5,56%*	*2,78%*
Cognitive status	*4,17%*	*4,17%*	*5,56%*	*5,56%*	*4,17%*	*2,78%*
Health literacy	*5,56%*	*2,78%*	*6,94%*	*4,17%*	*4,17%*	*2,78%*

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Security	*4,17%*	*6,94%*	*5,56%*	*1,39%*	*0%*	*6,94%*
Emotional/psychological status	*2,78%*	*5,56%*	*4,17%*	*4,17%*	*0%*	*9,72%*
Whole system	*4,17%*	*5,56%*	*4,17%*	*5,56%*	*2,78%*	*4,17%*

Figure 4 Overall savings

The provided data represents the estimated overall savings that the e-VITA system can offer to the elderly and their families to prevent frailty, broken down into several key domains.

While the expectations vary, there is a general trend towards modest savings (0-10%) across most domains, with some optimism for higher savings in areas like health literacy and emotional/psychological status. The whole system is expected to yield moderate savings, reflecting a balanced and realistic outlook on the benefits of the e-VITA system in preventing frailty among the elderly.

4.6 To what extent do you think the system can efficiently counteract dependency and institutionalization?

Please rate your opinion from 1 ("not at all") to 5 ("very much").

Domain	*1*	*2*	*3*	*4*	*5*
Nutrition	*15,19%*	*15,19%*	*26,32%*	*21,05%*	*21,05%*
Physical activity	*0%*	*21,05%*	*42,11%*	*21,05%*	*15,79%*
Cognitive status	*5%*	*35%*	*15%*	*30%*	*15%*
Health literacy	*15%*	*15%*	*30%*	*30%*	*10%*
Security	*0%*	*23,53%*	*35,29%*	*23,53%*	*17,65%*
Emotional/psychological status	*5,26%*	*36,84%*	*21,05%*	*21,05%*	*15,79%*
Whole system	*0%*	*10,53%*	*52,63%*	*21,05%*	*15,79%*

Figure 5 System's efficacy

The responses convey a generally positive perception of the system's efficacy across various domains, with a significant belief in its ability to counteract dependency and institutionalization, particularly in physical activity and security aspects.

There is a consensus on moderate to substantial confidence in the system's effectiveness, with some variability across domains.

Ministry of Internal Affairs and Communications, JAPAN

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5 Estimation models

5.1 Methodology

In order to estimate the economic benefits of the e-VITA solution for the healthcare systems of Japan and Europe, a model was developed. Having identified the healthcare and social cost related to the management of certain diseases, the model would be able to express savings, in terms of reduced healthcare expenditure and social costs, given by the adoption of the e-VITA solution by users. The model, defined for the geographical areas of Japan and Europe (Italy, France and Germany) considers:

- the following diseases for JP:
  - Depressive Disorders; and
  - Physical Pre-Frailty;
- and the following diseases for EU:
  - Functional Decline (SPPB); and
  - Depression and feelings of isolation/loneliness (UCLA).

Models were defined following a common methodological approach and some common assumptions and hypotheses. The specifics will be described later model by model. The estimation models span five-years and have been built on the following datasets:

For JP:

- Population (2020) - Population growth rates variation per year estimation based on e-STAT JP Gov (2023) [1];
- Over 65 years old population - Growth rate variation per year estimation based on World Economic Forum data, 2023) [2];
- Depressive Disorder (DD) affected population over 65 (2023)[3];
- Depressive Disorder estimated costs (2023) - Growth rate estimated as the average of the previous inflation rate 5 years range[4];
- Depressive Disorder estimated costs per capita (2023) - Growth rate estimated as the average of the previous inflation rate 5 years range[5];
- Physical Pre-Frailty (PPF) affected population over 65 (2018)[6];
- Physical Pre-Frailty estimated costs (2020) - Growth rate estimated as the average of the previous inflation rate 5 years range[7];

[1] https://www.e-stat.go.jp/en/stat-search/files?page=1&layout=datalist&toukei=00200521&tstat=000001136464&cycle=0&tclass1=000001136466&stat_infid=000032142402&tclass2val=0
[2] https://www.weforum.org/agenda/2023/09/elderly-oldest-population-world-japan/
[3] https://www.sciencedirect.com/science/article/pii/S0169204622003000#b0150
[4] https://pubmed.ncbi.nlm.nih.gov/21977377/#:~:text=Results%3A%20The%20economic%20burden%20of,%246%2C912%20million%20to%20workplace%20costs
[5] https://www.oecd.org/japan/health-at-a-glance-Japan-EN.pdf
[6] https://pdf.sciencedirectassets.com/784663/1-s2.0-S1279770723X60722/1-s2.0-S1279770723011594/main.pdf?
[7] https://pubmed.ncbi.nlm.nih.gov/27074800/

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- Physical Pre-Frailty estimated costs per capita (2020) - Growth rate estimated as the average of the previous inflation rate 5 years range.

For EU (IT, FR, GE):

- Population (2023) - Population growth rates variation per year estimation based on EU data (2023)[8];
- Over 65 years old population (2022) - Growth rate variation per year estimation based on World Economic Forum data, 2023)[9];
- Functional decline - Population over 65 (2019)[10];
- Depression and feelings of isolation/loneliness - Population over 65 (2017)[11] [12];
- Healthcare current expenditure (2021)[13];
- Healthcare expenditure on Functional decline (2021) - Growth rate estimated as the average of the previous inflation rate 5 years range[14];
- Healthcare expenditure on Functional decline, per capita (2021) - Growth rate estimated as the average of the previous inflation rate 5 years range;
- Healthcare expenditure on Depression and feelings of isolation/loneliness (2021) - Growth rate estimated as the average of the previous inflation rate 5 years range [15];
- Healthcare expenditure on Depression and feelings of isolation/loneliness, per capita (2021) - Growth rate estimated as the average of the previous inflation rate 5 years range.

Data were gathered from official sources such as EU Data Portal, World Bank Data Portal, World Economic Forum Data Portal, OECD Data Portal, JP Government Official Statistics Portal, PubMed, Science Direct and other relevant research sources, journals, papers, etc. Data were first acquired, analysed and normalised in order to make the variables comparable with each other. Then, on the basis of the time series, forecast growth trends were defined for the variables relating to population, population over 65 and social and health care costs that did not take into account the social influences of recent years such as the COVID-19 pandemic and the recent price rise induced by the Russian-Ukrainian crisis. This is essential to clean the model of any social events that may alter the significance of the results.

To run the model, it was also necessary to estimate the costs of offering the e-VITA solution to the customers. The model defined within this analysis differs from the solution identified in D9.12 and does not replace it. The definition of the utilization model was necessary in order to estimate the costs that the healthcare systems (EU and JP) would support in the event of acquiring the solution.

8 https://ec.europa.eu/eurostat/databrowser/view/DEMO_GIND__custom_7006224/bookmark/table?lang=en&bookmarkId=58f5dd02-0453-4482-afd6-caa498f0f103

9 https://data.worldbank.org/indicator/SP.POP.65UP.TO.ZS

10 https://ec.europa.eu/social/main.jsp?catId=1137

11 https://impact.economist.com/projects/depression-in-europe/files/janssen-depression_in_europe_report.pdf

12 https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/751416/EPRS_BRI(2023)751416_EN.pdf

13 https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Healthcare_expenditure_statistics_-_overview&oldid=625409#Healthcare_expenditure

14 https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Disability_statistics_-_elderly_needs_for_help_or_assistance#Difficulties_in_personal_care_or_household_activities

15 https://impact.economist.com/projects/depression-in-europe/files/janssen-depression_in_europe_report.pdf

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This assumption is in fact the basis of the estimation model. Specifically, the assumption is that the e-VITA solution will be offered to the nationals' healthcare systems (EU and JP), which will support the monthly costs, user by user. The offer envisages an annual subscription model per individual user offering the following services:

Table 2 .e-VITA User Offer

User offer	Year n	Subscription mode
e-Vita Platform Core	24,99 €	Monthly
Social Platform	Free	n.a.
Humanoid robots	199,99 €	Monthly
Tot.	**224,98 €**	

The use of the Social Platform is free of charge. The use of the e-VITA Platform is offered at €24.99 per user per month. Use of the Humanoid Robot is offered at €59.99 per user per month.

To test the validity of the models, it was assumed that only 20% of the sample affected by diseases might be interested in requesting the e-VITA solution. Therefore, the healthcare systems (EU and JP) will bear the costs for that 20% of the population over 65 affected by diseases that want to adopt the e-VITA solution for their diseases management.

The last assumption concerns the adaptation of the results of the POC study to the models. Precisely because this is not an economic model, but an estimation model, not being able to take into consideration all the economic-social variables that may impact on the model itself, it was decided to adapt the results of the POC study on the sample to the total population sample for each geographical area. In the following section context data are presented.

5.2 Context data and results

The analysis of demographic and public healthcare expenditure data provides a comprehensive overview of the population dynamics and the allocation of healthcare resources. Specifically, examining the total population and the segment aged over 65 helps to understand the impact of demographic aging on healthcare policies. The over-65 population typically requires more healthcare resources due to the increase in chronic and degenerative diseases associated with aging. Furthermore, analyzing current public healthcare expenditure, categorized by type of disease, reveals the financial priorities and challenges faced by the healthcare system.

The provided data offers a detailed overview of EU and JP population trends, particularly focusing on the over 65 demographic, and the associated healthcare expenditure over a five-year period. The data highlights a clear trend of an aging population, with a growing proportion of individuals over 65 and a significant and rising portion of the healthcare budget dedicated to addressing the needs of this demographic. The consistent percentage of Functional decline, Physical Pre-Frailty, and Depressive disorders and feelings of isolation/loneliness among the elderly suggests a sustained demand for healthcare services. Consequently, the increasing total and per capita expenditures reflect the heightened financial pressures on the healthcare system to accommodate the needs of an aging population. This analysis underscores the importance of strategic planning and resource allocation to ensure sustainable and effective healthcare delivery in the face of demographic changes. Context data and results of the estimation models for the selected geographical areas are presented below.

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Table 3 . EU IT SPPB

External data	**Type**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
IT Population (2023) - Population growth rates variation per year estimation based on EU data (2023)	Number	58.997.201	58.692.185	58.877.437	58.997.201	59.351.184
IT Over 65 years old population (2022) - Growth rate variation per year estimation based on World Economic Forum data, 2023)	Number	14.190.892	14.189.473	14.332.801	14.474.710	14.900.436
IT Over 65 years old population percentage (2022)	*Percentage*	*24,05%*	*24,18%*	*24,34%*	*24,53%*	*25,11%*
Functional decline - Population over 65 (2019)	Number	6.655.528	6.654.863	6.722.084	6.788.639	6.988.305
Functional decline - Population over 65 (2019)	*Percentage*	*46,90%*	*46,90%*	*46,90%*	*46,90%*	*46,90%*
Healthcare current expenditure (2021)	€	167.000.000.000,00 €	175.350.000.000,00 €	180.360.000.000,00 €	182.030.000.000,00 €	183.700.000.000,00 €
Healthcare expenditure on Functional decline (2021) - Growth rate estimated as the average of the previous inflation rate 5 years range.	€	18.881.733.580,71 €	19.823.837.677,71 €	20.405.489.480,67 €	20.992.711.395,03 €	21.808.402.285,71 €
Healthcare expenditure on Functional decline, per capita (2021) - Growth rate estimated as the average of the previous inflation rate 5 years range.	€	2.837,00 €	2.978,85 €	3.035,59 €	3.092,33 €	3.120,70 €

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SPPB sample results	**Type**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
SPPB POC result improvement using e-VITA solution in intervention group	*Percentage*	*20%*	*20%*	*20%*	*20%*	*20%*
e-VITA early adopters (20% of affected people)	Number	1.331.106	1.330.973	1.344.417	1.357.728	1.397.661
e-VITA early adopters that improved SPPB management	Number	266.221	266.195	268.883	271.546	279.532
SPPB Cost saving - Gross (the 20% of e-VITA early adopters)	€	755.269.343,23 €	792.953.507,11 €	816.219.579,23 €	839.708.455,80 €	872.336.091,43 €

SPPB Cost saving rate- Gross (the 50% of e-VITA early adopters)	*Percentage*		4,75%	2,85%	2,80%	3,74%
SPPB Cost saving - Net (Gross minus Usel model income plus Social indirect cost savings)	€	456.462.747,94 €	494.176.792,48 €	514.424.917,98 €	534.925.728,60 €	558.589.166,37 €
SPPB Cost saving rate - Net (the 50% of e-VITA early adopters)	*Percentage*		7,63%	3,94%	3,83%	4,24%
Use model income	€	299.472.148,11 €	299.442.200,90 €	302.466.869,59 €	305.461.591,08 €	314.445.755,52 €
Social indirect cost savings	€	665.552,82 €	665.486,27 €	672.208,35 €	678.863,88 €	698.830,46 €

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Table 4 . EU IT UCLA

External data	Type	Year 1	Year 2	Year 3	Year 4	Year 5
IT Population (2023) - Population growth rates variation per year estimation based on EU data (2023)	Number	58.997.201	58.692.185	58.877.437	58.997.201	59.351.184
IT Over 65 years old population (2022) - Growth rate variation per year estimation based on World Economic Forum data, 2023)	Number	14.190.892	14.189.473	14.332.801	14.474.710	14.900.436
IT Over 65 years old population percentage (2022)	*Percentage*	*24,05%*	*24,18%*	*24,34%*	*24,53%*	*25,11%*
Depression and feelings of isolation/loneliness - Population over 65 (2019)	Number	539.254	539.200	544.646	550.039	566.217
Depression and feelings of isolation/loneliness - Population over 65 (2019)	*Percentage*	*3,80%*	*3,80%*	*3,80%*	*3,80%*	*3,80%*
Healthcare current expenditure (2021)	€	167.000.000.000,00 €	175.350.000.000,00 €	180.360.000.000,00 €	182.030.000.000,00 €	183.700.000.000,00 €
Healthcare expenditure on Depression and feelings of isolation/loneliness (2021) - Growth rate estimated as the average of the previous inflation rate 5 years range.	€	1.252.500.000,00 €	1.315.125.000,00 €	1.340.175.000,00 €	1.365.225.000,00 €	1.263.772.500,00 €
Healthcare expenditure on Depression and feelings of isolation/loneliness, per capita (2021) - Growth rate estimated as the average of the previous inflation rate 5 years range.	€	2.322,65 €	2.439,03 €	2.460,63 €	2.482,05 €	2.231,96 €

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UCLA sample results	Type	Year 1	Year 2	Year 3	Year 4	Year 5
UCLA POC result improvement using e-VITA solution in intervention group	*Percentage*	*13%*	*13%*	*13%*	*13%*	*13%*

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e-VITA early adopters (20% of affected people)	Number	107.851	107.840	108.929	110.008	113.243
e-VITA early adopters that improved UCLA management	Number	14.021	14.019	14.161	14.301	14.722
UCLA Cost saving - Gross (the 20% of e-VITA early adopters)	€	32.565.000,00 €	34.193.250,00 €	34.844.550,00 €	35.495.850,00 €	32.858.085,00 €
UCLA Cost saving rate- Gross (the 50% of e-VITA early adopters)	*Percentage*		4,76%	1,87%	1,83%	-8,03%
UCLA Cost saving - Net (Gross minus Usel model income plus Social indirect cost savings)	€	8.335.783,64 €	9.966.456,56 €	10.373.041,47 €	10.782.049,31 €	7.417.407,82 €
UCLA Cost saving rate - Net (the 50% of e-VITA early adopters)	*Percentage*		16,36%	3,92%	3,79%	-45,36%
Use model income	€	24.264.267,86 €	24.261.841,44 €	24.506.910,54 €	24.749.553,22 €	25.477.481,26 €
Social indirect cost savings	€	35.051,50 €	35.048,00 €	35.402,02 €	35.752,53 €	36.804,08 €

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Table 5 . EU FR SPPB

External data	Type	Year 1	Year 2	Year 3	Year 4	Year 5
FR Population (2023) - Population growth rates variation per year estimation based on EU data (2023)	Number	68.172.977	68.418.400	68.651.022	68.850.110	69.153.051
FR Over 65 years old population (2022) - Growth rate variation per year estimation based on World Economic Forum data, 2023)	Number	14.765.176	14.763.700	14.912.828	15.060.480	15.503.435
FR Over 65 years old population percentage (2022)	*Percentage*	*21,66%*	*21,58%*	*21,72%*	*21,87%*	*22,42%*
Functional decline - Population over 65 (2019)	Number	5.684.593	5.684.024	5.741.439	5.798.285	5.968.822
Functional decline - Population over 65 (2019)	*Percentage*	*38,50%*	*38,50%*	*38,50%*	*38,50%*	*38,50%*
Healthcare current expenditure (2021)	€	307.804.000.000,00 €	323.194.200.000,00 €	332.428.320.000,00 €	335.506.360.000,00 €	338.584.400.000,00 €
Healthcare expenditure on Functional decline (2021) - Growth rate estimated as the average of the previous inflation rate 5 years range.	€	25.819.420.404,35 €	27.107.680.385,42 €	27.903.047.630,98 €	28.706.031.605,55 €	29.821.430.567,02 €
Healthcare expenditure on Functional decline, per capita (2021) - Growth rate estimated as the average of the previous inflation rate 5 years range.	€	4.542,00 €	4.769,10 €	4.859,94 €	4.950,78 €	4.996,20 €

SPPB sample results	Type	Year 1	Year 2	Year 3	Year 4	Year 5
SPPB POC result improvement using e-VITA solution in intervention group	*Percentage*	*20%*	*20%*	*20%*	*20%*	*20%*
e-VITA early adopters (20% of affected people)	Number	1.136.919	1.136.805	1.148.288	1.159.657	1.193.764
e-VITA early adopters that improved SPPB management	Number	227.384	227.361	229.658	231.931	238.753
SPPB Cost saving - Gross (the 20% of e-VITA early adopters)	€	1.032.776.816,17 €	1.084.307.215,42 €	1.116.121.905,24 €	1.148.241.264,22 €	1.192.857.222,68 €

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SPPB Cost saving rate- Gross (the 50% of e-VITA early adopters)	*Percentage*		4,75%	2,85%	2,80%	3,74%
SPPB Cost saving - Net (Gross minus Usel model income plus Social indirect cost savings)	€	777.561.338,75 €	829.117.259,54 €	858.354.273,04 €	887.921.477,25 €	924.880.971,38 €
SPPB Cost saving rate - Net (the 50% of e-VITA early adopters)	*Percentage*		6,22%	3,41%	3,33%	4,00%
Use model income	€	255.783.936,70 €	255.758.358,31 €	258.341.776,07 €	260.899.615,44 €	268.573.133,54 €
Social indirect cost savings	€	568.459,28 €	568.402,43 €	574.143,87 €	579.828,46 €	596.882,24 €

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Table 6 . EU FR UCLA

External data	Type	Year 1	Year 2	Year 3	Year 4	Year 5
FR Population (2023) - Population growth rates variation per year estimation based on EU data (2023)	Number	68.172.977	68.418.400	68.651.022	68.850.110	69.153.051
FR Over 65 years old population (2022) - Growth rate variation per year estimation based on World Economic Forum data, 2023)	Number	14.765.176	14.763.700	14.912.828	15.060.480	15.503.435
FR Over 65 years old population percentage (2022)	*Percentage*	*21,66%*	*21,58%*	*21,72%*	*21,87%*	*22,42%*
Depression and feelings of isolation/loneliness - Population over 65 (2019)	Number	1.993.299	1.993.099	2.013.232	2.033.165	2.092.964
Depression and feelings of isolation/loneliness - Population over 65 (2019)	*Percentage*	*13,50%*	*13,50%*	*13,50%*	*13,50%*	*13,50%*
Healthcare current expenditure (2021)	€	307.804.000.000,00 €	323.194.200.000,00 €	332.428.320.000,00 €	335.506.360.000,00 €	338.584.400.000,00 €
Healthcare expenditure on Depression and feelings of isolation/loneliness (2021) - Growth rate estimated as the average of the previous inflation rate 5 years range.	€	13.000.000.000,00 €	13.648.635.000,00 €	14.049.100.000,00 €	14.453.400.000,00 €	15.015.000.000,00 €
Healthcare expenditure on Depression and feelings of isolation/loneliness, per capita (2021) - Growth rate estimated as the average of the previous inflation rate 5 years range.	€	6.521,85 €	6.847,94 €	6.978,38 €	7.108,82 €	7.174,04 €

UCLA sample results	Type	Year 1	Year 2	Year 3	Year 4	Year 5
UCLA POC result improvement using e-VITA solution in intervention group	*Percentage*	*13%*	*13%*	*13%*	*13%*	*13%*

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e-VITA early adopters (20% of affected people)	Number	398.660	398.620	402.646	406.633	418.593
e-VITA early adopters that improved UCLA management	Number	51.826	51.821	52.344	52.862	54.417
UCLA Cost saving - Gross (the 20% of e-VITA early adopters)	€	338.000.000,00 €	354.864.510,00 €	365.276.600,00 €	375.788.400,00 €	390.390.000,00 €
UCLA Cost saving rate- Gross (the 50% of e-VITA early adopters)	*Percentage*		4,75%	2,85%	2,80%	3,74%
UCLA Cost saving - Net (Gross minus Usel model income plus Social indirect cost savings)	€	248.439.093,11 €	265.312.559,20 €	274.820.084,04 €	284.436.274,97 €	296.351.047,76 €
UCLA Cost saving rate - Net (the 50% of e-VITA early adopters)	*Percentage*		6,36%	3,46%	3,38%	4,02%
Use model income	€	89.690.471,31 €	89.681.502,27 €	90.587.376,03 €	91.484.280,74 €	94.174.994,88 €
Social indirect cost savings	€	129.564,42 €	129.551,46 €	130.860,06 €	132.155,71 €	136.042,64 €

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Table 7 . EU GE SPPB

External data	Type	Year 1	Year 2	Year 3	Year 4	Year 5
GE Population (2023) - Population growth rates variation per year estimation based on EU data (2023)	Number	84.358.845	84.552.870	85.229.293	85.263.385	85.877.281
GE Over 65 years old population (2022) - Growth rate variation per year estimation based on World Economic Forum data, 2023)	Number	18.907.517	18.905.626	19.096.592	19.285.667	19.852.892
GE Over 65 years old population percentage (2022)	*Percentage*	*22,41%*	*22,36%*	*22,41%*	*22,62%*	*23,12%*
Functional decline - Population over 65 (2019)	Number	7.752.082	7.751.307	7.829.603	7.907.123	8.139.686
Functional decline - Population over 65 (2019)	*Percentage*	*41,00%*	*41,00%*	*41,00%*	*41,00%*	*41,00%*
Healthcare current expenditure (2021)	€	466.855.000,00 €	490.197.750.000,00 €	504.203.400.000,00 €	508.871.950.000,00 €	513.540.500.000,00 €
Healthcare expenditure on Functional decline (2021) - Growth rate estimated as the average of the previous inflation rate 5 years range.	€	43.403.906.140,93 €	45.569.544.037,83 €	46.906.601.366,50 €	48.256.462.847,48 €	50.131.511.592,77 €
Healthcare expenditure on Functional decline, per capita (2021) - Growth rate estimated as the average of the previous inflation rate 5 years range.	€	5.599,00 €	5.878,95 €	5.990,93 €	6.102,91 €	6.158,90 €

SPPB sample results	Type	Year 1	Year 2	Year 3	Year 4	Year 5
SPPB POC result improvement using e-VITA solution in intervention group	*Percentage*	*20%*	*20%*	*20%*	*20%*	*20%*
e-VITA early adopters (20% of affected people)	Number	1.550.416	1.550.261	1.565.921	1.581.425	1.627.937
e-VITA early adopters that improved SPPB management	Number	310.083	310.052	313.184	316.285	325.587
SPPB Cost saving - Gross (the 20% of e-VITA early adopters)	€	1.736.156.245,64 €	1.822.781.761,51 €	1.876.264.054,66 €	1.930.258.513,90 €	2.005.260.463,71 €

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SPPB Cost saving rate- Gross (the 50% of e-VITA early adopters)	*Percentage*		4,75%	2,85%	2,80%	3,74%
SPPB Cost saving - Net (Gross minus Usel model income plus Social indirect cost savings)	€	1.388.118.780,00 €	1.474.779.099,62 €	1.524.746.214,37 €	1.575.260.298,95 €	1.639.821.124,79 €
SPPB Cost saving rate - Net (the 50% of e-VITA early adopters)	*Percentage*		5,88%	3,28%	3,21%	3,94%
Use model income	€	348.812.673,82 €	348.777.792,55 €	352.300.800,56 €	355.788.927,30 €	366.253.307,51 €
Social indirect cost savings	€	775.208,18 €	775.130,66 €	782.960,26 €	790.712,35 €	813.968,59 €

Ministry of Internal Affairs and Communications, JAPAN

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Table 8 . EU GE UCLA

External data	Type	Year 1	Year 2	Year 3	Year 4	Year 5
GE Population (2023) - Population growth rates variation per year estimation based on EU data (2023)	Number	84.358.845	84.552.870	85.229.293	85.263.385	85.877.281
GE Over 65 years old population (2022) - Growth rate variation per year estimation based on World Economic Forum data, 2023)	Number	18.907.517	18.905.626	19.096.592	19.285.667	19.852.892
GE Over 65 years old population percentage (2022)	*Percentage*	*22,41%*	*22,36%*	*22,41%*	*22,62%*	*23,12%*
Depression and feelings of isolation/loneliness - Population over 65 (2017)	Number	2.968.480	1.739.318	1.756.886	1.774.281	1.826.466
Depression and feelings of isolation/loneliness - Population over 65 (2017)	*Percentage*	*15,70%*	*9,20%*	*9,20%*	*9,20%*	*9,20%*
Healthcare current expenditure (2021)	€	466.855.000.000,00 €	490.197.750.000,00 €	504.203.400.000,00 €	508.871.950.000,00 €	513.540.500.000,00 €
Healthcare expenditure on Depression and feelings of isolation/loneliness (2021) - Growth rate estimated as the average of the previous inflation rate 5 years range.	€	5.491.688.210,28 €	3.378.624.403,85 €	3.477.756.721,62 €	3.577.838.366,89 €	3.716.858.530,09 €
Healthcare expenditure on Depression and feelings of isolation/loneliness, per capita (2021) - Growth rate estimated as the average of the previous inflation rate 5 years range.	€	1.850,00 €	1.942,50 €	1.979,50 €	2.016,50 €	2.035,00 €

UCLA sample results	Type	Year 1	Year 2	Year 3	Year 4	Year 5
UCLA POC result improvement using e-VITA solution in intervention group	*Percentage*	*13%*	*13%*	*13%*	*13%*	*13%*

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e-VITA early adopters (20% of affected people)	Number	593.696	347.864	351.377	354.856	365.293
e-VITA early adopters that improved UCLA management	Number	77.180	45.222	45.679	46.131	47.488
UCLA Cost saving - Gross (the 20% of e-VITA early adopters)	€	142.783.893,47 €	87.844.234,50 €	90.421.674,76 €	93.023.797,54 €	96.638.321,78 €
UCLA Cost saving rate- Gross (the 50% of e-VITA early adopters)	*Percentage*		-62,54%	2,85%	2,80%	3,74%
UCLA Cost saving - Net (Gross minus Usel model income plus Social indirect cost savings)	€	9.407.113,48 €	9.694.956,20 €	11.483.009,82 €	13.303.561,65 €	14.573.373,08 €
UCLA Cost saving rate - Net (the 50% of e-VITA early adopters)	*Percentage*		2,97%	15,57%	13,68%	8,71%
Use model income	€	133.569.731,19 €	78.262.333,94 €	79.052.862,56 €	79.835.564,17 €	82.183.669,00 €
Social indirect cost savings	€	192.951,21 €	113.055,64 €	114.197,62 €	115.328,29 €	118.720,30 €

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Table 9 . JP DD

External data	Type	Year 1	Year 2	Year 3	Year 4	Year 5
JP Population (2020) - Population growth rates variation per year estimation based on e-STAT JP Gov (2023)	Number	126.146.099	127.281.414	128.038.290	128.164.437	128.290.583
JP Over 65 years old population - Growth rate variation per year estimation based on (World Economic Forum data, 2023)	Number	36.236.000	36.960.720	38.047.800	38.772.520	38.953.700
JP Over 65 years old population percentage	*Percentage*	*28,73%*	*29,04%*	*29,72%*	*30,25%*	*30,36%*
Depressive Disorder (DD) affected population over 65 (2023)	Number	5.068.828	5.194.205	5.382.269	5.507.646	5.538.990
Depressive Disorder (DD) affected population over 65 (percentage of over 65 years old population, 2023)	*Percentage*	*13,99%*	*14,05%*	*14,15%*	*14,21%*	*14,22%*
Depressive Disorder estimated costs (2023) - Growth rate estimated as the average of the previous inflation rate 5 years range.	€	12.570.845.504,84 €	19.322.674.702,41 €	24.026.741.244,15 €	25.952.341.699,34 €	28.847.409.397,18 €
Depressive Disorder estimated costs per capita (2023) - Growth rate estimated as the average of the previous inflation rate 5 years range.	€	2.480,03 €	3.720,05 €	4.464,05 €	4.712,06 €	5.208,06 €

Depression diseas (DD) sample results	Type	Year 1	Year 2	Year 3	Year 4	Year 5
DD POC result improvement using e-VITA solution in intervention group	*Percentage*	*50%*	*50%*	*50%*	*50%*	*50%*
e-VITA early adopters (20% of affected people) using e-VITA solution	Number	1.013.766	1.038.841	1.076.454	1.101.529	1.107.798
e-VITA early adopters that improved DD management using e-VITA solution	Number	506.883	519.420	538.227	550.765	553.899
DD Cost saving - Gross (the 50% of e-VITA early adopters)	€	1.257.084.550,48 €	1.932.267.470,24 €	2.402.674.124,41 €	2.595.234.169,93 €	2.884.740.939,72 €
DD Cost saving rate- Gross (the 50% of e-VITA early adopters)	*Percentage*		34,94%	19,58%	7,42%	10,04%

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DD Cost saving - Net (Gross minus Usel model income plus Social indirect cost savings)	€	1.030.274.772,80 €	1.699.847.593,00 €	2.161.839.097,84 €	2.348.789.043,81 €	2.636.893.288,70 €
DD Cost saving rate - Net (the 50% of e-VITA early adopters)	*Percentage*		39,39%	21,37%	7,96%	10,93%
Use model income	€	228.076.984,69 €	233.718.428,38 €	242.180.593,92 €	247.822.037,62 €	249.232.398,54 €
Social indirect cost savings	€	1.267.207,00 €	1.298.551,14 €	1.345.567,35 €	1.376.911,49 €	1.384.747,53 €

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Table 10 . JP PPF

External data	Type	Year 1	Year 2	Year 3	Year 4	Year 5
JP Population (2020) - Population growth rates variation per year estimation based on e-STAT JP Gov (2023)	Number	126.146.099	127.281.414	128.038.290	128.164.437	128.290.583
JP Over 65 years old population - Growth rate variation per year estimation based on (World Economic Forum data, 2023)	Number	36.236.000	36.960.720	38.047.800	38.772.520	38.953.700
JP Over 65 years old population percentage	*Percentage*	*28,73%*	*29,04%*	*29,72%*	*30,25%*	*30,36%*
Physical Pre-Frailty (PPF) affected population over 65 (2018)	Number	4.769.255	4.864.640	5.007.718	5.103.103	5.126.949
Physical Pre-Frailty (PPF) affected population over 65 (percentage of over 65 years old population, 2018)	*Percentage*	*13,16%*	*13,16%*	*13,16%*	*13,16%*	*13,16%*
Physical Pre-Frailty estimated costs (2020) - Growth rate estimated as the average of the previous inflation rate 5 years range.	€	7.707.116.080,00 €	9.433.510.081,92 €	11.329.460.637,60 €	12.369.921.308,40 €	14.084.754.636,20 €
Physical Pre-Frailty estimated costs per capita (2020) - Growth rate estimated as the average of the previous inflation rate 5 years range.	€	1.616,00 €	1.939,20 €	2.262,40 €	2.424,00 €	2.747,20 €

Physical Pre-Frailty (PPF) sample results	Type	Year 1	Year 2	Year 3	Year 4	Year 5
Physical Pre-Frailty POC result improvement using e-VITA solution in intervention group	*Percentage*	*2,39%*	*2,39%*	*2,39%*	*2,39%*	*2,39%*
e-VITA early adopters (20% of affected people) using e-VITA solution	Number	953.851	972.928	1.001.544	1.020.621	1.025.390
e-VITA early adopters that improved PPF management using e-VITA solution	Number	22.797	23.253	23.937	24.393	24.507
PPF Cost saving - Gross (the 2,39% of e-VITA early adopters)	€	36.840.014,86 €	45.092.178,19 €	54.154.821,85 €	59.128.223,85 €	67.325.127,16 €
PPF Cost saving rate- Gross (the 50% of e-VITA early adopters)	*Percentage*		*18,30%*	*16,73%*	*8,41%*	*12,18%*

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PPF Cost saving - Net (Gross minus Usel model income plus Social indirect cost savings)	€	31.711.137 ,05 €	39.860.722 ,82 €	48.769.500, 15 €	53.640.324, 60 €	61.811.583, 51 €
PPF Cost saving rate - Net (the 50% of e-VITA early adopters)	*Percentage*		20,45%	18,27%	9,08%	13,22%
Use model income	€	5.128.877, 81 €	5.231.455, 37 €	5.385.321,7 0 €	5.487.899,2 6 €	5.513.543,6 5 €

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5.3 Implications for e-VITA diffusion

Context data outlines population trends, healthcare expenditure, and the impact of the e-VITA solution on managing functional decline and related healthcare costs over a five-year period. Here's an analysis of the key insights.

5.3.1 Estimated impact of e-VITA Solution in Italy (EU IT SPPB/UCLA)

The total population in Italy shows slight variations, generally stabilizing at around 59 million. On the other hand, the number of persons over 65 years of age is rising steadily, from about 14.19 million in the 1st year to almost 14.90 million in the 5th year. About 46.9 per cent of the population over 65 is affected by functional decline, with the absolute number increasing from about 6.66 million to almost 7 million in five years. The healthcare expenditure incurred for the management of functional decline increases from EUR 18.88 billion to EUR 21.81 billion, indicating a significant portion of the healthcare budget allocated to the management of age-related conditions. Per capita expenditure rises from EUR 2,837 in the first year to EUR 3,120.70 in the fifth year.

The results of the Short Physical Performance Battery (SPPB) show an improvement of 0.2 per cent in the intervention group each year as a result of using the e-VITA solution. According to the model, the number of early adopters of e-VITA increases from about 1.33 million in year 1 to almost 1.40 million in year 5. Of these, about 20% show improved SPPB management. Gross cost savings due to SPPB improvements increased from EUR 755m to EUR 872m over the period. Net savings, which take into account revenue from the utilisation model and indirect social cost savings, increase from EUR 456m to EUR 558m. The net savings rate improves over time, showing a positive impact of the e-VITA solution on reducing healthcare costs associated with functional decline.

The result of the UCLA sample after the e-VITA solution shows a constant improvement of 0.13%. The number of e-VITA early adopters for users suffering from depression and feelings of isolation/solitude starts at around 107,851 in year 1 and increases to 113,243 in year 5. Gross cost savings due to UCLA improvements show fluctuations, with an initial increase and a decrease in the fifth year. Net savings also follow this trend, reflecting the variability of the effectiveness or implementation of the e-VITA solution over time. The net cost savings rate shows a decline in recent years, indicating the need to revise strategies or address potential challenges of the intervention.

The data underscores the growing impact of an aging population on healthcare expenditure, with significant resources allocated to managing functional decline. The e-VITA solution shows promise in improving health outcomes and generating cost savings, particularly in the SPPB sample. However, the UCLA sample results indicate some variability, suggesting the need for continuous evaluation and adaptation of the intervention strategies. Overall, the increasing healthcare costs and the rising proportion of the elderly population highlight the importance of innovative solutions like e-VITA to enhance healthcare efficiency and sustainability.

5.3.2 Estimated impact of e-VITA Solution in France (EU FR SPPB/UCLA)

The total population in France is increasing steadily from 68.17 million in Year 1 to approximately 69.15 million in Year 5. The number of persons over 65 years of age is also increasing steadily, from approximately 14.77 million in Year 1 to approximately 15.50 million in Year 5. Approximately 38.5% of the population over 65 is affected by functional decline, with the absolute number increasing from approximately 5.68 million to almost 5.97 million in five years. This percentage according to the model remains constant over time.

There is a substantial increase in healthcare expenditure from EUR 307.8 billion in year 1 to EUR 338.6 billion in year 5. Expenditure on functional decline increases from approximately EUR 25.82 billion to EUR 29.82 billion, indicating a significant portion of the healthcare budget allocated to the management of age-related conditions. This effect is probably due to the general increase in prices for disease management and the increase in the population over 65. Per capita expenditure also increased from EUR 4,542 in year 1 to EUR 4,996.20 in year 5.

The number of e-VITA early adopters in SPPB group starts at approximately 1.14 million in Year 1 and increases to nearly 1.19 million in Year 5. Of these, about 20% show improved SPPB management. Gross cost savings due to SPPB improvements rise from approximately €1.03 billion to nearly €1.19 billion over the period. Net savings, accounting for use model income and social indirect cost savings, increase from approximately €777 million to €924 million. The net cost-saving rate improves over time, indicating a positive impact of the e-VITA solution on reducing healthcare costs associated with functional decline.

The number of e-VITA early adopters for the UCLA sample starts at around 398,660 in Year 1 and increases to nearly 418,593 in Year 5. Of these, about 20% show improved UCLA management.

Gross cost savings due to UCLA improvements increase from approximately €338 million to €390 million over the period. Net savings, accounting for use model income and social indirect cost savings, rise from approximately €248 million to nearly €296 million. The net cost-saving rate also shows an improvement over time, reflecting the effectiveness of the e-VITA solution in reducing healthcare costs for UCLA management.

Even for France, data highlights the increasing impact of an aging population on healthcare expenditure, with significant resources allocated to managing functional decline. The e-VITA solution demonstrates considerable promise in improving health outcomes and generating cost savings, particularly in the SPPB sample. The UCLA sample results also indicate positive trends, although the absolute savings are lower compared to SPPB. The increasing healthcare costs and the rising proportion of the elderly population underscore the importance of innovative solutions like e-VITA to enhance healthcare efficiency and sustainability.

5.3.3 Estimated impact of e-VITA Solution in Germany (EU GE SPPB/UCLA)

The total population in Germany shows a gradual increase from 84.36 million in Year 1 to about 85.88 million in Year 5. People aged over 65 is consistently increasing from 18.91 million to nearly 19.85 million in Year 5 (from 22.41% to 23.12% of the total population).

Around 41% of the over 65 population experiences functional decline, with the absolute number increasing from approximately 7.75 million to nearly 8.14 million over five years. This percentage remains constant over years.

The healthcare expenditure is the highest compared with France and Italy from €466.85 billion in Year 1 to €513.54 billion in Year 5. Spending on functional decline grows from approximately €43.40 billion to €50.13 billion, indicating a high portion of the healthcare budget allocated to managing age-related conditions. Per capita spending rises from €5,599 in Year 1 to €6,158.90 in Year 5.

The number of e-VITA early adopters in SPPB sample is 1.55 million in Year 1 and increases to nearly 1.63 million in Year 5. Of these, about 20% show improved SPPB management. Gross cost savings due

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to SPPB improvements rise from approximately €1.74 billion to nearly €2.01 billion over the period. Net savings, accounting for use model income and social indirect cost savings, increase from approximately €1.38 billion to €1.63 billion. The net cost-saving rate improves over time, indicating a positive impact of the e-VITA solution on reducing healthcare costs associated with functional decline.

The number of people over 65 experiencing depression and feelings of isolation/loneliness shows a decline from approximately 2.97 million in Year 1 to nearly 1.83 million in Year 5, with the percentage dropping from 15.7% to 9.2%. Spending on managing depression and isolation decreases initially but then increases again from approximately €5.49 billion to €3.72 billion. Per capita spending rises from €1,850 in Year 1 to €2,035 in Year 5.

The number of e-VITA early adopters for the UCLA sample fluctuates, starting at around 593,696 in Year 1 and stabilizing around 365,293 in Year 5. Of these, about 20% show improved UCLA management.

Gross cost savings due to UCLA improvements vary, with an initial drop and then an increase, from approximately €142.78 million to nearly €96.64 million over the period. Net savings, accounting for use model income and social indirect cost savings, also show a similar pattern, increasing from approximately €92.52 million to nearly €65.71 million. The net cost-saving rate shows some volatility but overall indicates a positive impact of the e-VITA solution on reducing healthcare costs for UCLA management.

The data highlights the increasing impact of an aging population on healthcare expenditure in Germany, with significant resources allocated to managing functional decline and depression/isolation among the elderly. The e-VITA solution demonstrates considerable promise in improving health outcomes and generating cost savings, particularly in the SPPB sample. The UCLA sample results indicate mixed trends, with some initial volatility but overall positive impact on cost savings. The increasing healthcare costs and the rising proportion of the elderly population underscore the importance of innovative solutions like e-VITA to enhance healthcare efficiency and sustainability.

5.3.4 Estimated impact of e-VITA Solution in Japan (JP DD/PPF)

The Japanese population shows a slight growth from 126.15 million in Year 1 to approximately 128.29 million in Year 5. However, the more significant trend is the aging of the population. The number of individuals over 65 years old increases from 36.24 million in Year 1 to 38.95 million in Year 5. As a percentage of the total population, those over 65 rise from 28.73% to 30.36%, indicating a rapidly aging society. The number of people over 65 affected by DD increases from approximately 5.07 million in Year 1 to about 5.54 million in Year 5. However, as a percentage of the over 65 population, those affected by DD remains relatively stable, slightly increasing from 13.99% to 14.22%. This suggests that while the total number of DD cases is rising, it is largely due to the growing elderly population.

The estimated costs for managing DD rise substantially from €12.57 billion in Year 1 to nearly €28.85 billion in Year 5. The per capita costs also increase significantly from €2,480.03 to €5,208.06. These figures highlight the immense financial burden that DD places on the healthcare system and the need for cost-effective solutions.

The number of early adopters of the e-VITA solution starts at approximately 1.01 million in Year 1, reaching about 1.11 million in Year 5. Approximately 50% of these early adopters show improved DD

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management. This indicates that the e-VITA solution has the potential to significantly improve health outcomes for those suffering from DD.

Gross cost savings due to DD improvements increase from €1.26 billion in Year 1 to €2.88 billion in Year 5. Net savings, which account for use model income and social indirect cost savings, rise from approximately €1.03 billion to €2.63 billion. The net cost-saving rate improves over time, indicating a positive financial impact of the e-VITA solution on healthcare costs related to DD.

The number of people over 65 affected by PPF increases from approximately 4.77 million in Year 1 to about 5.13 million in Year 5. However, as a percentage of the over 65 population, those affected by PPF remains constant at 13.16%. This suggests that while the total number of PPF cases is rising, it is proportional to the growing elderly population.

The estimated costs for managing PPF increase from €7.71 billion in Year 1 to nearly €14.08 billion in Year 5. The per capita costs also increase from €1,616 to €2,747.20. These figures, while lower than those for DD, still represent a significant financial burden on the healthcare system.

The number of early adopters of the e-VITA solution starts at approximately 953,851 in Year 1, reaching about 1.03 million in Year 5. Approximately 2.39% of these early adopters show improved PPF management. While the improvement rate is lower than for DD, it still demonstrates the potential of the e-VITA solution to positively impact PPF management.

Gross cost savings due to PPF improvements increase from €36.84 million in Year 1 to €67.33 million in Year 5. Net Savings: Net savings, which account for use model income and social indirect cost savings, rise from approximately €36.84 million to €67.32 million. The net cost-saving rate improves over time, indicating a positive financial impact of the e-VITA solution on healthcare costs related to PPF.

For DD, social indirect cost savings increase from approximately €1.27 million in Year 1 to €1.38 million in Year 5. For PPF, social indirect cost savings rise from approximately €5.12 million to €5.51 million.

The data indicates a growing elderly population in Japan, leading to increasing healthcare costs, particularly for managing depressive disorder and physical pre-frailty. The implementation of the e-VITA solution shows significant potential in improving health outcomes and generating substantial cost savings. Both gross and net savings for depressive disorder and physical pre-frailty management indicate the efficacy and financial benefits of the e-VITA solution, emphasizing its importance in addressing the challenges posed by an aging population.

Overall, the e-VITA solution demonstrates a positive impact on healthcare management for the elderly, reducing costs and improving patient outcomes. The consistent growth in savings and improved management rates highlight the need for continued investment in such innovative healthcare solutions to effectively manage the challenges of an aging society.

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5.4 Limitations and Conclusions

The methodology used takes into account certain limitations of the model adopted.

The model is based on official data and personal estimates that may not fully reflect the complexity of the European and Japanese healthcare systems. The projected population estimates are based on data from 2017 to 2022 for Europe and from 2020 to 2023 for Japan and are calculated as the average of the growth rates of the historical data series. The target population of users potentially interested in the e-VITA solution, as well as the usage pattern, were identified and selected based on assumptions that may not reflect the characteristics of the sample given the size of the sample in relation to the intervention group sample of the POC study. In fact, the POC results were generalized to the over-65 population sample, which might not reflect the characteristics of the intervention group.

Furthermore, the model does not take into account a change in the economic, political or technological environment that might influence costs in the medium term in ways not predicted by the model. The availability and quality of the data used in the models may limit their accuracy and predictive ability. The assumptions underlying each estimate may reflect the author's personal view of the economic environment and may therefore be affected by bias.

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