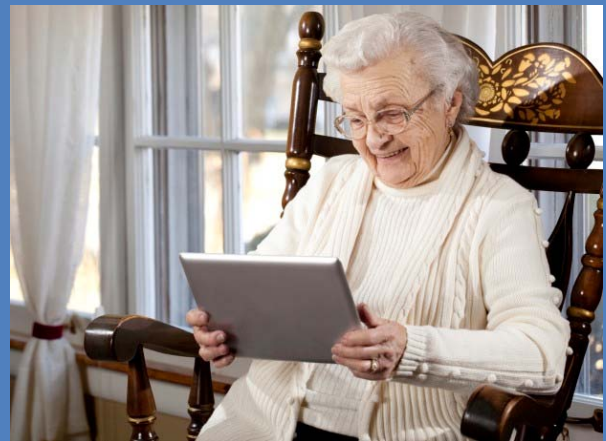# Final Evaluation
of the **Ambient Assisted Living Joint Programme**

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Final Evaluation of the Ambient Assisted Living Joint Programme

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Foreword

As a former European Commissioner for research and as a Member of the European Parliament, I was delighted to chair the Final Evaluation panel of the Ambient Assisted Living Joint Programme since I was initiator of the first of the initiatives (EDCTP), where the Union is participating in a joint research undertaken by several Member States under the Article 185 of the EU treaty (formerly Article 169).

The rapid ageing of the population combined with decreasing birth rates indeed represent a major challenge for Europe and most of the world. Therefore, it makes sense to join forces in Europe to develop relevant and innovative solutions for ageing well. At the same time, this area presents a number of untapped possibilities for new economic growth and jobs, in particular for SMEs, which Europe badly needs. The use of joint research under the Article 185 is definitely an adequate choice in this context: it requires a commitment by national authorities, which are closest to the problems and to the elderly users, while it opens up market opportunities for SMEs on a European scale.

The necessity, in view of the ageing of the population, to make the most of ICTs is more obvious than ever. The key impact of this programme is the engagement of the elderly users and their involvement in the research and innovation projects. These efforts aim for the provision of products and services which are targeting real needs and have a market potential across Europe. To this end, the programme has brought together a broad range of actors, notably through the organisation and success of the annual AAL forums, which has become one of the major assets of European added value.

Beyond addressing the fundamental questions, the Panel has been able to develop a good picture of the major results from the AAL JP over the last six years, coming out of the six different calls for proposals and 130 funded projects covering 20 Member States and three countries associated to the Framework programme. We have approached the Final Evaluation along the lines of the excellent Interim Report of our colleague former Commissioner Kuneva (of 21/09/2010) and we have also assessed the implementation of its recommendations.

Yet, not enough time has elapsed since the start of the AAL JP to allow us to measure the full effects of the invested efforts and means. There are, however, strong indications that the Programme is well underway to deliver on all its objectives. In any case, the participatory and responsible approach of the stakeholders is an asset that accounts for the high level of satisfaction expressed. The question of exploitation remains key, once the difficulties are identified. Our view is that the core question is the effective integration of new technologies in the health care and long-term-care systems in order to increase their efficiency, while helping to improve the quality of life for citizens and carers.

However, the diversity of health and social systems, as well as the on-going social and economic crisis in Europe, still create barriers for innovation to be introduced at large scale. Therefore, it is good to see that the AAL JP has become a partner in the European Innovation Partnership on Active and Healthy Ageing to support in addressing these barriers. This can help policy makers to coordinate (always difficult at the European level) various financing tools such as structural funds, research framework programme or public-private partnerships, to accelerate the innovation process and to achieve the AAL JP goals.

The evaluation has allowed us to measure the increased efficiency in the Programme since the start in 2008 and indeed an insight into the projects undertaken over the last five years. We have also noted that the greater involvement of elderly users has helped to develop better products and services that respond to their real needs and are designed accordingly.

By its very nature, Article 185 does not involve all Member States with the same intensity, still, a collective effort should be undertaken so as to enhance the European dimension of the Programme to get even more countries on board. The AAL JP needs to bring an even closer involvement of institutions and organisations directly involved in supplying care to elderly citizens. Communication plans to this effect should be included in the proposals of the projects. Our report insists also on effective sharing of knowledge about the innovations and the results of all AAL projects. The annual AAL forum provides very good opportunities for this.

To conclude, this first phase of the AAL JP has laid down the foundations for achieving a large scale impact in a field where Europe badly needs it and where the growth opportunities exist. The follow-up programme proposed by the European Commission forms an integral part of a set of large initiatives including Horizon 2020, the Joint Programming Initiative More Years – Better Lives, the EIP-AHA and the upcoming Knowledge and Innovation Community on Healthy Ageing under the EIT.

I am convinced that these initiatives together with a strong engagement of Member States will help Europe to provide an efficient policy response to the demographic challenge. We need to involve research, innovation and a favourable policy environment to ensure large scale implementation aiming at improving the well-being of a rapidly ageing population. Even if national responses to the ageing challenge differ, they are a solid foundation for a European momentum that can establish Europe as a global leader in innovation for ageing well.

<div align="right">Philippe Busquin</div>

Executive Summary

Scope of the Evaluation

The Final Evaluation of the Ambient Assisted Living Joint Programme (AAL JP) was undertaken by a High-Level Expert Panel, appointed by the European Commission, DG Communications Networks, Content and Technology and chaired by former European Commissioner Philippe Busquin.

The Final Evaluation addresses the six-year operation of the Programme, from 2008-2013. In line with the Panel's remit, it assesses:

- the progress towards the Programme's objectives and the recommendations from the Interim Evaluation;
- the progress towards the Programme's operational excellence and the effectiveness of the Article 185 approach in this domain.

In addition, it makes recommendations for the possible follow-up to the AAL JP within Horizon 2020.

The Panel used as inputs: reports and statistical information about the AAL Programme; background documents and case studies on ageing well and ICT; plus approximately 20 interviews with a variety of stakeholders both within the programme and outside. The Panel took particular note of the AAL JP Interim Evaluation undertaken in 2010 by a High-Level Expert Panel chaired by former European Commissioner Meglena Kuneva.[1]

Main Findings of the Final Evaluation

1. **The AAL JP has made good progress towards its objectives and responded well to the recommendations made in the Interim Evaluation of the Kuneva Panel in 2010**. The objectives were appropriate and well targeted and the Programme has made meaningful advances. The objectives continue to be strategically relevant for Europe but require strengthening and reinterpretation in certain areas to reflect emerging opportunities and trends.

2. Given the growing importance of demographic ageing, which is a shared and urgent challenge across Europe, **the AAL JP is very well justified.** In forging new forms of collaboration among various stakeholders and stimulating the creation of new markets, it occupies a unique position in the policy landscape and well matches the specificities of the European situation. As European activities in this domain expand, the Programme must continue to assert its uniqueness and to show leadership within an increasingly crowded policy space.

3. **The AAL JP operates as a coherent framework that delivers clear added value for Europe**. In acting as a bridge between research and innovation, the Programme showed strong complementarity with other initiatives and programmes, both EU and national. The fact that Member States have made contributions significantly beyond the required minimum is strong evidence of their commitment and interest.

4. **Research, development and innovation activity associated with the Programme is reaching critical levels**. New networks and communities are being created that together significantly enhance the prospects for European players in taking AAL innovations to market. The strong participation of SMEs is particularly noteworthy. Although users are well represented within projects, they are not sufficiently integrated and overall effective user involvement is still sub-critical.

5. **Activities aimed at improving conditions for industrial exploitation have expanded significantly** since the Interim Evaluation. To ensure sustainability and impact, scalability and integration need to be more strategically addressed, however. In addition, the knowledge and insights from projects need to be better shared across the Programme so as to assist market penetration.

6. The Programme is **well managed and has well-functioning governance arrangements**. Under AAL JP2, the Member States should take steps to further improve operational performance by building on the trust established and by analysing carefully possible bottlenecks and improvements. Opportunities should be sought to further optimise the respective governance roles (including the role of the CMU), workflows and procedures.

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[1] *Interim Evaluation of the Ambient Assisted Living Joint Programme: Unlocking innovation and ageing well*, European Commission, 2010

7. **Progress under the Programme is encouraging, although large-scale social and economic impacts have yet to emerge.** The main outcomes to date are a shared vision, the creation of a new innovation ecosystem of stakeholders and a demonstrated promising potential for exploitation of results within a new rapidly evolving field, one of great strategic relevance, economic potential and societal importance. These justify the Programme's continuation under AAL JP2, where further contributions can be expected.

Key Achievements

Key achievements of the AAL Joint Programme over the last six years include:

1) The creation of a critical mass of research, development and innovation activity in AAL systems and services at European level.

2) Strong network effects and the seeding of pan-European communities that bring the AAL field closer to the market.

3) A leveraging of national efforts for the European good under the Article 185 approach, through the pooling of national resources.

4) A strong catalytic effect on national initiatives and activity in ICT for ageing.

5) A diverse and interesting portfolio of projects that well address the 2-3 years to market time horizon.

6) A high participation of users, with around 30% of project participants having some form of user role.

7) A high participation of SMEs (around 40%), attracted by the opportunity to work within familiar national rules and procedures.

8) Stimulating industrial leadership, with around two-thirds of projects (67%) led by industry.

9) Good exploitation prospects for finished projects. Nearly 50% of the projects from the first two calls have secured IPR results and a number of first commercial results have also emerged.

10) Effective governance and management, with the management overhead within accepted norms.

Strategic Challenges: Opening to New Horizons

New horizons in active and healthy ageing are opening up on various fronts. Technology is becoming ever more pervasive, creating new possibilities for assistive technologies and solutions in the context of smart environments and services. Innovation ecosystems around AAL are becoming more mature, as new communities and networks emerge. Markets for AAL are becoming more sophisticated, leading to more extended value chains, and new and fast-growing market opportunities for European industry. And the policy landscape is becoming ever broader, as new EU, national and regional programmes are launched targeting specific aspects of the demographic challenge and existing initiatives reach critical mass.

These trends present a series of strategic challenges for the AAL JP1 as it gears up for AAL JP2:

1) **To embrace a more broad-based view of innovation** that fully takes into account service innovations and social innovations alongside development of ICT-based solutions.

2) **To intensify the market orientation across the Programme,** giving more focused attention to aspects such as interoperability, standardisation, harmonisation, and transnational transfers so as to make results sustainable and achieve impact.

3) **To strengthen coherence with other AAL programmes and initiatives,** so as to stay at the forefront of thinking – and action – within an increasingly crowded policy landscape.

Programme Strategy

The Panel considers that these strategic challenges are best addressed through the following four Recommendations in relation to Programme Strategy, which together set a direction of travel for the AAL JP2.

- **Recommendation 1: Stretch the AAL Value Chain**: A stronger market focus requires a widening of demand side participation in the Programme. This expansion should aim for both breadth (allowing users to be funded across all Participating Countries) and depth (improving the *quality* of users' involvements and drawing new actors into the value chain). The AAL JP must **aim for scale** by implementing demonstrations and pilots operating under realistic, real-world conditions, including under differing national conditions. Operational mechanisms should be found to reflect this stronger value chain focus, including a more specific exploitation of synergies with other initiatives and programmes. Improvements in standardisation and interoperability should be key aims.

- **Recommendation 2: Enrich the AAL Ecosystem:** The Programme should further enrich the ecosystem surrounding the AAL community in Europe through initiatives and actions that promote networking and stimulate uptake. Emphasis should be on novel measures that have not been tried up to now, such as: sub-programmes involving lead customers and owners; new models of co-creation and living lab solutions; further expansion of the AAL Forum; and greater post-project support on exploitation (e.g. through the marketplace with European Innovation Partnership on Active and Healthy Ageing (EIP-AHA) to facilitate bringing together demand and supply).

- **Recommendation 3: Expand the AAL Policy Space:** Under AAL JP2, the Programme should continue to strengthen cross-programme linkages by engaging and building strong relationships with other EU, national and regional level programmes and initiatives within and around its field of interest. As the industry has yet to find a coherent voice, the Programme still relies heavily on public agencies for its vision and strategy. Innovation requires active participation from both the demand side and the supply side. This, in turn, requires governments to take ownership of the AAL JP as a vehicle for effecting systemic change, while continuing to argue for ageing well within the political agenda.

- **Recommendation 4: Benchmark European AAL Experiences against similar International initiatives**: The Programme should benchmark its activities against relevant international initiatives in relation to ICT for active and healthy ageing so as to facilitate knowledge sharing, disseminate European best practices, and improve market access for European innovations.

Figure ES1: Strategic Orientations for AAL JP2
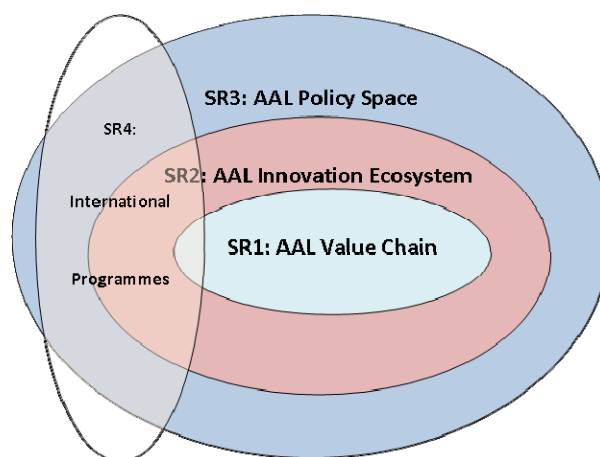
Summary of Operational Recommendations

In relation to operational excellence, the Panel's recommendations address the following:

- **Recommendation 5: Further enhance the Programme's operational performance** through commitments to streamline governance and simplify procedures. In addition, the Participating Countries should continue to invest in the AAL JP so as to realise its catalytic effect.

- **Recommendation 6: Strengthen implementation and monitoring of the Programme,** by experimenting with new, more flexible instruments that are more responsive to market demands; and adopting a more dynamic approach to quality assurance, including a comprehensive system of performance metrics.

- **Recommendation 7: Improve the knowledge base on project achievements and insights** suitable for communication within and beyond the Programme.

- **Recommendation 8: Reinforce the market orientation across the Programme,** ensuring market entry and commercial exploitation issues are addressed more explicitly and with greater weight in all aspects.

- **Recommendation 9: Further enhance and extend the multidisciplinary approach**, including the close involvement of end-users at all stages of programme design and execution, and engagement with new stakeholder communities, including European regions.

- **Recommendation 10: Strengthen the Outreach Programme,** so as to involve the relevant stakeholders and clearly demonstrate the benefits and routes to market for AAL innovations and services.

1. Introduction

1.1 The AAL JP Final Evaluation

The Decision of the European Parliament and the Council on the Community's participation in the Ambient Assisted Living Joint Programme (AAL JP) foresaw that the European Commission shall carry out a final evaluation of the AAL Joint Programme no later than 2013[2]. This report accordingly presents the findings of the Final Evaluation of the AAL JP prepared by a High-Level Expert Panel, appointed by the European Commission, DG Communications Networks, Content and Technology and chaired by former European Commissioner Philippe Busquin.

The Final Evaluation addresses the five-year operation of the Programme, from 2008-2013, covering:

1) the progress towards the Programme's objectives and the recommendations from the Interim Evaluation;
2) the progress towards the Programme's operational excellence and the effectiveness of the Article 185 approach in this domain; and
3) recommendations for the possible follow-up to the AAL JP within Horizon 2020.

This report is timely as it comes when the European Commission is proposing new ways to address the demographic ageing challenge through innovation, notably with the new European Innovation Partnership on Active and Healthy Ageing (EIP-AHA) and proposals for a follow-up programme, AAL JP2 within Horizon 2020. These initiatives seek to maximise the benefits of ICT for ageing well solutions through research and deployment coordination, and cooperation with public health and e-health initiatives.

1.2 Evaluation Methodology

The High-Level Expert Panel comprised a multidisciplinary team of experts appointed by the European Commission. Their summary CVs are listed in Annex 6.

The Panel used as inputs: reports and statistical information about the AAL Programme; background documents and case studies on ageing well and ICT; plus approximately 20 interviews with a variety of stakeholders both within the programme and outside, including members of the AAL General Assembly and AAL Executive Board. The interviews were conducted through face-to-face meetings, as well as by phone, videoconference and email. A special information gathering session was held in Brussels in August 2013 to which selected stakeholders were invited. Furthermore, the Panel also took into account the reports of the Annual Reviews. These were produced by a team of experts, who each year review the Programme's operations management. As such, they provide a complementary assessment track to the strategic review and recommendations presented here.

The Panel took particular note of the AAL JP Interim Evaluation undertaken in 2010 by a High-Level Expert Panel chaired by former European Commissioner Meglena Kuneva.[3] The Interim Evaluation identified 45 recommendations oriented around five strategic principles which, it suggested, should guide future action in the AAL JP and in the wider area of ICT research and innovation for ageing well. This highly detailed and informative document has provided a valuable baseline for the current assessment.

Many issues identified by the Kuneva Panel are still relevant and much of its analysis remains valid. Instead of readdressing the same issues, the Panel has concentrated on those aspects which appear to

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[2] Decision no 742/2008/EC of the European Parliament and the Council of 9th July 2008, in particular Recitals 12), 20), 23), 25), 27) & Articles 2, 3, 5, 12.2.
[3] *Interim Evaluation of the Ambient Assisted Living Joint Programme: Unlocking innovation and ageing well*, European Commission, 2010

be of greatest relevance to the AAL Joint Programme today, as it draws to the end of AAL JP1 and seeks to embark on a new programme, AAL JP2, covering the period 2014-2020. Thus, our report can be considered as 'standalone' rather than a 'follow-on', focusing on implementation, results and impact over a five-year timeframe and on the future strategic perspective. In addition, as required under the Mandate, the Panel comment specifically on the follow-up of the Interim Evaluation's recommendations (see Annex 1).

1.3 Main Findings and Key Achievements

Main Findings of the Final Evaluation

1. **The AAL JP has made good progress towards its objectives and responded well to the recommendations made in the Interim Evaluation of the Kuneva Panel in 2010**. The objectives were appropriate and well targeted and the Programme has made meaningful advances. The objectives continue to be strategically relevant for Europe but require strengthening and reinterpretation in certain areas to reflect emerging opportunities and trends.

2. Given the growing importance of demographic ageing, which is a shared and urgent challenge across Europe, **the AAL JP is very well justified.** In forging new forms of collaboration among various stakeholders and stimulating the creation of new markets, it occupies a unique position in the policy landscape and well matches the specificities of the European situation. As European activities in this domain expand, the Programme must continue to assert its uniqueness and to show leadership within an increasingly crowded policy space.

3. **The AAL JP operates as a coherent framework that delivers clear added value for Europe**. In acting as a bridge between research and innovation, the Programme showed strong complementarity with other initiatives and programmes, both EU and national. The fact that Member States have made contributions significantly beyond the required minimum is strong evidence of their commitment and interest.

4. **Research, development and innovation activity associated with the Programme is reaching critical levels**. New networks and communities are being created that together significantly enhance the prospects for European players in taking AAL innovations to market. The strong participation of SMEs is particularly noteworthy. Although users are well represented within projects, they are not sufficiently integrated and overall effective user involvement is still sub-critical.

5. **Activities aimed at improving conditions for industrial exploitation have expanded significantly** since the Interim Evaluation. To ensure sustainability and impact, scalability and integration need to be more strategically addressed, however. In addition, the knowledge and insights from projects need to be better shared across the Programme so as to assist market penetration.

6. The Programme is **well managed and has well-functioning governance arrangements**. Under AAL JP2, the Member States should take steps to further improve operational performance by building on the trust established and by analysing carefully possible bottlenecks and improvements. Opportunities should be sought to further optimise the respective governance roles (including the role of the CMU), workflows and procedures.

7. **Progress under the Programme is encouraging, although large-scale social and economic impacts have yet to emerge.** The main outcomes to date are a shared vision, the creation of a new innovation ecosystem of stakeholders and a demonstrated promising potential for exploitation of results within a new rapidly evolving field, one of great strategic relevance, economic potential and societal importance. These justify the Programme's continuation under AAL JP2, where further contributions can be expected.

Key Achievements

Key achievements of the AAL Joint Programme over the last six years include:

1) **The creation of a critical mass of research, development and innovation activity in AAL systems and services at European level**. A substantial proportion of the companies operating in this space in Europe are now involved in the Programme.

2) **Strong network effects and the seeding of pan-European communities that bring the AAL field closer to the market**. The AAL Forum, in particular, has grown rapidly into an important platform for the AAL community in Europe: around 750 delegates attended the 2013 AAL Forum in Norrköping, Sweden.

3) **The Article 185 approach has enabled national efforts to be leveraged for the European good**. The pooling of national resources across 23 countries delivers added value for Europe as a whole. Overall, Participating States have contributed around €182m over six calls (around 57% of the total). National funding contributions in these calls have generally been around 25-30% higher than the minimum required.

4) **A strong catalytic effect on national initiatives and activity in ICT for ageing**. New programmes are being launched, existing programmes are being adapted to reflect the priorities and requirements of the wider European effort, and strong synergies between national programmes are being created.

5) **A diverse and interesting portfolio of projects**. The calls have met the objectives set by the Participating States and generally resulted in projects that well address the 2-3 years to market time horizon.

6) **A high participation of users**. Around 30% of the organisations involved in AAL JP projects are entities with a user role, a substantially higher proportion than in FP7 even though users are not eligible for funding in all countries.

7) **A high participation of SMEs**, attracted by the opportunity to work with familiar national rules and procedures. Around 40% of participants are SMEs (a substantially higher proportion than in FP7) and a further 10% are large enterprises.

8) **Stimulating industrial leadership.** Around two-thirds of projects (67%) are led by industry and the proportion of SMEs as project leaders has increased in later calls.

9) **Good exploitation prospects for finished projects.** Nearly 50% of the projects from the first calls (i.e. completed or nearing completion) have secured IPR results and around one-third of these projects have secured funding to take their results to market. A number of first commercial results have also emerged.

10) **Effective governance and management.** The Programme is well managed and has well-functioning governance arrangements. At 6%, the management overhead is within accepted norms.

2. Demography, Policy and the Programme

2.1 Responding to the Demographic Challenges and Opportunities

The Ambient Assisted Living Joint Programme is a response to the demographic challenges of an ageing population. In Europe, average life expectancy has increased from 55 in 1920 to over 80 today. As the baby boom generation reaches retirement, the number of people aged from 65 to 80 will rise by nearly 40% between 2010 and 2030.

This demographic change poses significant challenges to Europe's society and economy, affecting public as well as private finances.[45] In the EU, total government spending on pensions, healthcare, long-term care, unemployment benefits and education is projected to increase by almost 20 per cent between 2010 and 2060.[6] Over this period the expenditures for long-term care (including nursing, social care and medical components, adding up to 1.8% of GDP in 2010) are estimated to almost double.

Figure 1: Demographic Trends in the EU-27, 2010 and 2060
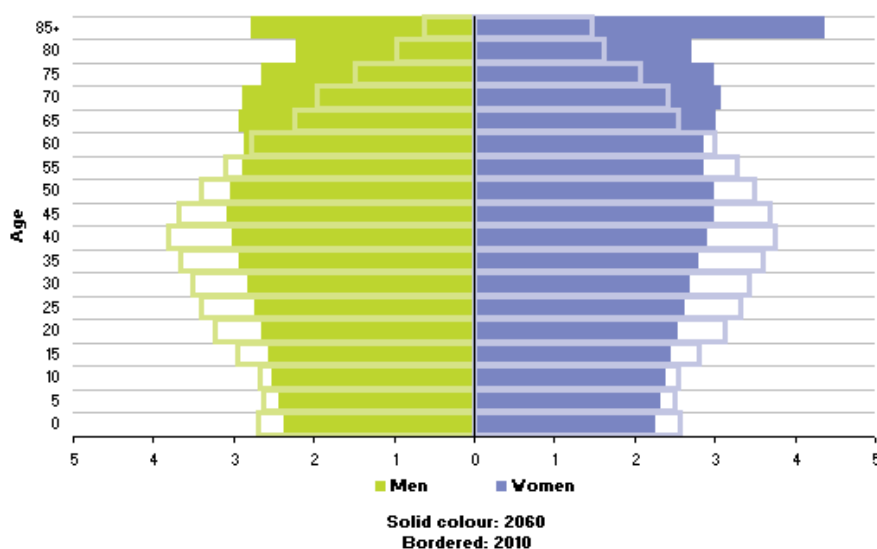
Source: Eurostat 2011 Demographic Projections

Information and communication technologies (ICT), and in particular solutions oriented around ambient assisted living, can play an important role in dealing with these challenges. ICT can help older persons to **improve quality of life, stay active and healthy as well as live independently for longer**. Innovative solutions are emerging to help counteract problems related to memory, vision, hearing, mobility, and loss of independence which become more prevalent with age[7]. ICT also enables older persons to remain active at work or in their community. Their accumulated experience and skills is a great asset, especially in the knowledge society.

The ageing of the population also puts pressure on **the sustainability of health and social care services** and the availability of health and social care staff, requiring re-organisation of the way these services are currently offered to cope with an increasing demand in the future. Care providers across the world are looking for new business models that can deliver greater health benefits more efficiently. In the wake of the financial crisis, the outlook in terms of sustainability of health and social care

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[4] COM(2005) 658; COM(2006) 57
[5] COM(2009) 545, 17 Sept 2009
[6] The 2012 Ageing Report; Economic and budgetary projections for the 27 EU Member States (2010-2060)
http://ec.europa.eu/economy_finance/publications/european_economy/2012/pdf/ee-2012-2_en.pdf
[7] 45% of those aged 75 and older are to some degree impaired in their daily living activities

systems varies substantially between countries. New information and communication technologies make it possible to provide the care and treatment people require – at lower cost – in their own homes rather than in institutional settings. Ambient assisted living solutions also enable higher quality care, allowing carers to spend more time with their clients, by cutting red tape, facilitating data sharing and ensuring effective workflows.

At the same time, this current situation offers **new and fast growing global market opportunities for European industry.** This applies particularly to small and medium-sized enterprises (SMEs), supplying innovative ICT products and services for ageing well. Many innovations are available already and it is up to Europe to seize the opportunity of becoming a global player in the market of ICT for active and healthy ageing.

The potential of the EU telehealth market is illustrated in Figure 2 below. According to Eurostat, there were 87 million people over 65 years in the EU-27 in 2010. At least two-thirds of them, or 56 million people, suffered from chronic conditions like diseases of the circulatory and the respiratory system, cerebrovascular diseases and diabetes. Experts estimate that at present between 25-60% of the population could benefit from telehealth, a potential market size of 14 to 33 million patients, and by 2060 the market could be much larger. Other evidence of the sector's economic potential is provided by the European App Economy Study, which identifies the market for smart online apps, including health apps, growing at around 28% per year through to 2016 and creating around 500k new jobs[8]. The study notes reliability and trust as key issues in market development.

Figure 2: Potential Take-up of Home Telehealth Solutions in Europe, 2010 to 2060 (millions of users)
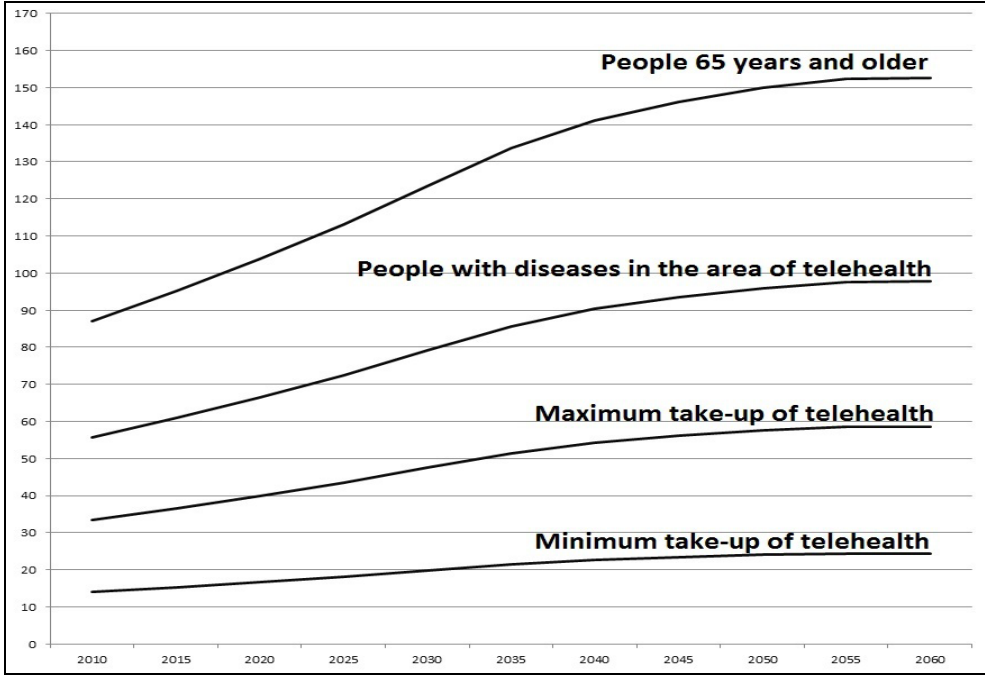
In conclusion, there is the opportunity of **a triple win**: a higher quality of life for elderly people, lower cost and higher sustainability for health and social care systems, and European industrial leadership and economic growth in ICT products and services for ageing well. **The window of opportunity is limited, however**. Suppliers and solution providers in the US, Korea, Canada, Japan, and other regions are prioritising this area and developing their own (often proprietary) solutions. Demand for AAL products and services is rising very rapidly, probably more so than in any other consumer electronics market. Europe must move quickly in order to capture the opportunity both at home and abroad.

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[8] The European App Economy Study 2013, http://eurapp.eu/

2.2 The Evolving EU Policy Landscape

Over recent years the ageing challenge has been put higher on the European policy agenda and reform of health and social care have gained considerable momentum. Elderly care is a national competence, and rightly so as there are strong social, cultural and regulatory components. Nevertheless, the societal impact and market potential justify both national and EU interventions.

Demographic ageing has been identified in the Europe 2020 Strategy[9] as both a challenge and an opportunity for smart, sustainable, and inclusive growth. The flagship initiatives 'A Digital Agenda for Europe' and 'Innovation Union'[10] both address demographic ageing as a priority. The Digital Agenda focuses on ICT-enabled innovative services, products and processes, and includes several actions on eHealth and a specific action on reinforcing the AAL JP.

Other European programmes addressing the challenges and opportunities of demographic ageing are:

- The **European Innovation Partnership on Active and Healthy Ageing**[11] is a partnership supporting the European Innovation Union. Its goal is to achieve two additional healthy years for all European citizens by 2020 as well as improve quality of life for citizens and improve efficiency of care systems in Europe. Of course, there is an obvious trade-off between improving the quality of the services and their costs. The role of ICT however is to play a major role in meeting these goals while hedging the trade-off and making the best use of synergies. EIP-AHA's Strategic Implementation Plan sets out priorities for accelerating and scaling up innovation in active and healthy ageing across Europe in three domains ('pillars'): prevention and health promotion; care and cure; and independent living and social inclusion[12].

  The AAL JP1 (and AAL JP2) and the EIP-AHA are highly complementary. The Programme focuses on the "valley of death" part of the innovation chain, whereas the EIP-AHA aims to accelerate market creation, large-scale uptake and also overcome barriers to deployment by addressing issues such as standardisation and interoperability. At present the AAL JP addresses one of the EIP-AHA's pillars ('Active Ageing and Independent Living'); under AAL JP2 a closer mapping is foreseen across all three.

- The **Seventh Framework Programme** has addressed longer-term research in ICT and ageing, while the ICT based solutions it delivers can be fed into innovation and market validation activities under the ICT Policy Support Programme of the Competitiveness and Innovation Programme (CIP). The AAL JP complements both of these.

- The Commission's proposal for **Horizon 2020**, the Research Framework Programme for 2014-2020, has a specific section for societal challenges, with Health, Demographic Change and Wellbeing as one of the priorities. The AAL JP is mentioned as one of the Article 185-initiatives eligible for continued support, provided they meet a given set of criteria.

- The **"More Years, Better Lives" Joint Programming Initiative (JPI)**[13] on demographic change brings together 13 European countries to address new science-based knowledge for future policy making on ageing, based on a wide range of research disciplines. The AAL JP can provide an application context for the JPI's multi-disciplinary research and feed the JPI research agenda with user experience, while sharing research methodologies such as the life course approach.

- **EIT Knowledge and Innovation Communities (KICs)**. In the Commission proposal for a Decision on the Strategic Innovation Agenda of the European Institute of Innovation and

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[9] COM(2010)2020, 3 Mar 2010
[10] COM(2010)1161, 6 Oct 2010
[11] See http://ec.europa.eu/research/innovation-union/index_en.cfm?section=active-healthy-ageing
[12] These pillars are: Prevention, screening and early diagnosis; Care and Cure; Active Ageing and Independent Living; and Horizontal Issues. COM(2012)83, 29 Feb 2012
[13] COM(2008) 468, Towards Joint Programming in Research

Technology (EIT) 2014-2020, 'Innovation for healthy living and active ageing' is one of the priority themes for the KIC wave in 2014-2015.

With these inter-related programmes that jointly cover a significant part of the research and innovation 'chain', Europe has a globally unique strength in ICT for ageing well. The AAL JP addresses different channels to market than either traditional FP research projects or innovation initiatives such as the European Technology Platforms. More specifically, it addresses diffuse value chains that do not scale from one country to another. The AAL field is dealing with an entirely new ecosystem that requires the cooperation of diverse stakeholders. Scaling in such a transnational context poses particular challenges, requiring exposure to different national markets and circumstances. The AAL JP seeks to tackle this through a programme that is owned and orchestrated by national actors rather than by the European Commission.

## 2.3 The Ambient Assisted Living Joint Programme

The Ambient Assisted Living Joint Programme is an applied research funding programme aiming to support projects developing ICT solutions for ageing well with a 2-3 years to market time horizon. It has a total budget of around €600m, including €150m from the European Commission, and runs from 2008-2013. The Programme is undertaken jointly by 19 EU Member States and three countries associated to the Seventh Framework Programme for Research and Technological Development (FP7). In addition, the Programme has provided inputs for downstream innovation and market validation activities under the Competitiveness and Innovation Programme, so as to close the loop from basic research to market uptake, which is a key target of EU research and innovation policies.

The AAL Joint Programme has three specific aims:

- **Foster the emergence of innovative ICT-based products, services and systems for ageing well** at home, in the community, and at work, thus increasing the quality of life, autonomy, participation in social life, skills and employability of elderly people, and reducing the costs of health and social care;

- **Create critical mass of research, development and innovation at EU level** in technologies and services for ageing well in the information society, including the establishment of a favourable environment for participation by small and medium-sized enterprises (SMEs);

- **Improve conditions for industrial exploitation** by providing a coherent European framework for developing common approaches and facilitating the localisation and adaptation of common solutions which are compatible with varying social preferences and regulatory aspects at national or regional level across Europe.

The AAL JP is executed by the Participating Countries through the AAL Association (AALA) which has set up a Central Management Unit (CMU) for daily programme operations. This is supported by the AAL General Assembly comprising representatives from all Participating States, which in turn elects an AAL Executive Board.

Figure 3: Governance Structure of the Ambient Assisted Living Joint Programme
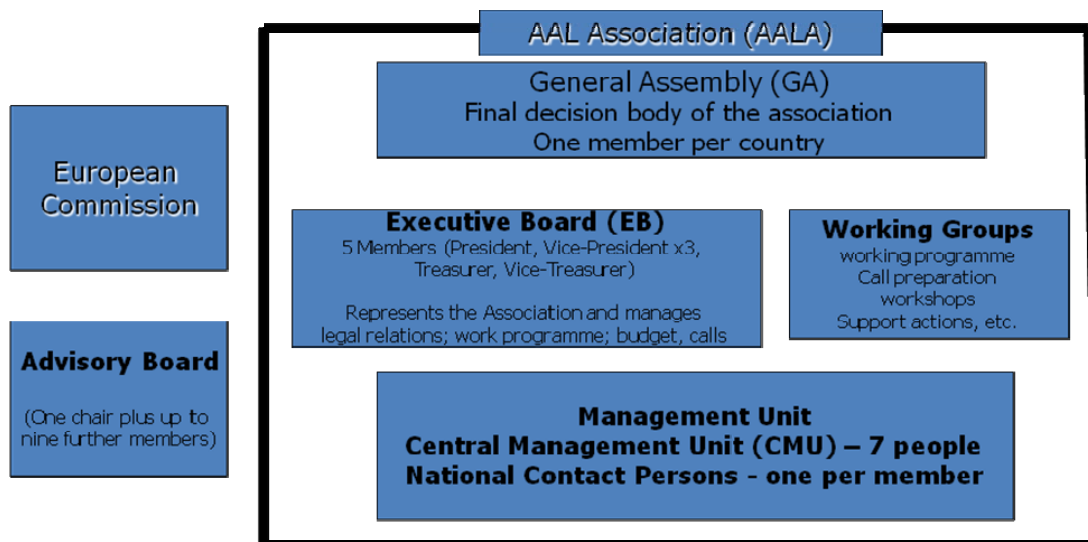
To fulfil its objectives and reflecting its market orientation, over the period 2008-2013 the Programme issued six calls for proposals. These have resulted in around 130 projects being funded with a total public funding commitment of €317.5 million, of which €182.4 million (57.5%) was financed by the Participating Countries.

In addition, the AAL JP has put in place a series of support actions designed to help the Programme achieve its objectives and multiply its overall socio-economic impact. These support actions have addressed specific challenges – some of which were identified in the Interim Evaluation – such as access to finance, commercialisation and deployment of AAL solutions, market barriers, and user-centred design.

Further detail on the Programme's governance, operational and support activities, and project portfolio is presented in Annex 2.

It is interesting to note that the AAL JP grew out of earlier efforts on ambient intelligent environments supported by the European Commission's Information Society Technologies (IST) programme and promoted by the IST Advisory Group (ISTAG). These activities were first initiated over ten years ago. The current AAL JP can be seen as the flagship programme, and the intellectual inheritor, of that work. The prolonged gestation underlines the long-term nature of the European research effort and also the continuity in programmes over time.

3. Progress towards the Programme's Strategic Objectives

3.1 Strategic Objectives and Strategic Positioning

The AAL JP occupies a unique position in the policy landscape and well matches the specificities of ageing in Europe. The AAL Joint Programme is a policy response to the demographic challenges of an ageing population. Europe has unique characteristics in this respect: its approach to ageing is vested in a patchwork of national cultures, legislation and programmes, where solutions are best sought from the bottom up. Europe as a whole places a high priority on the sustainability of health and social care, where again the circumstances vary considerably between countries. Furthermore, Europe's strong investment in the information society – growth of broadband, advanced position in mobile and in embedded systems and software – mean it is well positioned to make use of advanced ICT tools and services in addressing the ageing challenge. The AAL JP occupies a unique position within this landscape, spanning from research to innovation, from the technological to the non-technological, and from national to EU perspectives. [➲ referred in **Main Finding 2**]

The objectives of the AAL Programme continue to be valid and remain strategically relevant for Europe. Demographic change, curbing healthcare expenditures and enhancing the quality of life of older people by applying technological innovations are important aims for Europe. The AAL JP's three-pronged approach – fostering the emergence of innovative ICT-based products, services and systems, creating a critical mass in research, development and innovation (RDI), and improving the conditions for industrial exploitation – was appropriate and well-targeted. [➲ referred in **Main Finding 1**]

In acting as a bridge between research and innovation, the Programme showed strong complementarity with other initiatives and programmes, both EU and national. In particular, there was a clear differentiation with longer-term research under the FP7. In addition, the Programme helped to raise awareness of the potential for innovative solutions to ageing issues and pushed the topic up EU and national agendas. Overall, the AAL JP's objectives continue to be relevant but require strengthening and reinterpretation in certain areas to reflect emerging opportunities and trends. [➲ referred in **Main Finding 3**]

The Programme operates as a coherent framework that delivers demonstrable added value for Europe. As an Article 185 initiative, there was a risk that the AAL JP developed as a patchwork of national initiatives, rather than as a concerted and coordinated activity. This most certainly has <u>not</u> been the case. On the contrary, there are clear signs of national efforts being leveraged for the European good in a way that delivers added value for Europe as a whole. National activity in ICT for ageing well exists where there was none before; countries that had programmes have started to adapt them to reflect the priorities and requirements of the wider European effort; and strong synergies have been created with and across national programmes. Having the Participating Countries drive the agenda mobilises support more readily than if the EU acted alone. Participating Countries appreciate the common goals and working arrangements, and have demonstrated their commitment by assigning 25-30% more funding than the required minimum (Figure 4). [➲ referred in **Main Finding 3** and **Key Achievements 3, 4**]

Furthermore, it is clear to the Panel that participants – researchers, SMEs, large enterprises, user organisations – greatly value the diversity of instruments and schemes available as it allows them to chose the most appropriate way of working in given circumstances.

Figure 4: National Funding Commitments by Call (€millions)
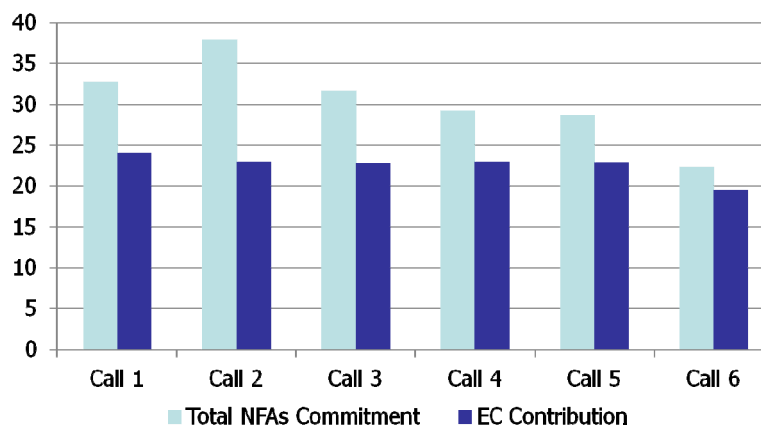
3.2 Objective 1: Foster the emergence of innovative ICT-based products, services and systems for ageing well

Many industrial actors, service providers and user organisations have come together under the Programme's umbrella to develop innovative ICT-based solutions. The focus is on adapting simple and existing technology, like the TV, smartphones, tablets and digital cameras, as well as standard PCs, to the needs of elderly people, carers and intermediaries. Often this requires adaptation in terms of reliability, versatility and price to take account of the setting in which the technology is to be used.

- **Clear evidence of a European vision in a complex and rapidly emerging field**. The Programme has addressed a variety of themes and issues relating to AAL and developed an innovative and interesting portfolio of projects focused on AAL solutions and services. Projects generally have a 2-3 years to market time horizon.

- **Users are better represented across the Programme**. User involvement has improved significantly since the Interim Evaluation and is now seen as one of the Programme's most positive aspects. Their participation helps to define user needs and facilitate uptake. For example, the Advisory Board now comprises end-user representatives and service providers, and more user representatives are included in preparing and evaluating calls. Around 30% of the organisations involved in AAL JP projects are entities with an end-user role, a substantially higher proportion than in FP7 even though users are not eligible for funding in all countries. The launch of the User Integration Survey is providing valuable information on the efforts made with respect to the integration of end-users and relevant stakeholders. This shows that a majority of projects integrate users in some form, most commonly in the requirements and testing phases (see Annex 3 for an example). [➲ referred in **Key Achievement 6**]

- **However, projects are not fully user centric and effective user involvement is still sub-critical.** Despite the progress made, the involvement of users can and should be made even more explicit. The nature of 'users' is imprecisely defined at present (e.g. differentiation between end-users, intermediate bodies, advocacy organisations). Users need not just to participate as project partners, but to make an **active contribution** that is measured, assessed and made visible. For instance it is important to articulate (and where possible to quantify) issues such as: How have projects benefited from working with users? What insights have been gained? What are the implications for service delivery in the real-world? A true user orientation means co-creation setting and active involvement in a living-lab type context. Users should be much more closely involved in business modelling so as to ensure acceptance and better uptake of systems. Greater attention should also be paid to sociological and psychological factors that influence the openness of potential users (older persons, informal

carers, professional care workers etc.) to accept AAL innovations. [↪ referred in **Main Finding 4** and **Recommendations 6, 7, 8, 9**]

- **The broadening of activity from research towards innovation should be intensified.**
Initially the AAL JP work programme was too technology oriented: this aspect has improved as a result of recommendations made in the Interim Evaluation. But still insufficient attention is paid to service and social innovations and to the innovation environment more broadly. These wider aspects of the innovation agenda will be critical to growth in the market for AAL solutions and services, and need to be better addressed in both projects and the programme as a whole. Greater emphasis should be placed on pushing assistive technology into the mainstream rather than targeting specific market niches. As noted previously, the window of opportunity for Europe is time critical, necessitating a profound market focus. [↪ referred in **Main Finding 5** and **Recommendations 1, 2, 6, 8**]

3.3 Objective 2: Create a critical mass of research, development and innovation

A critical mass of R&D and innovation is understood to mean the presence of a sufficient number of actors, sufficient cooperation, and sufficient total R&D and innovation activity to initiate a self-sustaining, productive and viable research environment. The focus here, therefore, is on actors, cooperation, and amount of activity in the AAL JP.

- **The Programme has successfully seeded a pan-European community of practice in AAL systems and services**. Activities facilitated by the Programme, through calls, studies, workshops and other events, have served to create networks between research communities (in particular between the 'engineering' and 'social' sciences) and between researchers and those able to take AAL innovations to market. For instance, 72% of Finnish participants say the Programme has improved and strengthened technology transfer with other actors in the field and a similar proportion say that it has strengthened their knowledge base. The AAL Forum, in particular, has served as an important platform for disseminating results and raising awareness. The creation of these new networks and communities is a key indicator for creation of critical mass at European level. [↪ referred in **Main Findings 2, 4** and **Key Achievement 2**]

- **Research, development and innovation activity associated with the Programme is reaching critical levels.** The Programme has successfully established multi-stakeholder ecosystems for AAL innovations that span the whole value chain and have proved especially attractive for SMEs. The participation of large enterprises (10%) is comparable to FP7 and that of SMEs (40%) is significantly better (Figure 5). A substantial proportion of the companies (SMEs) operating in this space in Europe are now involved in the Programme and across 23 countries. Furthermore, other value chain actors – such as large enterprises, user organisations, and investors – are being brought into the loop. Further efforts are required to develop these ecosystems and leverage their economic and societal value. [↪ referred in **Main Finding 4** and **Key Achievements 1, 7, 8**]

- **The sustainability of projects remains an issue, however.** Too few projects start from validated user insights or have identified customers for the solutions proposed. Such real world inputs are essential in ensuring innovations have real market potential.

Figure 5: Participants by Organisation Type (for Submitted Proposals)[14]

	AAL JP Call 1 2008	AAL JP Call 2 2009	AAL JP Call 3 2010	AAL JP Call 4 2011	AAL JP Call 5 2012	AAL JP Call 6 2013	FP 7 ICT programme, ICT & Ageing, First Call
Large enterprises	9%	7%	10%	10%	7%	9%	10%
SMEs	38%	46%	49%	52%	44%	47%	19%
User and other organisations	18%	14%	11%	11%	21%	16%	6%
Research organisations	19%	21%	19%	14%	12%	15%	35%
Universities	16%	12%	9%	13%	16%	13%	30%
Total	100%	100%	100%	100%	100%	100%	100%

3.4 Objective 3: Improve conditions for industrial exploitation

The AAL JP targets a new and emerging field with relatively few industrial players. In this respect it differs markedly from other programmes, such as the Joint Technology Initiatives (JTIs), where the industrial landscape is much more well developed. As such, the Programme has a role not just in growing the market but in creating it.

- **Activities aimed at improving conditions for industrial exploitation have expanded significantly since the Interim Evaluation**. The AAL2Business initiatives, the expansion of the AAL Forum, the launch of the impact assessment and the user and satisfaction surveys, and exploratory activities such as the AAL Summit and study on standards and interoperability are all welcome and valuable developments. Around one-third of projects from the early calls have secured funding to take their results to market and a number of first commercial results have begun to emerge. [➲ referred in **Main Finding 5** and **Key Achievement 9**]

- **Small and medium-sized enterprises are a key strength of the Programme but require a greater range of support**. The reliance on SMEs is a key strength, allowing the Programme to capitalise on the agility and innovative capacity of small companies (See ROSETTA in Annex 3 for example of a start-up). But there are also weaknesses inherent in this approach. In a market as complicated as AAL, small companies face major hurdles in bringing innovations to market by themselves. A more lateral approach to thinking about the market ecosystem is required that enables companies to build the relationships and networks necessary to exploit their results successfully. [➲ referred in **Recommendation 5**]

- **Scalability and integration are strategic issues needing to be more systematically addressed**. The latter point regarding SMEs is indicative of a more general shortcoming: the low priority given to scalability and integration within the Programme so far. Yet this is a key strategic issue: cost reductions will only arise from AAL innovations if the results integrate well and are truly scalable. This is not necessarily a key focus for researchers but is nevertheless essential for successful rollout. The present position is a consequence not just of the preponderance of SMEs, but also of the fragmented and heterogeneous nature of the

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[14] The data shown for AAL JP are for submitted proposals, and are very similar to the data for ranked proposals – i.e. those eligible for funding. Average SME participation in the whole FP7 ICT programme is 14.4% (FP7 report, Spring 2010, European Commission, DG-Research).

project portfolio. The call topics, and the resulting projects selected, are useful and valid in themselves but tend to address specific vertical niches (for instance mobility, home care, chronic conditions). 'Horizontal' issues, such as scalability and integration, are deserving of more focused attention for a programme focused on innovation rather than purely on research. [➲ referred in **Main Finding 5** and **Recommendations 1, 2, 5, 6**]

3.5 European and National Added Value

Progress under the Programme is encouraging, although large-scale social and economic impacts have yet to emerge. A consolidated view on the results and impact of the AAL Joint Programme is still premature, as the first projects are only now completing and being brought to market. Although large-scale added value has yet to materialise in the form of major social and economic impacts, progress to date with the Programme is encouraging. The main outcomes are tacit and difficult to measure but tangible nevertheless: a shared vision and commitment within a new, rapidly evolving field, one of great strategic relevance, economic potential and societal importance. [➲ referred in **Main Finding 7**]

Various aspects of the added value for Europe from the AAL JP have already been described. These include:

- The creation of a critical mass of research, development and innovation activity in AAL systems and services at European level;

- Strong network effects and the seeding of communities which bring the AAL field closer to the market.

- The high participation of SMEs attracted by the opportunity to work within familiar national rules and procedures.

- The strong involvement of user organisations, despite variations in eligibility for funding.

- The catalytic effect on national initiatives and activity.

- The leveraging of national funding and the strong commitment shown by Participating Countries, with financial contributions running at around 25-30% above the required minimum.

The AAL JP offers Participating Countries a valuable vehicle within an increasingly competitive research environment. For governments, the landscape for research, development and innovation is increasingly complex and competitive. No country can afford to think of RDI strategies in purely national terms any more. They have to capitalise on all channels available to them, internationalising national programmes and initiatives, and nationalising the international. In the new and emerging market of ageing well, AAL offers national (and regional) authorities a very valuable vehicle.

A number of national programmes and initiatives on ambient assisted living have emerged as a direct result of, or stimulated by, the AAL JP. These include the German national AAL programme (Box 1), the Hungarian eVITA initiative for innovative opportunities in the healthcare system, the Spanish EVIA innovation platform, and the UK Technology Strategy Board Assisted Living Innovation Platform (ALIP). Current national public sources for the co-financing of AAL JP calls are listed in Annex 4. [➲ referred in **Key Achievement 4**]

The AAL JP should continue to build synergies with other European programmes and assert its uniqueness within an increasingly crowded policy space. One of the Programme's most visible impacts has been in building synergies with other European initiatives and programmes. Programme representatives have contributed actively to the EIP-AHA, ensuring that the AAL JP is better known within the policy community and that its calls are broadly aligned with the EIP-AHA's strategic priorities. [➲ referred in **Main Finding 2** and **Recommendation 3**]

> **Box 1: Germany - Public-Private Partnerships in AAL**
>
> In Germany, research into ambient assisted living has been funded by the Federal Ministry for Education and Research since 2008. In recent years this has operated as part of the funding programme "Human-Technology-Interaction for Demographic Change". National calls have been highly complementary to those supported by AAL JP topics (e.g. the national and JP calls on "mobility" and "care").
>
> To promote the growing AAL-community an innovation partnership has been established between the German Electrical Engineering Association (VDE) and the Federal Ministry for Education and Research (BMBF). This began with the launch of the annual AAL-Congress in 2008, which has since become an established forum for the active German-speaking AAL-community. In addition, several working groups have been set up, which now run under the umbrella of the German Societies for Biomedical Engineering (DGBMT) and Electric, Electronic and Information Technologies (DKE).

Complementarity with other initiatives will become even more important in future, in view of the evolving context for AAL and related fields. Given the stronger innovation focus within Horizon 2020, compared to FP7, AAL JP2 will need to demonstrate even more strongly that it is capable of delivering a real and measurable impact. Similarly, there are opportunities to strengthen links with other Joint Programming Initiatives, such as the More Years Better Lives JPI and the Joint Programme on Neurodegenerative Diseases. Many of the Expert Panel's recommendations underscore this need for the Programme to **assert its uniqueness** and to **exercise leadership** within an increasingly complex constellation of European initiatives.

Despite the real and substantial progress made under the AAL JP over the last five years, and its high strategic relevance for Europe, its future success is far from assured. Large variations within and between countries remain. Some countries and regions are very active whilst others take more of a back seat and or have yet to participate at all in the AAL JP. Maintaining national commitment, so that Participating States do not lose interest and withdraw national funding, is a key challenge: a situation one might describe as 'from ambience to ambivalence'. Similarly, as other EU and national programmes reach critical mass there is a risk that they become more attractive to Participating Countries allowing them to 'occupy' the space that the AAL JP has started to carve out.

Under the Article 185 instrument, governments will always be free to vary their participation in the Programme as national circumstances dictate (as recent decisions have shown). In such a competitive world, the Programme needs to articulate its benefits and value more clearly than ever before.

4. Progress towards the Programme's Operational Excellence

4.1 Governance and Funding

The Programme has been well managed and has well-functioning governance arrangements. Having overcome some early start-up issues, the Programme is led and managed in an efficient way. The management overhead of 6% is standard and the available supportive resources are used in an effective way. There is a clear reporting structure and the spirit in the management team is good and supportive. The Programme's governance structure is transparent and inclusive and appears to work well. Recommendations on operational performance from the Interim Evaluation have been taken into account and addressed satisfactorily. [➲ referred in **Main Finding 6** and **Key Achievement 10**]

On the one hand, **the Programme's national orientation and devolved structure based on Article 185 is a key strength.** Implementation through national organisations has been a key factor in success to date. SMEs in particular welcome the opportunity to work within familiar national structures and procedures. The expertise of the NCP network has ensured strong links to national authorities and also close contact with participants and potential participants, hence avoiding duplicate or redundant applications. National accessibility has also stimulated the inclusion of new players and facilitated the emergence of new communities. The balance between the centre (the CMU) and the periphery (the NCPs) remains an issue, however: it is not always clear where power and responsibilities lie.

On the other hand, **the Programme's national orientation is a weakness.** At times, implementation has been hampered by diverging national interests, loose central controls, and high bureaucratic overhead. At the practical level, this has consequences which can be difficult to accommodate. For instance, differing national rules regarding contracts and payments can lead to long delays in projects being launched[15]. These variations in performance, which can limit the Programme's agility and strategic positioning, are widely recognised and acknowledged by the Participating Countries but viable solutions have yet to be found. In addition, variations in participation rules mean that users are eligible for funding in some countries but not in others. The proposal, under the new Decision for AAL JP2, for a set of minimum performance targets on operational aspects is a positive step which the Panel fully endorses.

The Participating Countries should take stronger ownership of the Programme. These operational issues are structural to a certain extent – a natural consequence of the pooling of national efforts under the Article 185 instrument. Even so, they need not be and should not be a barrier to efficiency and effectiveness. Notwithstanding the provisions of Article 185, the Panel considers that there is scope for substantial improvements in operational management. The issue is primarily one of **ownership and trust**: Participating Countries should take stronger ownership of the Programme and at the same time further devolve authority for its successful delivery to a trusted executive team – the EB and CMU. Taking ownership means recognising the Programme for what it is: a successful, collaborative effort led and financed by the national authorities. No major institutional changes are needed: it is more a matter of trusting the central team to translate the common strategic vision and manage for the common good. [➲ referred in **Main Finding 6** and **Recommendation 5**]

The CMU operates efficiently from an administrative standpoint but needs to envision its role as the Programme Champion. The capacity of the Central Management Unit has been strengthened since the Interim Evaluation and efficiency has increased. There is a difference between programme management and programme orchestration, however. At present, the CMU's strategic role is limited

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[15] In the Satisfaction Survey, less than half of respondents (45%) thought time to contract excellent or satisfactory. Other indicators are more positive: 73% were satisfied with consortium 'reconfiguration' procedures; 66% were satisfied with time for reconfiguration; and over 70% were satisfied with time to payment. However, the response rate for the Survey was only 35% and was heavily skewed to certain countries (six countries accounted for 73% of respondents). These shortcomings in metrics are addressed in later recommendations.

which inhibits its ability to steer the programme and to react proactively to new developments. It must provide greater leadership, acting as **Programme Champion not just Programme Manager**. This does not mean taking power *away* from the Participating Countries, but rather of being a stronger advocate *for* the PCs, and the Programme as a whole, in achieving common goals. [➲ referred in **Recommendation 5**]

National funding has delivered European added value and will be even more important in the future. As noted above, the AAL JP has secured substantial investments by the Participating Countries that have delivered real added value for Europe. National funding will continue to be important in the future in terms of creating synergies and enabling the Programme to leverage funding from other programmes and channels. For the Programme's catalytic effect to be fully realised these investments must be at least maintained and where possible substantially increased. This is primarily an issue of earmarking existing resources rather than finding new ones. [➲ referred in **Recommendation 5**]

4.2 Programme Implementation

The Programme calls have been well organised and have resulted in a diverse and interesting portfolio. The calls for proposals – six in total – have been well designed and organised and have received good responses. The success rate, at around 1:4 to 1:5, is acceptable and compares favourably with FP7 (Figure 6). Around two-thirds of projects (67%) are led by industry and the proportion of SMEs as project leaders has increased in later calls. Many of the projects are either multidisciplinary, in the sense of involving different disciplines and actors, and/or cross-thematic – applying an innovation in different thematic areas. Overall, the calls have met the objectives set by the Participating Countries and generally resulted in projects that well address the 2-3 years to market time horizon. [[➲ referred in **Key Achievements 5, 6**]

A thematic orientation alone is not enough to address emerging challenges, however. In line with the shift to a more broad-based view of innovation, there is a need for greater weight on issues such as integration, scalability, and overcoming barriers to market entry rather than technology development *per se.* Calls should be multidisciplinary and address 'horizontal' issues (such as smart environments, usability, privacy) as well as discrete vertical niches. Reliance on validated user needs, exploitation potential and ability to address diverse societal contexts are all important aspects. Evaluation and selection criteria will need to evolve to better recognise such business-driven projects. [➲ referred in **Recommendation 6**]

Figure 6: Number of Submitted and Funded Proposals, by Call
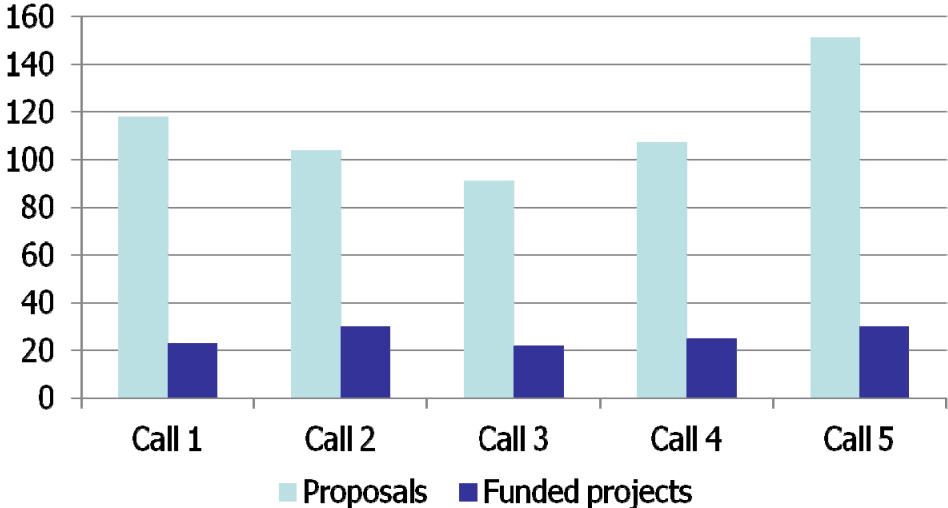
Procedures need to be further streamlined in order for the Programme to remain attractive.
Although improved, work programme development and project selection and approval are still
cumbersome. A joint work programme is a key feature of European collaboration but, as noted above,
faces national constraints. Lead times are long, sometimes over one year, which hampers the
development of consortia. On the other hand, the technology environment is highly dynamic: for
instance tablet computers were barely thought of at the time of the early AAL calls. This mismatch
represents a particular problem for SMEs operating in complex and turbulent markets.

In addition to traditional projects, **there is scope for new, more flexible instruments that allow
projects to respond to emerging trends**, such as online app development, or encourage them to focus
on particular aspects of the problem chain. This aspect is already recognised in the AAL JP2 proposal
and should be embraced. The AAL JP might learn from the experiences of collaborative initiatives
such as Artemis, where strategic planning is a mixture of 'top-down' and 'bottom-up' approaches. [➲
referred in **Recommendation 6**]

Projects are looking for a more supportive role from the CMU. Exploitation is alien territory for
some projects and it is clear that most would welcome greater support. Of the projects completed
under Call 1, for instance, future needs were identified as: improvements and validation (63%), trials
and validation (58%), and market research (26%), with further investment being needed in all of these
areas. There is scope for the CMU to play a more supportive role including in: advising new consortia,
training and development for SMEs as coordinators, and better support on exploitation and IPR issues.
[➲ referred in **Recommendation 5**]

Quality management has been insufficiently addressed and should be improved. Whilst most
projects appear to have performed efficiently, a formal quality assurance regime is lacking at both
project and programme levels. For example, there is no action to assess and develop the management
skills of the project leaders. Similarly, there is no mechanism for early termination in the exceptional
cases where projects are judged as failing. A more dynamic monitoring regime, with the authority for
'go/no-go' decisions on continuation (i.e. 'stage gating'), would ensure projects stay focused on
delivery, leading to better and faster outcomes. The mid-term review is an appropriate staging point.
Adoption of such a strict, commercial approach would represent a major innovation in terms of EU
programmes. [➲ referred in **Recommendation 6**]

**An acute lack of performance metrics obscures a clear view of the Programme's achievements
and impact**. AAL monitoring activity is partial, covering only input, operations and output level
information. Furthermore, the relatively poor responses to recent surveys and studies show there is
room for improvement in the discipline towards projects and in their obligations to provide data back
to the CMU. An absence of data (for instance on the improvements resulting from user involvement)
not only hinders a clear view on the performance and business case of individual projects but also
negates the evidence base for the programme as a whole. Such metrics should have been considered *ex
ante* rather than *ex post* and the new programme provides an opportunity to improve. **Urgent action is
needed** by putting in place a comprehensive system of performance reporting, monitoring and
indicators at both project and programme levels. [➲ referred in **Recommendation 6**]

Box 2: UK Assisted Living Innovation Platform - Addressing Interoperability in AAL

In the UK, the Dallas (delivering assisted living lifestyles at scale) initiative is thinking beyond traditional health
and social care to consider how new ideas and technology can be used to improve the way people live. By
summer 2015, Dallas aims to impact the lives of 169,000 people across the UK, benefiting from new and
innovative products, systems and services redesign to transform their choices as they age. It is part of the
Technology Strategy Board's Assisted Living Innovation Platform (ALIP).
The Dallas Interoperability Conference, held in November 2012, tackled some priority issues relating to
interoperability in the emerging Assisted Living domain, bringing together NHS, third sector and industrial
partners. Four priorities were identified: consumers' own devices and the Medical Devices Directive; personal
health records and statutory information systems; identity and consent; and delivery of services to multiple
platforms. An evaluation has been launched, looking at the impact that the dallas programme has made to
individuals, carers, systems and the wider economy, and will report in 2015.

4.3 Exploitation and Impact

The impact of the Programme should be made more transparent. Whilst the effects on the research community are clear, the wider impacts for society and the economy of the Programme's activities are less evident. Many projects struggle to find channels to market and, in general, projects pay insufficient attention to how their results are to be transferred to an end-user or project customer. The impact of the Programme needs to be made much more transparent. Such moves would rely in part on the previous recommendations regarding better quality assurance and performance metrics and are complemented by further points below.

There are opportunities for a more systematic sharing of knowledge and experiences across the AAL JP. As much of the Programme's value lies in the tacit knowledge developed within projects, the way in which knowledge is collected and shared has a direct bearing on exploitation. At present it is not clear how such knowledge and insights (i.e. the reflective conclusions on the knowledge gained) are secured and preserved for the future. The absence of a validated evidence base on the knowledge and experience gained from user involvement in projects has already been noted. This is indicative of a wider shortcoming in the way results and impacts are documented and disseminated. Inter-project interactions should be a key source of exchange and learning, yet the amount of meaningful transfer between projects is far too low. [➲ referred in **Main Finding 5** and **Recommendation 7**]

Given that the scope of the AAL community is continually increasing, knowledge sharing should not be confined to Programme participants. Stakeholders from other projects and programmes should also be engaged, not just on technological issues but also social, cultural and economic aspects.

Projects' business planning practices require improvement. The AALA's recent impact assessment has revealed an interesting picture of projects' business practices and exploitation intentions. The assessment showed that while some attention is paid to business planning, practices are not fully mature. For instance, only 30% of projects have plans that look ahead 2-3 years after project completion, and only one-third of completed projects have secured funding to take results to market. The impact assessment itself had major shortcomings: response was not compulsory, datasets were overlapping, and the key messages were obscured by poor presentation. Overall, reliable data on aspects such as business and market planning practices, post-project funding, and intellectual property is lacking. [➲ referred in **Recommendation 8**]

The scalability of results is a major issue requiring concerted action. As already noted, a programme principally comprising SME-led projects will inevitably face barriers in moving results to scale. These barriers cannot be allowed to remain, however. Projects should be required to at least indicate how results should be scaled and to provide a clear plan for doing so. For instance, they could be required to develop a knowledge transfer plan at an early stage detailing how the knowledge and results from the project will be used, even if commercial exploitation is not possible. Such a plan would be subject to continual reappraisal and in time evolve into a full business plan as the project nears completion. [➲ referred in **Main Finding 5** and **Recommendation 8**]

The current position necessitates a step-change in the Programme's market orientation: For projects to be brought to scale and made sustainable in the manner required, the Programme's market-facing actions need to go even wider and deeper. This should involve, for instance: closer attention to exploitation potential during call development and project selection; more flexible instruments; a greater emphasis on business planning within projects; a clearer identification of elements likely to hinder rollout; and better strategic linkages to large enterprises, the investor community and others such as regional authorities able to bring results to market (see below).

Some of these aspects are due to be addressed under the AAL2Business initiative. This is still in its early stages and the Panel encourages the initiative to move quickly and take radical action. Additional actions could and should be considered such as: an AAL Label for successful products; clustering of projects so as to test groups of products and services EU-wide; and opportunities for projects to

showcase their results to big players. Studies show that on average new ventures redirect business models four times before finding success[16]: AAL JP projects need this agile approach.

The Programme should also adopt a stronger advocacy role in addressing market barriers. Many issues of costs, diverging regulations, standardisation and interoperability are beyond the Programme's control. Nevertheless the experiences gained by AAL projects, both individually and collectively, provide an important opportunity to influence policy debates. This should be part of the CMU's championing and advocacy role and should underpin the AAL JP's efforts to expand the AAL Policy Space. [➲ referred in **Recommendation 3**]

International markets represent an important opportunity and resource. The Programme's exposure outside of Europe has been relatively limited up to now. Countries such as Japan, Korea, Canada and the US, which face a similar ageing challenge, represent an important opportunity to benchmark the AAL JP internationally. In turn, the knowledge gained would help open up new markets for European suppliers. [➲ referred in **Recommendation 4**]

4.4 Communication and Community Building

The Programme's multi-disciplinary approach is a key asset, one of its main achievements, and should be further extended. Increasingly, innovation happens at the interstices of disciplines rather than within a single technological or economic domain: the stronger the intersection between the disciplines, the more radical the innovation that can arise. Active and healthy ageing is a key case in point, requiring perspectives from ICT, engineering, social and psychological sciences, health and social care, as well as the end-users – older people themselves. The Programme has made major strides in this area since the Interim Evaluation and can be proud of its achievements. Nevertheless, there is scope to push the boundaries still further, by engaging with an even wider range of technological disciplines and new stakeholder communities (investors, reimbursement authorities, social policy, regional agencies). [➲ referred in **Recommendation 9**]

The regional dimension to the demographic challenge is increasingly significant and should be a key focus under the AAL JP2. In Europe, regions are important competitive actors and some are highly affected by demographic change. Being closer to the citizen, and in some cases being responsible for the delivery of health and social care services, regions are important gatekeepers and offer an alternate business model. Moreover, they could be key in reforming service delivery models and so are natural partners for the AAL JP.

These decentralised activities need to be better reflected in the Programme's activities. The Panel notes and welcomes the recent action on Collaboration with Regions, although this has yet to deliver tangible results. Although regions provide a mechanism for extending the scope of activities beyond national borders, the usual national constraints are likely to surface. An appropriate starting point could be with leading regions known to place a high priority on the implementation of innovative AAL systems and services. This might then lead on to clusters of motivated regions and/or to cross-border activity. [➲ referred in **Recommendation 9**]

Communication and outreach should be further stepped up and made more visible. Advocacy for the *ideas* behind ageing well – not just for specific project results – is a key part of the Programme's raison d'être. This outreach activity is underdeveloped at present and needs to be made more visible. It requires that the Programme actively disseminates its knowledge and insights to decision-makers at all levels (EU, national, regional, business) who will be critical gatekeepers in enabling solutions to reach the market. Specific efforts should be made towards education, in particular at university level, so as to inspire and encourage the next generation of entrepreneurs to enter the AAL field. [➲ referred in **Recommendation 10**]

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[16] Presentation of Angelo de Rosa, Medtronics, AAL Forum 2013

5. Final Evaluation Recommendations

5.1 Strategic Challenges

The key issue for the Ambient Assisted Living Joint Programme going forward will be to focus on relevant and cost-effective responses to the needs and opportunities in active and healthy ageing facing Europe in the coming years.

New horizons are opening up on various fronts. Technology is becoming ever more pervasive, creating new possibilities for assistive technologies and solutions in the context of smart environments and services. Innovation ecosystems around AAL are becoming more mature, as new communities and networks emerge. Markets for AAL are becoming more sophisticated, leading to more extended value chains, and new and fast-growing market opportunities for European industry. And the policy landscape is becoming ever broader, as new EU and national programmes are launched targeting specific aspects of the demographic challenge and existing initiatives reach critical mass.

These trends present a series of strategic challenges for the AAL JP1 as it gears up for AAL JP2:

1) **To embrace a more broad-based view of innovation**: The AAL JP's uniqueness is as an *innovation programme* (as opposed to purely a research programme) unifying national efforts and allowing companies to provide relevant solutions to existing and emerging user needs across Europe. As such, a more broad-based view of innovation is required that fully embraces service innovations and social innovations alongside development of ICT-based solutions. There should be a stronger strategic focus on **creating the marketplace** in which products and services can flourish rather than on the development of products and services *per se*. This requires a very close alignment with EU and national policy efforts, such as the EIP-AHA.

2) **To intensify the market orientation across the Programme**: For the AAL JP's market creation role to be realised within a transnational setting, much more focused attention to exploitation and commercialisation will be required. Aspects such as interoperability, standardisation, harmonisation, and transnational transfers are integral to making results sustainable and achieving impact, and will require concerted effort. The extent to which results proliferate within the AAL ecosystem (i.e. get taken up by other projects and by other actors within the community) should be a key measure of success.

3) **To strengthen coherence with other AAL programmes and initiatives**: As the policy landscape becomes more crowded, the AAL JP will need to devote more focused attention to staying at the forefront of thinking – and action. Specific effort will need to be addressed to ensuring strategic alignment between the AAL JP and European programmes and initiatives (H2020, EIP/AHA and other JPs). It will also need to strengthen coherence between the AAL JP and national/regional programmes, and look outward towards international initiatives.

The Programme has to be open to these challenges. It must **stretch the AAL value chain**, embracing an ever wider range of actors and implementing large-scale demonstrations and pilots operating under realistic real-world conditions, including differing national conditions. It must **enrich the European AAL ecosystem** through initiatives and actions that promote networking and stimulate take-up. It must **expand the AAL policy space**, seeking collaborations and synergies with programmes and initiatives wherever they are to be found: EU, national and regional. And it must seek valuable opportunities to **benchmark against relevant activities and opportunities internationally** so as to ensure AAL in Europe remains truly world-class.

The Panel considers that the strategic challenges are best addressed through the following four Recommendations in relation to Programme Strategy, which together set a direction of travel for the AAL JP2.

Naturally, the Programme operates within the context of budgetary constraints and in the presence of complementary initiatives. This makes it all the more important to sharpen the AAL JP's strategic goals and to show the added value of the Programme's activities. Our four strategic recommendations are intended to facilitate this. Recommendations 1-3 represent a continuation and intensification of existing activities and actions, whereas Recommendation 4 introduces a new emphasis on the international dimension.

Figure 7: Strategic Orientations for AAL JP2
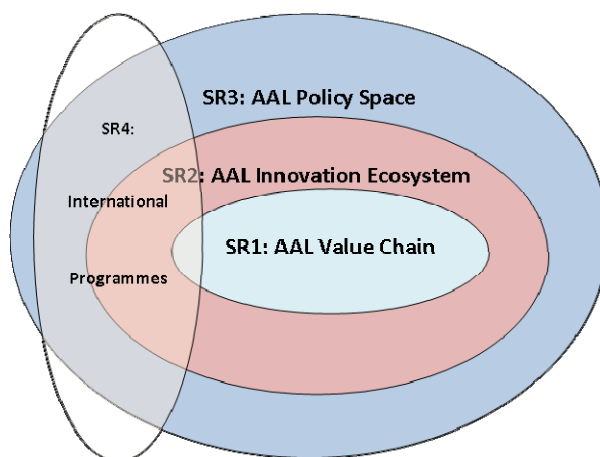
5.2 Strategic Recommendations

- **Recommendation 1: Stretch the AAL Value Chain**: A stronger market focus requires a widening of demand side participation in the Programme. This expansion should aim for both breadth (allowing users to be funded across all Participating Countries) and depth (improving the *quality* of users' involvements and drawing new actors into the value chain). The AAL JP must **aim for scale** by implementing demonstrations and pilots operating under realistic, real-world conditions, including under differing national conditions. Operational mechanisms should be found to reflect this stronger value chain focus, including a more specific exploitation of synergies with other initiatives and programmes. Improvements in standardisation and interoperability should be key aims.

- **Recommendation 2: Enrich the AAL Ecosystem:** The Programme should further enrich the ecosystem surrounding the AAL community in Europe through initiatives and actions that promote networking and stimulate uptake. Emphasis should be on novel measures that have not been tried up to now, such as: sub-programmes involving lead customers and owners; new models of co-creation and living lab solutions; further expansion of the AAL Forum; and greater post-project support on exploitation (e.g. through the marketplace with EIP-AHA to facilitate bringing together demand and supply).

- **Recommendation 3: Expand the AAL Policy Space:** Under AAL JP2, the Programme should continue to strengthen cross-programme linkages by engaging and building strong relationships with other EU, national and regional level programmes and initiatives within and around its field of interest. As the industry has yet to find a coherent voice, the Programme still relies heavily on public agencies for its vision and strategy. Innovation requires active participation from both the demand side and the supply side. This, in turn, requires governments to take ownership of the AAL JP as a vehicle for effecting systemic change, while continuing to argue for ageing well within the political agenda.

- **Recommendation 4: Benchmark European AAL Experiences against similar International initiatives**: The Programme should benchmark its activities against relevant

international initiatives in relation to ICT for active and healthy ageing so as to facilitate knowledge sharing, disseminate European best practices, and improve market access for European innovations.

5.3 Operational Recommendations

These recommendations for Programme Strategy are complemented in the following section by further observations and recommendations on Programme Operations clustered around four key themes: enhancing governance and funding; strengthening implementation and monitoring; intensifying exploitation and achieving impact, and expanding communication and community-building.

A unifying theme running through several of the recommendations is the need for the Programme to help create a favourable and supportive environment for better funding of AAL products and services. This is reflected, in particular, in the proposed measures relating to:

➤ **Early preparation and involvement of end-users,** and involvement of new stakeholder communities; [Recommendations 6, 10]

➤ **Stronger market orientation** (improved business planning, better linkages with large enterprises); [Recommendation 8**]**

➤ **Acheiving impact** (performance metrics, improve knowledge base, stronger advocacy role of the Programme, key focus on regions); [Recommendations 6, 7, 9]

➤ **Strenghtened the coordination and supportive role of the CMU**. [Recommendation 5]
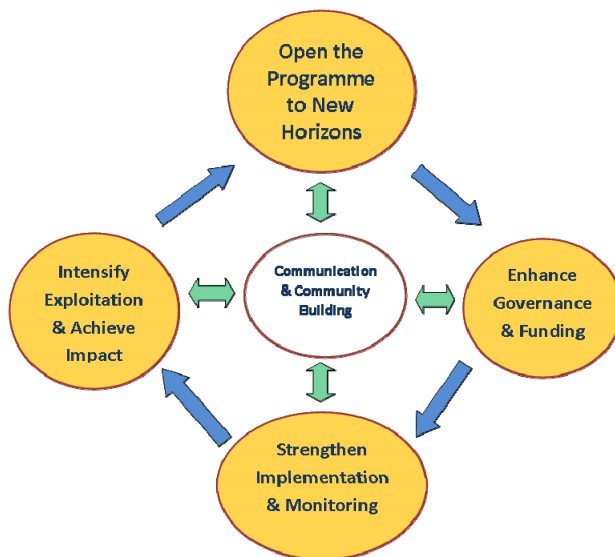
Enhancing Governance and Funding

- **Recommendation 5: Further enhance the Programme's operational performance:** Further efforts should be made to improve the Programme's operational performance through commitments to streamline governance and simplify procedures. This should include:

    o Strengthening the **coordination role of the CMU**: The CMU's capacity to address both operations and strategy should be improved so as to better address the challenges ahead (both internal and external). It should be encouraged and empowered to be more proactive and strategic, so as to take full advantage of the knowledge and insights

gained through day-to-day programme management. The emphasis should be on translating project level results into programme level outcomes: portfolio analysis; collecting, analysing and reporting; engaging with other programmes and initiatives; and advocacy for programme outcomes and AAL ideas.

- o Strengthening the **supportive role of the CMU**: At the same time, the CMU's management remit should be expanded to include areas such as consortia development, developing SMEs as coordinators, methodological development of measurement of benefit, effectiveness of AAL services and of end-user expectations/behaviour/ satisfaction, management of intellectual property; and post-project support for exploitation.
- o Continuing to **invest in the AAL JP so as to realise its catalytic effect**: Participating States should continue to commit at least the same budget in real terms to AAL JP2.

Strengthening Implementation and Monitoring

- **Recommendation 6: Strengthen implementation and monitoring of the Programme:** Improvements should be made in a number of areas so as to strengthen the way in which the Programme operates and is monitored.
  - o **Adopt new approaches and instruments that better reflect the evolving innovation context in AAL**. Calls should be defined so as to take better account of economic and societal challenges, not just technological options, and the evaluation criteria adapted accordingly. **User panels** should be used to evaluate and consult on calls and the areas identified should be verified as commercially viable. In addition, as envisaged under the AAL JP2 proposal, the Programme should experiment with **new, more flexible instruments** that are more responsive to market demands. Possible examples include an acceleration fund to enable projects to bring results to market more quickly, training & exchange grants, and innovation prizes.
  - o **Adopt a more dynamic approach to quality assurance.** The AALA should put in place a more dynamic quality assurance regime, monitoring projects to ensure they stay focused on results, including a mechanism for early termination for those not meeting their objectives. This should include a **comprehensive system of performance metrics** for projects and the programme overall. The quality regime should also allow for the **exchange of best practices between NCPs** on operational management.

Intensifying Exploitation and Achieving Impact

- **Recommendation 7: Improve the knowledge base on project achievements and insights.** Develop methodologies and knowledge bases for documenting and sharing project achievements and insights suitable for communication within and beyond the Programme. Such repositories should adopt **a multidisciplinary approach** and include **experiential and economic aspects** as well as technological data. Particular attention should be paid to the collection, assessment and validation of **experiences and insights gained from user integration**.

- **Recommendation 8: Reinforce the market orientation across the Programme**. The AAL JP should ensure market entry and commercial exp**loitation issues are addressed more exp**licitly and with greater weight in all aspects, from call development and project selection, to mid-term reviews and post-project evaluation and support.
  - o **More coordinated actions** should be encouraged within and between projects.
  - o All projects should be required to **develop a business plan at an early stage** detailing how the knowledge and results will be used.
  - o **New business models and routes to market** need to be explored, with **the close involvement of end-users** so as to ensure acceptance and better uptake of systems.

o **Market barriers should be addressed more explicitly** through special actions, initiatives and studies that make barriers (legal, cultural, institutional, etc) to the commercialisation and rollout of innovative AAL systems and services more visible.

Expanding Communication and Community Building

- **Recommendation 9: Further enhance and extend the multidisciplinary approach:** The multi-disciplinary approach that has served the Programme so well to date needs to be further enhanced and extended, including **the close involvement of end-users** at all stages of programme design and execution.
  o Specific efforts should be made to **engage with new stakeholder communities**, such as investors, reimbursement authorities, social policy, and regional agencies.
  o In addition, the Programme should **engage with European regions** motivated to invest in innovative solutions to the demographic challenge. Cooperation with and between regions should become a major feature under the AAL JP2, including under the EIP-AHA and other major initiatives involving regions.

- **Recommendation 10: Strengthen the Outreach Programme:** The Outreach Programme needs to involve the relevant stakeholders and clearly demonstrate the benefits and routes to market for AAL innovations and services. Activities should target in particular decision-makers in business, research, national and regional authorities, and end-user organisations, as well as university level education.

Annex 1: Progress towards the Recommendations of the Interim Evaluation

As described in the Introduction, this Final Evaluation has taken particular account of the Interim Evaluation undertaken by the Kuneva Panel in 2010. Whilst not intending to repeat or duplicate that exercise, relevant issues and recommendations from the IE are referenced through this report.

By way of conclusion, and in line with the specific requirement in our Mandate to assess the Programme's response to the Kuneva Report, we present a short comparison of the issues and recommendations in these two evaluations of the AAL Joint Programme.

Many of the issues and recommendations from the IE were solved successfully and so were not touched again in this Final Evaluation (FE). The quality of R&D and innovation, the administrative capacity of the CMU, and the design and process of calls were highly criticized in 2010, but all have been strengthened and corrected appropriately until now. At that time, the EU market for AAL products and services was not yet taking off and visible. The participation of SMEs was mentioned as a weak point of the AAL Programme in the early phase, but has improved significantly over the last few years. Other key problems have also improved a lot, such as the R&D on AAL products and services reaching a critical mass.

However, the majority of key topics and recommendations of the IE were reinforced and partly reformulated in the FE:

- The need to focus on wider service and social innovations, not only a niche technology.
- Reinforce the market orientation across the Programme.
- Market barriers should be addressed more explicitly. Develop business model and planning.
- National orientation and commitment were mentioned and is also highlighted and reformulated here (i.e. in terms of encouraging ownership by the Participating Countries).
- Sustainability of the R&D and AAL products and services remains a key issue.
- Exchange of best practices between NCPs.
- Cultural barriers revealed as a problem and need to be handled more effectively.
- The close involvement of end-users remains a key issue.
- Enforcement of CMU supportive and coordinative role.

Nevertheless, the FE Panel has highlighted many new issues in order to support the successful continuation of the AAL JP into AAL JP2. The most important new recommendations and new topics are to: strengthen implementation and monitoring, build up performance metrics, the outreach of the programme involving relevant stakeholders (sponsors, investors, public purchasers), and to improve the internal knowledge base on project achievements and insights. In the implementation phase the regional focus is highlighted as a new emphasis. In addition, we recommend to widen the scope of the AAL Programme by reinforcing stronger cross-programme linkages with other EU programmes.

Figure 9:Comparison of Key Issues and Recommendations of the Interim and Final Evaluations

Key recommendations of the Interim Evaluation were solved	Recommendations of the IE reinforced in the Final Evaluation	New recommendation of the Final Evaluation
– Improved the CMU administrative capacities – Better design of calls – Higher participation of SMEs – More visible AAL society, critical mass of AAL R&D activities and Innovation – AAL Forums as a platform for disseminating results.	– Better service and social orientation – Market orientation: improved business models and planning – Close involvement of end-users – Exchange best practices within NCPs – Reinforced the CMU supportive and coordination role	– Stretch the AAL value chain – Enrich the AAL Ecosystem – Stronger cross-programme linkages with other EU prog. – Strengthen outreach programme – Benchmark with other EU ICT progs – Engage with European Regions – Better comunication of results and insights

Annex 2: Set up of the Programme

Legal basis

The Ambient Assisted Living Joint Programme (AAL JP) was established under Article 185 of the Treaty on the Functioning of the European Union (TFEU), which enables the EU to participate in research programmes undertaken jointly by several Member States. The programme was formally adopted by Council and Parliament in June 2008 and runs until 2013.

The AAL JP aims to join together national research activities in the area of ICT and ageing well and complements EU-funded activities within the Seventh Framework Programme (FP7). At present the Programme engages 19 EU Member States and 3 associated countries[17]. The Programme is financed by Participating Countries, the EU and organisations participating in AAL JP projects (approximately 25%, 25% and 50% respectively). It has a total minimum budget of €600 million, of which a minimum of €300 million is public funds, including up to €150 million from FP7.

EU funding is only committed once Participating States have made clear political and financial commitments to the Programme, and EU payments are only made once Participating States have paid their contributions. In this way the Programme aims to overcome one of the problems of the earlier Article 169 initiatives (such as the 'clinical trials' ECDTP[18]).

The AAL JP addresses applied research in the areas of independent living systems and applications with a short to medium term time horizon and a time-to-market of 2-3 years. The Programme is designed to complement longer-term research under FP7, which focuses on advanced research with a time-to-market of 5-10 years. In addition, the AAL Programme has provided inputs for downstream innovation and market validation activities under the Competitiveness and Innovation Programme (and specifically the ICT Policy Support Programme element). In this way it has aimed to close the loop from basic research to market uptake, a key target of EU research and innovation policies.

Governance

The Participating States have set up a dedicated implementation structure which is responsible for the administrative, financial and contractual management of the joint research programme. It consists of the AAL Association (AALA), with a Central Management Unit (CMU) for daily programme operations and a network of national contact points (see Figure 1). The supreme decision-making body is the General Assembly, with representatives from all partner countries. It elects an Executive Board as the official legal representative of the Association, responsible for staffing, contracting and budget planning. Technical advice is provided by an Advisory Board of recognized experts from business, innovative technology, research and politics.

Each year the Participating States, together with the European Commission, agree a joint research work programme. This invites proposals for joint projects with participants from at least three partner countries, subject to a common evaluation procedure and co-funding from national budgets.

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[17] As of June 2013 the AAL JP consisted of 19 EU Member States: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Poland, Portugal, Romania, Slovenia, Spain, Sweden and the United Kingdom and 3 associated countries: Israel, Norway and Switzerland. Greece is currently not taking part in the calls for proposals.

[18] European & Developing Countries Clinical Trials Partnership, as assessed under the chairmanship of former MEP Van Velzen in July 2007.
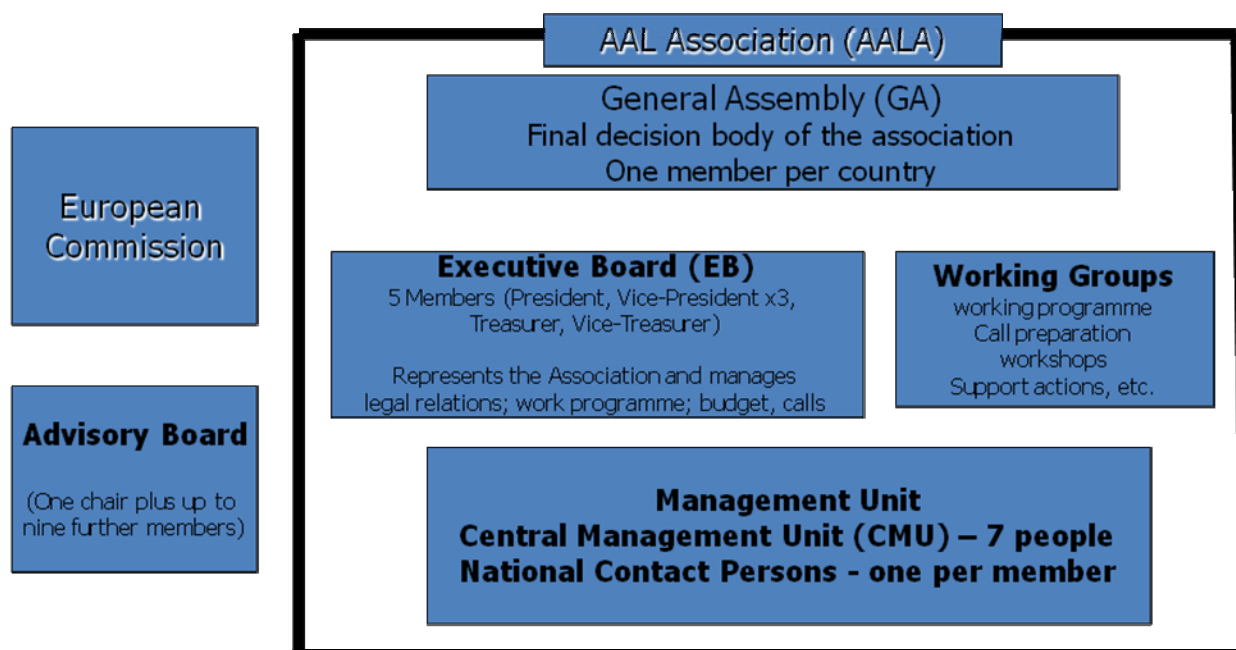
Way of Working

The AAL JP supports two types of activities:

- Technological research, demonstration and dissemination activities, implemented via shared cost transnational projects. These involve transnational consortia from different Participating States. Projects should be targeted at market-oriented research, be of short to medium-term duration, and demonstrate the capability to exploit project results within a realistic time frame.

- Brokerage, programme promotion and networking activities. These are implemented through dedicated events or in combination with existing events.

To fulfil its objectives and reflecting its market orientation, over the period 2008-2013 the Programme issued six calls for proposals, as follows:

1. **Call 1 (2008): ICT-based solutions for Prevention and Management of Chronic Conditions of Elderly People**. 118 proposals received, of which 23 funded.

2. **Call 2 (2009): ICT-based Solutions for Advancement of Social Interaction of Elderly People**. 104 proposals received, of which 30 funded.

3. **Call 3 (2010): ICT-based Solutions for Advancement of Older Persons' Independence and Participation in 'Self-Serve Society'**. 91 proposals received, of which 22 funded.

4. **Call 4 (2011): ICT-based Solutions for Advancement of Older Persons' Mobility**. 107 proposals received, of which 25 funded.

5. **Call 5 (2012): ICT-based Solutions for Home Care for Older Persons**. 151 proposals received, of which 30 funded.

6. **Call 6 (2013): ICT-based Solutions for (Self-) Management of Daily Life Activities of Older Adults at Home**. 81 proposals received, of which XX funded.

Overall, the sixcalls up to 2013 resulted in around 130 projects being funded with a total public funding commitment of €317.5 million, of which €182.4 million (57.5%) was financed by the Participating Countries.

Figure A2.1: Public Sector Contributions by Call

	Call 1 2008	Call 2 2009	Call 3 2010	Call 4 2011	Call 5 2012
Partner State commitment (€m)	33	36	30	29	26,5
% of public funding	57,9	61,0	56,3	55,9	55,7
European Commission commitment (€m)	24	23	23	23	22,85
% of public funding	42,1	39,0	43,7	44,1	44,3
Total public funding commitment (€m)	57	59	53	52	49,4

Project portfolio

Projects are similar in size to FP7 'STREPS' but have a larger number of partners (FP7 average: 4.0-5.0). Some projects have up to 13 partners (the maximum under the rules is 10).

Key characteristics are:

Average partners per proposal:	7.5
Average total budget per proposal:	€2.6m
Average funding request per proposal:	€1.5m

Further analysis of the composition of the calls, the participants and related funding, and the outputs and achievements is presented in subsequent sections.

Supporting activities

The AAL JP has put in place a series of support actions designed to help the Programme achieve its objectives and multiply its overall socio-economic impact. These support actions have addressed specific challenges – some of which were identified in the Interim Evaluation – such as access to finance, commercialisation and deployment of AAL solutions, market barriers, and user-centred design.

Four such actions have been supported:

- **Action 1: AAL2Business:** An initiative designed to assist in the commercialisation and market deployment of ICT-based products, systems and services. It offers support to AAL JP projects in bringing their developed solutions to the market within 2 to 3 years after the end of the funding period. A concept for a pilot phase was developed, assessing the needs of AAL JP projects and potential supporting actions. Based on this pilot, a scaled-up three-year support action was launched (running from September 2013-September 2016) providing:

  o consortia building, integrating all relevant value network actors;
  o individualised on-demand business coaching;
  o methodology workshops;
  o facilitation of access to finance by building a network of private investors dedicated to AAL;
  o exchange of experience among AAL JP projects and a post-project marketplace to foster and ensure continued activity.

- **Action 2: Collaboration With Regions**: An action (undertaken between May-October 2013) aimed at facilitating the deployment of AAL solutions through a series of support measures: workshops with local and regional representatives to raise awareness of AAL JP projects; and fostering exchange of experience between European regions.

- **Action 3: The AAL JP End-User Survey**: An initiative (undertaken between March-November 2013) to support AAL JP projects in involving users in the most appropriate and effective way during research, development and role-out. Activities include: survey and analysis of current user involvement; mapping and characterisation of user organisations; practical guidelines and toolkit to help improve user involvement; compilation of needs, wishes and requirements of older adults in general and with respect to ICT; development of a workshop concept and trial workshop to help AAL JP projects to optimise user involvement.

- **Action 4: Standards and Interoperability in AAL**: An action (undertaken between June-December 2013) to raise awareness about interoperability issues of AAL solutions to facilitate market uptake. Activities include: making existing AAL standards more easily accessible based on use-cases linked to relevant standards; and raising awareness of existing standards in the developer community and the wider AAL community through workshops.

All support actions are coordinated with the partners of the EIP-AHA and contribute directly to the delivery of the EIP-AHA.

The **AAL Forum** was launched in 2009 as an annual meeting place for AAL JP projects and other stakeholders, including end users and industry. It provides a platform for the increasing European AAL community to meet and discuss topics related to improving the AAL JP as well as the adoption of AAL solutions in the market. Five Forums were organised between 2009-13, with attendees increasing from 500 to 1200 (in 2012). There has been a similar increase in exhibitors, and commercial sponsors and media partners have been engaged. Around 1500 participants attended the AAL Forum 2013, held in Norrköping, Sweden from 24-26 September, including 70 exhibitors.

Attendee Profile	2010, Odense	2011, Lecce	2012, Eindhoven
Public administration	198	106	230
End Users	60	61	78
Business	204	114	748
Research	192	132	173

Other events have included the **AAL Summit 2012** (Bilbao, Spain), aimed at raising awareness of market and investment opportunities; a seminar at the European Parliament in October 2012, which attracted 122 participants; and information days allied to calls for proposals. There has also been an increasing presence at international events.

In March 2013, an online **Satisfaction Survey** was launched, targeting project coordinators and project participants from calls 1 to 5. It solicited views on projects' experiences of the AAL JP, including the call procedures, contract negotiations, and payments. Around 180 existing projects responded, including 92 coordinators and 127 project participants.

In 2011, in the wake of the Interim Evaluation of the AAL JP, the CMU commissioned an **Impact Assessment**. This aimed to inform the Programme's own planning and also to feed into the Commission decision-making over the continuation of the AAL JP under Horizon 2020. The second phase of this assessment was completed in June 2013 and aimed to assess how the Programme is currently performing and how it had matured since the earlier information gathering exercise.

Annex 3: Examples of AAL projects

Example 1: DOMEO - Working with Users to Enhance Market Perspectives

The AAL-DOMEO project developed a modular robot for use in professional care environments. The robot includes an autonomous base platform, comprising of a cognitive assistance system and a medication management carousel system. Expansion modules can be added, such as the walking aid, position change assistance (standing, sitting) and handling systems. A communication platform enables the user to keep in constant touch with their carer.

Over the course of the project, which was coordinated by Robosoft, the team accumulated over 700 days of experiments with real dependent patients. Through this work and these experiments Robosoft has built up extensive experience in the field of assistive robotics, which has given it a clear vision for how to approach the market in the short term.   http://www.aal-domeo.org

Example 2: ROSETTA - Commercialisation through Spin-off

The ROSETTA project developed an innovative system for elderly persons affected by chronic progressive diseases (such as Alzheimer's). One of its functions is to monitor the resident's activities by means of multiple and different sensors and generate an alarm in case of unexpected/deviant (in)activity or wandering, which is forwarded to the caregiver (the so-called AAPS part).

At the end of the project, the AAPS surveillance was almost market ready and therefore was brought to market first. In 2013 TNO created a spin-off company called Dutch Domotics BV funded by private investors. It undertook final product development and is now selling the system to customers in the Netherlands. In 2013 around 200 systems are expected to be sold, rising to around 4000 in 2014. The main target group remains people with dementia living in their own houses or in small-scale living communities. www.dutchdomotics.com

Example 3: WeCare - Adapting Solutions to National Markets

The WeCare project aimed to enable older people to participate in social networks, both online and in real life, so as to prevent loneliness and improve their well-being. The project delivered prototypes of four online social networking services, in four different countries.

These services were designed in close cooperation with older people (primary users) and their family members, informal carers or formal caregivers (secondary users). The user trials revealed that the services enabled people to engage in new activities, to meet people with similar life situations, improve their social relationships, and boost their confidence.

Moreover, business models were developed in close cooperation with the industry. The business models in Finland and Spain focused on improving existing services, whereas in Ireland and The Netherlands they focused on packaging with other services and increasing their value and revenues.

Finally, the project delivered recommendations for developers and policy makers who intend to develop and deploy similar services.   www.wecare-project.eu

Example 4: Mylife - System refinement through field trials

Mylife developed and tested a service to support the social inclusion and independence of people with dementia. The team chose to base their development on currently available technologies, presented using a touch-screen tablet computer. With assistance from a family member or carer, each Mylife tablet can be customised to the individual user's needs and preferences. The Mylife user can access a range of information, such as the day, date and time, daily and weekly appointments, news and weather, favourite music and photos.

The project team carried out a series of field trials in the UK, Norway and Germany to test the acceptance, usability and usefulness of the Mylife system. The trials included participants with mild cognitive impairments and their carers, and were carried out in their homes. These allowed further refinement of the system. The field trials showed increased independence and wellbeing, a reduction in social isolation, increased participation in daily activities, stimulation of cognitive abilities and access to internet-enabled services. For carers, the outcome was a reduction in the stress caused by worry, and the need to respond to repeated questions and multiple phone calls.

The Mylife system was first released for sale in Norway and a German version is also being brought to market. www.mylifeproducts.no.

Annex 4: List of national public sources for the co-financing of the AAL JP calls in 2012

	AAL Member State	Source of the funding
1	Austria	BMVIT – Austrian Federal Ministry for Transport, Innovation and Technology.
2	Belgium	IWT – Agency for Innovation by Science and Technology, Flemish funding programme "O&O Bedrijfsprojecten".
3	Switzerland	Federal Office for Professional Education and Technology.
4	Cyprus	Research Promotion Foundation.
5	Germany	Federal Ministry for Education and Research.
6	Denmark	Danish Agency for Science, Technology and Innovation.
7	Greece	Currently not participating in the calls.
8	Spain	Ministry of Science and Innovation/ ISCIII – Instituto de Salud Carlos III. "Strategic Action for Health Research within the R+TF+I National Plan 2008-2011" and Ministry of Industry, Tourism and Trade.
9	Finland	Tekes – Finnish Funding Agency for Technology and Innovation.
10	France	ANR – French Research Agency and CNSA – French National Fund of Solidarity for Autonomy.
11	Hungary	The National Office for Research and Technology
12	Ireland	Enterprise Ireland.
13	Israel	Ministry of Industry, Trade and Labour. "Encouragement of Industrial Research & Development law 57744-1984".
14	Italy	MIUR - Ministero dell'Istruzione, dell'Università e della Ricerca. FAR (Fondo Agevolazione alla Ricerca).
15	Luxemburg	Luxinnovation – Agènce Nationale pour la Promotion de l'Innovation e de la Recherche. Fond National de la Recherche. INTER/AAL Programme.
16	The Netherlands	Ministry of Health, Welfare and Sport.
17	Norway	The Research Council of Norway. IT Funk.
18	Poland	National Centre for Research and Development.
19	Portugal	UMIC - State Organization Knowledge Society Agency.
20	Romany	Ministry of Education, Research, Youth and Sport. programme "Partnership".
21	Slovenia	Ministry of Higher Education, Science and Technology.
22	Sweden	VINNOVA – Governmental Agency for Innovation Systems.
23	United Kingdom	Technology Strategy Board. programme "Assisted Living Innovation Platform".

Annex 5: List of Stakeholders Interviewed

	First Name	Last Name	Company/Entity	Title
1	Regis	Cazin	Active audio	ICityForAll project
2	Frans	de Bruine	Commission Européenne	Directeur Général Honoraire
3	Boris	de Ruyter	Philips Group Innovation	Senior Scientist
4	Alun	Foster	Artemis	Acting Director
5	Alain	Franco	CHU de Grenoble	Member of the AAL JP Advisory Board, President of the International Society for Gerontechnology (ISG)
6	Jean	Gelissen	ICTLabs	Action Line Leader
7	Peter	Hanák	Budapest University of Technology and Economics	Professor. President of eVITA national platform in Hungary
8	Anne	Kaarnasaari	Nordic Health Care Group	AAL Programme Coordinator
9	Pekka	Kahri	Tekes	former AAL NCP for Finland
10	Csaba	Kucsera	Hungarian Academy of Sciences	Researcher, Institute for Sociology, Centre for Social Sciences
11	Johan	Lukkien	Eindhoven University of Technology	Professor
12	Karina	Marcus	AAL Association	Director
13	Anne Sophie	Parent	Age Platform European	Director
14	Mika	Peteri	Mawell Ltd.	AAL project representative
15	Christian	Schoen	GTN SAS	Hopes project
16	Axel	Sigmund	VDI/VDE-IT Innovation + Technik GmbH	AAL NCP for Germany
17	Peter	Skiczuk	Frequentis	Rapporteur of AAL JP annual reviews
18	Constantine	Stephanidis	ICS FORTH	Director
19	Hartmut	Strese	VDI/VDE-IT Innovation + Technik GmbH	AAL NCP for Germany
20	Kirsi	Vähä-Pietilä	Tekes	AAL NCP for Finland
21	Jan	van den Biesen	Philips Group Innovation	VP Public-Private Partnerships
22	Gurvinder	Virk	HIG	Exoleg project
23	Reiner	Wichert	Fraunhofer IGD Darmstadt	Leader or partner of FP7 and AAL projects, supporter and promoter of AALOA (AAL Open Association)

Annex 6: The Final Evaluation Expert Panel

Philippe Busquin, Panel Chair (Belgium). From 1999 to 2004, Philippe was European Commissioner with responsibility for Research. He then served as Member of the European Parliament from 2004 to 2009 for the French Community of Belgium with the Socialist Party, part of the Socialist Group and sat on the European Parliament's Committee on Industry, Research and Energy. He was the chairman of the Science and Technology Options Assessment Panel. He also was a substitute for the Committee on the Environment, Public Health and Food Safety and a member of the Delegation to the EU-Russia Parliamentary Cooperation Committee.

Emile Aarts (Netherlands). Emile joined Philips Research in 1983 where he worked in various research positions until he was appointed in 2009 as Chief Scientific Officer. In 2012 he left Philips to resume his academic career as dean of the faculty of Mathematics and Computing Science of the Eindhoven University of Technology. He serves on numerous academic and governmental advisory boards at national and European level. He is the co-author of fifteen books and more than two hundred scientific papers. He was involved in the launch of the concept of Ambient Intelligence and co-founder of Philips' ExperienceLab. In 2010 he founded the Intelligent Lighting Institute at the Eindhoven University of Technology. His current research interests focus on Data Science, Social Innovation Technologies, and Open Innovation.

Csaba Dózsa (Hungary). A health economist and health policy analyst. From 1994 he worked for the Hungarian National Health Insurance Fund Administration, where he was responsible for budget planning as the Head of the Planning and Budgeting Department between 1999 and 2000. He then served as Head of Preventive and Curative Care and was responsible for capacity planning, contractual policy and financing and control of health care providers. Later he worked as Deputy Director General for Health Policy and Health Care. From 2005 to 2006 he worked for the Hungarian Ministry of Health as Deputy Secretary of State on Economics and Health Care Development. Since 2006 he has been the Managing Director of his own company Med-Econ Ltd and works as advisor for hospitals and EU funded programmes. He is Associate Professor in Health Economics at the University of Miskolc, and from 2011-2012 was President of the Hungarian Health Economics Association, where he is currently Scientific Vice-President.

Heidrun Mollenkopf (Germany). A sociologist and gerontologist. She was Senior Researcher at the German Centre for Research on Ageing (DZFA) at the University of Heidelberg until she retired in December 2004. She has published widely in the fields of ageing and technology, mobility, senior friendly neighbourhoods and quality of life of older people. Since 2007, Heidrun has been a member of the German National Association of Senior Citizens' Organisations (BAGSO) Expert Council and Chair of the "Universal Access and Independent Living" Expert Group of AGE Platform Europe.

Petri Uusikylä (Finland). Co-founder and director at Frisky & Anjoy. He is based in Helsinki, Finland. He has over 20 years experience in evaluating Science, Technology and Innovation Programmes in Europe, Asia and Africa. He has also written several books and article on public policy evaluation and European Policy-making.

Michael Sharpe, Panel Rapporteur (UK). Director of MS Consulting & Research Ltd, a communications and strategy consultancy specialising in technology-based sectors. Michael has been involved with European research programmes since 1992, and over recent years has worked with the EU ICT Programme on strategy, communication and evaluation assignments. He has participated in numerous consultation meetings, workshops, and strategy groups, as well as supporting the evaluation of proposals in various fields (under FP5, 6 and 7).

Annex 7: List of Abbreviations

AAL2B	AAL to Business (AALA-project)
AALA	AAL Association
AAL JP	Ambient Assisted Living Joint Programme
AAL JP1	Ambient Assisted Living Joint Programme 2008 - 2013
AAL JP2	Ambient Assisted Living Joint Programme 2014 – 2020 (or: Active and Assisted Living Joint Programme)
AGE	AGE Platform Europe (for senior citizens)
ALIP	Assisted Living Innovation Platform (from UK Technology Strategy Board)
CIP (ICT PSP)	ICT Policy Support Programme of the Competitiveness and Innovation Programme
CMU	Central Management Unit (of the AAL Association)
COPD	Chronic Obstructive Pulmonary Disease
DG CONNECT	Directorate-General for Communication Networks, Content and Technology
DG RTD	Directorate-General for Research and Innovation
EBAN	European Business Angel Network
EC	European Commission
EIP (on) AHA	European Innovation Partnership on Active and Healthy Ageing
EIT	European Institute of Innovation and Technology
ERA-net	European Research Area Networks
EU	European Union
EU 2020	Europe 2020 Strategy for smart, sustainable and inclusive growth
EUREKA	European Research Coordination Agency
EVIA	Spanish Technological Platform for eHealth, eWellness and Social Cohesion (Spain)
eVITA	Assistive Information and Communication Technologies and Applications (Hungary)
FERPA	European Federation of Retired and Elderly People
FP7	7th Framework Programme for Research and Technological Development
FP8	8th Framework Programme for Research and Technological Development (= H2020)
GDP	Gross Domestic Product
GO	General Objective
H2020	Horizon 2020 – Framework Programme for Research and Development 2014 - 2020
IAB	Impact Assessment Board
IASG	Inter-service Impact Assessment Steering Group
ICT	Information and Communication Technology/ies
IPR	Intellectual Property Rights
JP	Joint Programme
JPI	Joint Programming Initiative
KIC(s)	Knowledge and Innovation Community/ies (EIT-related)
MS(s)	Member State(s)
MYBL	More Years Better Lives (JPI)
NFA(s)	National Funding Authority/ies
NGO	Non-Governmental Organisation
ONCE	Organización Nacional de Ciegos Españoles (Spanish National Organisation for the Blind)
OO	Operational Objective
PPP	Public-Private Partnership
QOL	Quality of Life
R&D	Research and Development
SF	Structural Fund (of the EU)
SME(s)	Small and Medium Enterprise(s)
SO	Strategic Objective
TFEU	Treaty on the Functioning of the European Union
WHO	World Health Organization (of the United Nations)
WRC	Work Research Centre

Annex 8: Glossary

Ambient Assisted Living (AAL): (a combination of) intelligent systems of assistive products and services, integrated in the preferred living environment, to constitute 'intelligent environments' to compensate predominantly age-related functional limitations and support an independent, active and healthy course of life.

Assisted living: a system of housing and limited care that is designed for senior citizens who need some assistance with day-to-day activities but not requiring care in a nursing home. Assisted living can include private quarters, meals, personal assistance, housekeeping aid, monitoring of medications, and nurses' visits.

Adaptive Technology (subset of assistive technologies): any object or system that is *specifically designed* for the purpose of increasing or maintaining the capabilities of people with disabilities.

Assistive Technology (AT): Any item, piece of equipment, or product system, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities or functional limitations, allowing an individual to perform a task that they would otherwise be unable to do, or increases the ease and safety with which the task can be performed. ATs comprise wheelchairs, walkers, personal emergency response systems, prosthesis, computer accessibility enhancing software and many other devices.

Cost-effective(ness): Relationship between monetary inputs (costs) and the desired outcome (improvement in health status, clinical parameters (reduced blood pressure), life gained or life years gained).

Cost-utility: Relationships between monetary inputs (costs) and the desired outcome measure buy QALY (Quality Adjusted Life Years).

European Innovation Partnership (EIP): a partnership supporting the European Innovation Union, breaking down silos and bringing together all relevant stakeholders across policies, sectors and borders to speed up innovations that address a major societal challenge, and gain competitive advantages for growth and job creation in Europe. For the European Innovation Partnership on Active and Healthy Ageing, see http://ec.europa.eu/research/innovation-union/index_en.cfm?section=active-healthy-ageing .

Health Care: The prevention, treatment, and management of illness and the preservation of mental and physical well-being through the services offered by the medical and allied health professions.

Independent living: A living arrangement that maximizes independence and self-determination, especially of disabled persons and persons with functional limitations living in a community instead of in a medical facility. In the context of eldercare, independent living is seen as a step in the continuum of care, with assisted living being the next step.

Integrated Care (also: coordinated care, comprehensive care, seamless care and transmural care): health care reform and new organizational arrangements for the provision of more coordinated, integrated and person centred forms of health and social care. The WHO-definition: *Integrated care is a concept bringing together inputs, delivery, management and organization of services related to diagnosis, treatment, care, rehabilitation and health promotion. Integration is a means to improve services in relation to access, quality, user satisfaction and efficiency.*

Personal Emergency Response System: an alarm system installed in a residence, often triggered by an alarm button or sensor system, designed to signal a medical or personal emergency so that the monitoring alarm company or community members may dispatch appropriate aid.

Social Care: the planning and delivery of care and other support services for individuals and groups with identified needs.

Telecare: offering remote care and reassurance of elderly and physically less able people, to allow them to remain living in their own homes. E.g. the use of sensors may be part of a package which can provide support for people with illnesses such as dementia, or people at risk of falling. Telecare applications can be used for prevention, early warning, monitoring, safety confirmation and reduction of harm.

Teleconsultation (also: virtual consultation): any medical consultation by either a non-medical consumer, or by a health care professional from a colleague on an electronic network like the internet.

Telehealth: using electronic information and telecommunications technologies to support and promote long-distance clinical health care, patient and professional health-related education, public health, and health administration.

Telemedicine: using electronic communication and information technologies to provide or support clinical care at a distance. Included in this definition are patient counselling, case management, and supervision of rural medical residents and health professions students involving direct patient care.

Telemonitoring: using audio, video, and other telecommunications and electronic information processing technologies to monitor the health status of a patient from a distance.

Telepresence: using robotic and other instruments that permit a clinician to perform a procedure at a remote location, by manipulating devices and receiving feedback or sensory information that contribute to a sense of being present at the remote site and allows a satisfactory technical achievement.