



# **Progressive Standards Around ICT for Active and Healthy Ageing**

## **WP6 Online Platform Development and Collation of Information**

### **Deliverable 6.5**

### **“Innovative Approaches Identified”**

**V2.0**

**This project has received funding from the  
European Union’s Horizon 2020 Research and Innovation Programme  
Under Grant Agreement no. 727802**



## Document Control

<b>Deliverable</b>	D6.5 “Innovative Approaches Identified”
<b>WP/ Task Related</b>	<p>The main focus of this deliverable is on innovative approaches in the field, reflected by both the mission and the current outcomes of the PROGRESSIVE project.</p> <p>WP6: The associated task 6.3 was intended to help to facilitate the identification of innovative approaches and potential good practice(s). [...] <sup>1</sup></p>
<b>Delivery Date</b>	<p>4 October 2018 (As per Grant Agreement dated 06/09/2016 [Ares(2016)5033506] the delivery date was originally stated to be M7.)</p>
<b>Dissemination Level</b>	Public.
<b>Lead Partner</b>	EHTEL / OU
<b>Contributors</b>	<p>EHTEL: Diane Whitehouse, Stephan Schug, Marc Lange.</p> <p>OU: Caroline Holland, Verina Waights.</p> <p>With additional materials provided by Fernando Machicado (UNE) and Estelle Huchet (AGE).</p>
<b>Reviewers</b>	Project coordination team (Malcolm Fisk, Nitika Bhalla).
<b>Abstract</b>	This report illustrates what is new and innovative that has emerged from the field on Information and Communication Technologies for Active and Healthy Ageing in relation to standardisation, especially in terms of work done in the PROGRESSIVE project until the end of September 2018.
<b>Key Words</b>	approach, conclusions, co-production, deliverable, discussion, ethics, good practice, inclusion, innovation/innovative, process, smart home, smart housing, STAIR platform, standard, table, use case.

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<sup>1</sup> As part of this task, stipulated in the original Description of Action, the intention included to: take note of outcomes from consultations undertaken under the umbrella of WP4 (i.e., with the task force members); explore to what extent innovative approaches are taking place outside of the more ‘formal’ areas of standardisation – through industry bodies or other institutions and associations; and to draw on performance measures laid out in WP3 (D3.2 i.e., now D3.3). Attention has been paid to all three, although mostly to the performance measures on standards mentioned in D3.3.

## Revision History

Version	Date	Author(s)	Reviewer(s)	Notes
0.0	30/08/2018	Diane Whitehouse (EHTEL)		Shared with OU on 4.9.2018. Inserted into formal PROGRESSIVE deliverable format as per 05.09.2018.
0.4	10/09/2018	Caroline Holland (OU)		Materials on D6.6 added. Three further revisions developed from 8-9/09.2018.
0.5/6	12/09/2018	Caroline Holland and Diane Whitehouse		Materials from D2.1 and D7.1/7.2 added. STAIR platform added.
0.7-0.8	14/09/2018-26/09/2018	Caroline Holland and Diane Whitehouse		Co-production added. Corrections from Fernando Machidado and Estelle Huchet added.
0.9a-c	29/09/2018	Diane Whitehouse	Marc Lange (EHTEL) Stephan Schug (EHTEL) Verina Waights (OU)	Additional materials added. Document re-structured; grammar and syntax modified.
0.9d-g	30/09/2018	Diane Whitehouse		Further clean-up of manuscript, especially structure and syntax. Version to be circulated for commentary especially on Discussion and Conclusions to EHTEL and OU cc DMU.
0.9g	1/10/2018	Diane Whitehouse	Caroline Holland (OU) Marc Lange (EHTEL) Stephan Schug (EHTEL) Verina Waights (OU)	Submitted to colleagues for final review.
0.9h2	4/10/2018	Diane Whitehouse	Verina Waights (OU)	Enhancements made on final commentary received.
1.0	4/10/2018	Diane Whitehouse and Verina Waights	Nitika Bhalla, Malcolm Fisk	Submitted for quality review.

## Acknowledgement

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

## List of Abbreviations

AAL	Active and Assisted Living Joint Programme
AGE	AGE Platform Europe
AHA	Active and Healthy Ageing
AI	Artificial Intelligence
BT	Technical Board (in English)
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
COPD	Chronic Obstructive Pulmonary Disease
EHTEL	European Health Telematics Association
EIP on AHA	European Innovation Partnership on Active and Healthy Ageing
ETSI	European Telecommunication Standards Institute
EU	European Union
GDPR	General Data Protection Regulation
GPS	Global Positioning System
(g)ReEIF	Generalised Refined eHealth European Interoperability Framework
IEC	International Electrical Commission
ICT	information and communication technology
ICT for AHA	Information and Communication Technology for Active and Healthy Ageing
IHE	Integrating the Healthcare Enterprise
ISO	International Organization for Standardization
IT	Information technology
ITU	International Telecommunications Union
NWIP	New work item proposal
ONS	Office for National Statistics [in the United Kingdom]
PCHA	Personal Connected Health Alliance
R&I	Research and innovation
RRI	Responsible Research and Innovation
STAIR	Standardisation, Innovation and Research
STAIR-AHA	Standardisation, Innovation and Research-Active and Healthy Ageing
STAIR-IPI	Standardisation, Innovation and Research for an Innovative Process Industry
TC	Technical Committee
UK	United Kingdom
VWiQ	Networked Living in the Neighbourhood (in English)
W3C	World Wide Web Consortium
WCAG	Web Content Accessibility Guidelines
WG	Working Group
WP	Work Package

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## Executive Summary

This report illustrates what is new and innovative that has emerged from the field of Information and Communication Technologies for Active and Healthy Ageing (ICT on AHA), especially in relation to standardisation. The focus is on materials that have been gathered from the range of PROGRESSIVE reports delivered during 2018. Coverage includes topics such as ethics, use cases and interoperability, co-production and inclusion, smart housing, standards and the standardisation process – in particular, with relevance for the foundation of a Standardisation, Innovation and Research (STAIR) platform on active and healthy ageing (AHA).

The work is introduced in chapter 1, including a set of definitions. The core of the work in the field of ICT for AHA related to standardisation, including how it has been handled by PROGRESSIVE and how PROGRESSIVE's ideas build innovatively on each other, is described in chapter 2. Chapter 3 states the implications of these findings both contemporarily and for the future. Chapter 4 comes to a set of preliminary recommendations for the future. Continuing consultation with and of older people is needed to ensure the relevance and importance of these items.

Ultimately, this report shows that innovations in ICT for AHA are occurring in many different fields and not just in the **technologies/devices themselves**. This has **implications for a wide range of standards**, not simply those in technologically-related fields.

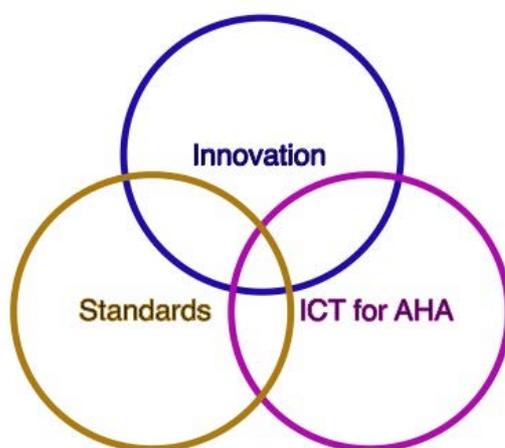
## 1 Introduction

The inter-relationship between Information and Communication Technology for Active and Healthy Ageing (ICT for AHA), standards, and innovation is emerging at the forefront of European thinking. For example, in her 19 October 2017 presentation on research and innovation at the first PROGRESSIVE large-scale meeting on ‘Making ICT standards fit for active and healthy ageing in Europe’ Andreaa GULACSI, who manages Policy and Stakeholder Engagement in CEN-CENELEC, reinforced the message outlined in the 2015 Communication of the European Commission<sup>2</sup>:

*“Standards are crucial for innovation and progress in the Single Market: they increase safety, interoperability and competition and help remove trade barriers.”<sup>3</sup>*

On the one hand, **standards** and interoperability **can be seen as enablers of innovation** just as they can also be embedded into technologies<sup>4</sup>. On the other hand, there are many other **innovative services and applications** that have appeared in the field of ICT for AHA, like the services linked to smart homes, which now need more appropriate standards.

In PROGRESSIVE, these three elements were combined in a simple intersection:



**Figure 1: Intersection between Innovation, Standards, and Information and Communication Technology for Active and Health Ageing (ICT for AHA)**

<sup>2</sup> COM(2014)500 final “The annual Union work programme for European standardisation in 2015”, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2014:500:FIN> last accessed 24 September 2018

<sup>3</sup> [https://progressivestandards.org/wp-content/uploads/2018/06/03-ANDREA-GULAACSI\\_The-European-standardisation-system-and-its-relation-to-R\\_I.pdf](https://progressivestandards.org/wp-content/uploads/2018/06/03-ANDREA-GULAACSI_The-European-standardisation-system-and-its-relation-to-R_I.pdf) last accessed 24 September 2018.

<sup>4</sup> One can innovate by using standards such as Fast Healthcare Interoperability Resources (FHIR), a point strongly argued by Catarina Chronaki of HL7 International Foundation e.g., at the EHTEL 2017 Symposium, <https://www.ehtel.eu/activities/ehtel-symposium/ehtel-2017-symposium> last accessed 24 September 2018.

## 1.1 Definitions

This report is D6.5 “Innovative approaches identified” of the PROGRESSIVE project: here, it is simply called ‘this report’. It concentrates on **innovation approaches** rather than focusing directly on innovation, which is a huge area of study both practical and academic. It focuses on what can be considered as “innovative” in terms of **activities** or **practices** (e.g., standards, use cases, and other topics), **approaches** or **methods**, and **processes** in terms of the work undertaken by the PROGRESSIVE project.<sup>5</sup> Wherever possible, its chief orientation is towards standardisation in terms of ICT for AHA.

In this report, a flexible yet workable definition of **innovative approaches** has been used in order to identify the breadth of the ICT for AHA field and to capture the range of ideas covered in standardisation for ICT for AHA, and therefore in the remit of the PROGRESSIVE project. This report draws on various definitions selected from common dictionaries, many of which have online variants.

**Table 1: Definitions used in this report**

Adjective or noun	Definition and/or explanation
activity or practice	“A thing that a person or group does or has done <sup>6</sup> .” “The customary, habitual, or expected procedure or way of doing of something <sup>7, 8</sup> .”
approach	“A way of dealing with a situation or problem in a certain way <sup>9</sup> .”
good practice	<b>Explanation:</b> Where good practices are involved, attention has been paid to arguments expressed in one of PROGRESSIVE’s other reports (D6.6). Emphasis has also been placed on the good practices identified by the work of the European Innovation Partnership on Active and Healthy Ageing, with which this coordination and support action is closely associated.
innovation	Novelty in processes or outcomes that results (in economic or social contexts) from thought, activity and/or the manner of use of products and materials. <sup>10</sup>

<sup>5</sup> Any PROGRESSIVE work referred to relates to those PROGRESSIVE reports that have been produced largely throughout 2018.

<sup>6</sup> Oxford Living Dictionaries: <https://en.oxforddictionaries.com/definition/activity> last accessed 24 September 2018.

<sup>7</sup> Oxford Living Dictionaries: <https://en.oxforddictionaries.com/definition/activity> last accessed 24 September 2018.

<sup>8</sup> Oxford Living Dictionaries: <https://en.oxforddictionaries.com/definition/practice> last accessed 24 September 2018.

<sup>9</sup> Oxford Living Dictionaries: <https://en.oxforddictionaries.com/definition/approach> last accessed 24 September 2018.

<sup>10</sup> This terminology was developed in the GREAT project (which ran from 2013-2016) on governance for responsible innovation: <http://www.great-project.eu> last accessed 29 September 2018.

Adjective or noun	Definition and/or explanation
innovative	Using new methods or ideas <sup>11,12</sup> .
process	A series of actions or steps taken to achieve a particular end <sup>13</sup> .
standard	[A c]riterion used as a rule, guideline or definition by which materials, products, processes and services can be determined as fit for the purpose. Standards are recognised as ‘Norms’ in some countries. <sup>14</sup>

## 1.2 Standards work in organisations related to Active and Healthy Ageing

This section of this report explores and analyses briefly work being undertaken in official bodies related to European active and healthy ageing that cover innovative topics related to ICT, active and healthy ageing, and standardisation.

### 1.2.1 The European Innovation Partnership on Active and Healthy Ageing and its innovative practices

The European Innovation Partnership initiative was launched by the European Commission in 2011. At an umbrella level, it is a partnership that can help strengthen European research and innovation. There are several of these partnerships: all bring together relevant actors – from the European Union (EU), national and regional areas, as well as industry and stakeholders – across different policy areas with the intention of tackling “*a specific societal challenge and involv[ing] all the innovation chain levels*”. The European Innovation Partnership on Active and Healthy Ageing (EIP on AHA)<sup>15</sup> was the first EIP created in 2011. The European Innovation Partnership on Active and Healthy Ageing (EIP on AHA)<sup>16</sup> serves “*to foster innovation and digital transformation in the field of active and healthy ageing*.” It focuses on the active and healthy ageing of the people of Europe.

<sup>11</sup> Online Cambridge Dictionary: <https://dictionary.cambridge.org/dictionary/english/innovative> last accessed 24 September 2018. The examples used by the dictionary to illustrate the notion refer to individuals or companies/organisations.

<sup>12</sup> Similarly, Wiktionary describes innovative as being characterised by the “*creation of new ideas or inventions*”, as one meaning of the adjective, or “*forward-looking*” or “*ahead of current thinking*”, as a second meaning. Wiktionary: <https://en.wiktionary.org/wiki/innovative> last accessed 24 September 2018.

<sup>13</sup> Oxford Living Dictionaries: <https://en.oxforddictionaries.com/definition/process> last accessed 24 September 2018.

<sup>14</sup> The PROGRESSIVE project has adapted its definition of a standard from the description of the International Standardization Organization (ISO), and written up in PROGRESSIVE’s “Key Terms and Phrases” internal document.. For the current collection of PROGRESSIVE standards related to ICT on AHA, see: <https://progressivestandards.org/standards-database/> last accessed 29 September 2018.

<sup>15</sup> [https://ec.europa.eu/eip/ageing/about-the-partnership\\_en](https://ec.europa.eu/eip/ageing/about-the-partnership_en) last accessed 24 September 2018.

<sup>16</sup> [https://ec.europa.eu/eip/ageing/about-the-partnership\\_en](https://ec.europa.eu/eip/ageing/about-the-partnership_en) last accessed 24 September 2018.

The Partnership offers a repository of “*innovative practices*”<sup>17</sup>. The repository is described as being “*the basis for the European scaling up strategy*”. The ambition of this collection of innovative practices is that, combined with the resources and expertise brought together by the EIP on AHA, it “*will ensure implementation of innovative solutions for active and healthy ageing on a European scale*”. The more than 150 innovative practices collected by the EIP on AHA is based on work that was conducted before spring 2016 in the early stages of work of the Partnership.

Taking, purely as examples, the most recent eight innovative practices, they have been uploaded by individuals from March 2017 to April 2018. Most are applications/services that are in development and are described as being ready for deployment in a period of one to three years from their time of upload. They are being developed in locations in Italy (2), Portugal (2), and Spain (4). They are for use by people who have had strokes, have Parkinson’s disease, are experiencing psychological traumas, are frail, have chronic or respiratory disease (COPD), have had cancer, have a type of diabetes, or want to get involved in doing exercise in a group setting. Several are mobile health apps.

The EIP on AHA consists of a number of action groups (currently six). They explore specific aspects of active and healthy ageing: examples include integrated care, independent living, and age-friendly environments. The intention, as with the European Scaling-up Strategy in Active and Healthy Ageing<sup>18</sup>, is to enhance the use of good practices. The activities in several of these action groups have been based directly on good practices in their particular fields. As examples, these include work done in relation to the Age-friendly environments action group<sup>19,20</sup>, and work undertaken by both the Act@Scale project on coordinated care/telehealth<sup>21</sup> and the SCIROCCO project on scaling-up integrated care in context<sup>22</sup>.

### 1.2.2 EIP on AHA on Standards

The EIP on AHA originally presented a list of the situation of European and international standardisation on topics related to AHA; the list is described as “*complete*”<sup>23</sup>. The list covers 300 standards that are comprised of almost 100 industry standards, as

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<sup>17</sup> <https://ec.europa.eu/eip/ageing/repository> last accessed 24 September 2018.

<sup>18</sup> European Commission (2015). European Scaling-up Strategy in Active and Healthy Ageing.

<sup>19</sup> This Age-friendly environments action group is often called “D4” by its members, a classification system used in the Partnership: [https://ec.europa.eu/eip/ageing/actiongroup/index/d4\\_en](https://ec.europa.eu/eip/ageing/actiongroup/index/d4_en) last accessed 29 September 2018.

<sup>20</sup> EuroHealthNet [https://ec.europa.eu/eip/ageing/commitments-tracker/d4/dissemination-good-practices-related-healthy-ageing\\_en](https://ec.europa.eu/eip/ageing/commitments-tracker/d4/dissemination-good-practices-related-healthy-ageing_en). See especially <http://www.healthyageing.eu/healthy-ageing-action> last accessed 24 September 2018.

<sup>21</sup> [https://ec.europa.eu/eip/ageing/commitments-tracker/b3/actscale-advancing-care-coordination-and-telehealth-scale\\_en](https://ec.europa.eu/eip/ageing/commitments-tracker/b3/actscale-advancing-care-coordination-and-telehealth-scale_en) last accessed 24 September 2018.

<sup>22</sup> SCIROCCO: <https://www.scirocco-project.eu/good-practices/> last accessed 24 September 2018. Five regions of Europe were each able to name between 4-8 good practices on integrated care; the regions are currently twinning and coaching with a focus on a single practice out of the larger number they each originally targeted.

<sup>23</sup> [https://ec.europa.eu/eip/ageing/standards\\_en](https://ec.europa.eu/eip/ageing/standards_en) last accessed 24 September 2018.

well as technical reports, technical specifications, guidance documents, various databases, scientific methodologies, and tools<sup>24</sup>. The topics are classified into five basic categories: the city, the home, healthcare, education and training, and information and communication technology (ICT) and communication<sup>25,26,27</sup>.

Just 11 of the standards can be directly cross-referenced to the topic of innovation<sup>28</sup>. These 11 examples cover standards development work such as that contained in the Active Assisted Living (AAL) Programme or in the 2017 publication of the General Data Protection Regulation (GDPR)<sup>29</sup>, in EIP on AHA-related proposals for AHA-associated interoperability; or, in relation to technologies, home automation and home grids, including instances like Zigbee<sup>30</sup>, technologies for independent living, and standards or guidelines on semantics<sup>31</sup>.

The standards so far collected by the EIP on AHA are considered to be incomplete and to have too narrow a scope.

The PROGRESSIVE project has therefore done its own uploading of an eventual estimated set of 250 standards to its online platform<sup>32,33</sup>. The standards are organised into eight categories, and range from assistive technologies through to travel, transportation and mobility. They aim to be directly relevant to “active and healthy ageing”, although they are not necessarily “older person specific”. The standards fulfil important criteria such as being inclusive, using co-production methods, and placing emphases on usability and accessibility.

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<sup>24</sup> The precise figures are 301 standards, 96 industry standards, 90 guidance documents, 69 technical reports, and 9 scientific methodologies or tools.

<sup>25</sup> The latter two areas (ICT, and communication) are brought together in a single category.

<sup>26</sup> The most populated areas/categorisations of standards are: ICT and communication (228), the home (128), and healthcare (127). Relatively few standards are mentioned in the ‘city’ category (39), and very few under education and training (8).

<sup>27</sup> The PROGRESSIVE project has commented that, while it finds the list of standards useful, the items are not directly pertinent in terms of the PROGRESSIVE set of criteria for standards appropriate for ICT for older people.

<sup>28</sup> [https://ec.europa.eu/eip/ageing/standards/search/innovation\\_en](https://ec.europa.eu/eip/ageing/standards/search/innovation_en) last accessed 24 September 2018.

<sup>29</sup> Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) (Text with EEA relevance) <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32016R0679> last accessed 24 September 2018.

<sup>30</sup> <https://www.zigbee.org/what-is-zigbee/> last accessed 24 September 2018.

<sup>31</sup> <https://www.snomed.org/snomed-ct> last accessed 24 September 2018.

<sup>32</sup> By 26 September 2018, the number uploaded was 166.

<sup>33</sup> PROGRESSIVE deliverable D3.3 on “Periodic Report on Performance”, submitted on 26 September 2018, recounts details of the standards covered by the project in more detail. The eight categories related to AHA covered include assistive technologies; built environment and outdoor spaces; communication and information; digital health; engagement, inclusion, and citizenship; health and well-being; housing care facilities; and travel, transportation, and mobility. Of the 166 items uploaded, almost two-thirds are indeed standards (93). The three other largest categories are IHE profiles (26), guides or guidelines (13), technical reports/specifications (13). All other types of standards-related documents are small in number: codes of practice, national regulations/recommendations, pre-standards, standardisation requests, and other (21 in total).

### 1.2.2.1 EIP on AHA action groups related to standards

EIP on AHA's action group on independent living solutions has had an especially strong association with interoperability and standardisation/ICT<sup>34</sup>. Its more recent work has been done in liaison with the action group on Age-friendly environments<sup>35</sup>.

At least one event incorporating an interest in standards has been held by the EIP on AHA action groups: it was the 2018 Conference of Partners<sup>36</sup>. Similar topics and developments have been publicised at the AAL Forum 2018, held from 24-26 September 2018<sup>37</sup>.

## 1.3 Other work on standards

Key important areas of standards that could be added are those relating to usability and accessibility, which represent key ethical tenets of relevance to older people. As a result, reference should be made to the whole universe of web standards developed by the World Wide Web Consortium (W3C)<sup>38</sup> and its work on web accessibility<sup>39</sup>. These standards are at the basis of many of user interfaces which provide innovative web-based services.

The W3C lies outside any of the European standardisation organisations, like the European Telecommunications Standards Institute (ETSI), or other international standardisation organisations, such as the International Telecommunications Union (ITU).

### 1.3.1 Work outside of the standardisation organisations

In the "classic" field of standardisation generally, there are sets of new standards that are currently being developed: they can be contrasted with early standards that emerged in preliminary or initial periods of ICT development. For example, the International Organization for Standardization (ISO) has a "fast track" mechanism for standardisation which appears to be growing in use<sup>40</sup>: it is intended to facilitate the creation of important standards in a rapid way. Similarly, the organisation encourages new work item proposals (NWIPs). Indeed, PROGRESSIVE, the project, itself aims to take advantage of this new work item proposal (NWIP) mechanism.

An initial proposal was made by PROGRESSIVE consortium members to examine the work of (standards) profiling organisations, such as Integrating the Healthcare Enter-

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<sup>34</sup> In EIP on AHA terminology, this independent living-oriented action group is called "C2".  
[https://ec.europa.eu/eip/ageing/actiongroup/index/c2\\_en](https://ec.europa.eu/eip/ageing/actiongroup/index/c2_en) last accessed 29 September 2018.

<sup>35</sup> [https://ec.europa.eu/eip/ageing/actiongroup\\_en](https://ec.europa.eu/eip/ageing/actiongroup_en) last accessed 24 September 2018.

<sup>36</sup> [https://ec.europa.eu/eip/ageing/news/main-conclusion-conference-partners-2018\\_en](https://ec.europa.eu/eip/ageing/news/main-conclusion-conference-partners-2018_en) last accessed 29 September 2018.

<sup>37</sup> AAL Forum 2018: <https://www.aalforum.eu> last accessed 24 September 2018.

<sup>38</sup> <https://www.w3.org> last accessed 29 September 2018.

<sup>39</sup> <https://www.w3.org/WAI/standards-guidelines/wcag/> last accessed 29 September 2018.

<sup>40</sup> This observation is undocumented, and the fast track mechanism has been in existence in reality since for around 30 years –perhaps simply less often used than is becoming the trend today.

prise (IHE) and Personal Connected Health Alliance (PCHA) to standards. They have both clearly developed a wide range of standards. INTEROpen, an action group of almost 150 members in the United Kingdom (UK) refers, however, to the work of the profiling organisations on standards – somewhat irreverently – as a “*smörgåsbord*”<sup>41,42</sup>.

On reflection, it was considered that these profiling organisations are not necessarily more innovative than the standardisation organisations themselves. In fact, since profiling organisations bundle and post-process standards to application profiles, they must generally be conservative by definition. The standardisation organisations are, indeed, now increasingly moving in the direction of accepting the importance of involving older people during the design and development of products and services and in the topic of active and healthy ageing.

The AAL Programme on “ageing well in the digital world”<sup>43</sup> is encouraging activities around innovation and ICT – as well as non-technical solutions – for older people. One example of its work is being held at the AAL Forum 2018, and is called the Hack4Elder Advantage Hackathon<sup>44</sup>.

One particular set of organisations appear to be working mostly on innovation, standards, and ICT for AHA. They are the trade unions. Their work has been highlighted in editions of the PROGRESSIVE newsletter.

Last but not least, in industry generally, *de facto* standards are being established that wield a considerable driving force, many of these relate to the field of web services.

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<sup>41</sup> INTEROpen: <https://www.interopen.org/2018/07/19/ihe-hl7-fhir-openehr-a-smorgasbord-of-standards/> last accessed 24 September 2018. INTEROpen is an action group that has grouped together to accelerate the development of open standards for interoperability in the health and the social care sectors in the United Kingdom (UK): <https://www.interopen.org/#> last accessed 24 September 2018.

<sup>42</sup> A “*smörgåsbord*” [or smorgasbord in English] is a buffet meal consisting of a wide range of dishes.

<sup>43</sup> See AAL: <http://www.aal-europe.eu> last accessed 24 September 2018.

<sup>44</sup> See AAL Forum 2018 <https://www.aalforum.eu>, the Hack4Elder Advantage Hackathon was held on 22-23 September 2018 <https://hack4age.com> last accessed 24 September 2018.

## 2 Innovative Approaches

These innovative approaches are those which are emerging from the field of ICT for AHA in relation to standardisation. Many have been covered by investigatory work undertaken in the PROGRESSIVE project, and reported in its regular monthly newsletters. The types of innovative approaches, and approaches to innovation, covered in the main reports and activities of the PROGRESSIVE project, have thus been assessed in detail in this chapter. The chapter that follows (chapter 3) assesses the implications of these innovative approaches for the future.

### 2.1 Innovative approaches in general and in relation to standardisation in ICT for AHA

What follows is a list of important topics in the field of innovative approaches to standardisation for ICT for AHA:

- Ethics.
- Use cases and interoperability.
- Co-production.
- Smart housing.
- Standards, including the standardisation process.

The sequence includes the philosophy ('ethics') underpinning PROGRESSIVE (D2.1): this has been tackled as a first item in this chapter, since it is these ethics that frame the entire approach of the project towards what are the important standards in ICT for AHA: the ethics are supported by a rigorous attempt to include viewpoints of older people on important standards. This argument is supported by an examination of the kinds of use cases that are most relevant to PROGRESSIVE (see D7.1/D7.2); an assessment of the importance of interoperability (D7.2); a concentration on the significance of co-production methods (D9.1); a shift towards the field of 'smart housing' with a focus on older people (D10.1); and the way in which standards and the standardisation process can respond to these challenges.

In chapter 3, the implications of such innovations in the particular area of work is explored from two specific viewpoints:

- The main message of innovative approaches for the particular topic **today** e.g., co-production or smart housing.
- Implications of innovative approaches for the **future** for the particular field e.g., co-production or smart housing.

Wherever possible, the way in which the approaches can be applied innovatively in the standardisation field relevant to ICT for AHA is highlighted. The relationship with standardisation, in terms of the way in which the Standardisation, Innovation and Research (STAIR) platform on AHA (STAIR-AHA) picks up on these issues, is described in chapter 3.

The way in which these issues can be taken on in the future is pulled together in chapter 4.

### 2.1.1 Ethics underpinning ICT and active and healthy ageing

**Description:** Deliverable D2.1 provides guidance on ethical tenets/principles that should be observed and respected in standardisation work around ICT for AHA, which has impact on further work packages within PROGRESSIVE.

D2.1 (referred to here as the ‘ethics report’) takes a broad view of the ethical dimension in the production of standards around ICT for AHA. It places developments in ICT for AHA in two contexts: worldwide population ageing, and increasing digitisation and connectivity. As the ethics report identifies, ICT-based products and services can contribute to AHA and help older people to carry out daily activities, monitor their health, create social networks, increase participation in society and augment safety.

The nine ethical tenets, laid out as having key relevance for ICT for AHA, are:

- Accessibility and accountability.
- Affordability.
- Autonomy and empowerment.
- Beneficence and maleficence<sup>45</sup> (i.e., do good; do no harm).
- Care, protection, and support.
- Equality, equity, and justice.
- Inclusion, non-discrimination, and social impact.
- Interoperability.
- Privacy, safety, and security.

#### 2.1.1.1 Innovative approaches: updating the vision of “older people” in policy and practice

The ethics report points out that, whereas an ageing population is often associated in popular opinion with economic challenges (e.g., payment of pensions; the need for care and support), it is actually the fact that **healthy older people are in many ways net contributors to economies**<sup>46</sup>; in any case, as citizens, all older people deserve community and societal support. The **reality of health and income inequalities includes a gender dimension**<sup>47</sup>, which innovation and standardisation must also address more adequately than they do at present.

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<sup>45</sup> Terminology initially drawn from one of the classic volumes on ethics and health: Beauchamp TL & Childress JF (2013). Principles of Biomedical Ethics. Oxford: Oxford University Press, Seventh Edition.

<sup>46</sup> Example positions of this sort are the Age UK Chief Economist's Report Spring 2014 Based on analysis of the Office for National Statistics (ONS) Labour Force Survey, ONS Annual Survey of Housing and Caring, ONS Economic Accounts, Understanding Society, Pacey Annual Survey of Child Minding Fees <https://www.ageuk.org.uk/latest-press/archive/61-billion-the-economic-contribution-of-people-aged-65-plus/> last accessed 29 September 2018.

<sup>47</sup> Work on standards related to the United Nations' sustainability development goals is increasingly emphasising gender dimensions in standards. As of 2016, this was highlighted in documentation from the United Nations' Economic Commission for Europe (UNECE): [https://www.unece.org/fileadmin/DAM/trade/wp6/documents/2016/ECE\\_CTCS\\_WP6\\_2016\\_03E.pdf](https://www.unece.org/fileadmin/DAM/trade/wp6/documents/2016/ECE_CTCS_WP6_2016_03E.pdf) last accessed 29 September 2018.

In looking at the ethical dimensions of standardisation, the ethics report points to the need for **a change in ageist and dismissive attitudes so that there is more openness to inclusive ways of thinking**<sup>48,49</sup> that value older people and their potential contribution as co-producers of standards. The notion of AHA – taken up in full force by European institutions since around 2000 – was itself originally an innovation, since it tried to find an alternative approach to previous views of ageing, such as disengagement theory<sup>50</sup> and previous emphases on senescence, dependency, negative language, and ‘special’ provision for older people.

It is important to acknowledge that AHA must **embrace individuals’ capabilities and potential on their own terms** so as to empower older people across the whole range of health and activity. The ethics report states that:

even allowing for the fact that a minority of older people can be described as ‘dependent’ [...] does not detract from obligations (as indicated in the Convention for the Rights of Persons with Disabilities) to ensure that people’s wishes are taken into account, regardless of age, disability, etc. (p. 11).

This position has already been stated in, and is reinforced by, the European Parliament’s 4 July 2017 resolution on European standards for the 21<sup>st</sup> century<sup>51</sup>, which calls for **the inclusion of people of all abilities in the development of standards**<sup>52</sup>. This viewpoint represents an innovation in thinking about the appropriate and effective creation of standards. In late 2018, the Health Council continues to work along these lines<sup>53</sup>.

#### 2.1.1.2 Innovative approaches: Responsible Research and Innovation

In many ways, the PROGRESSIVE ethics report coincides with the latest thinking at a policy-related level in Europe. Its call for a new ethical framework for standards and standardisation begs the question as to how innovations in ICT can be brought together with developing social norms i.e., behaviour and attitudes. The ethics report points out that **‘effective innovation[s], like effective standards, are dependent on buy-in from those expected to use them’** (p.12).

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<sup>48</sup> The importance of the WHO’s anti-ageist policies was highlighted in the context of the EIP on AHA Conference of Partners in February 2018: [https://ec.europa.eu/eip/ageing/news/conclusions-1st-day-conference-partners-27th-february-2018\\_en](https://ec.europa.eu/eip/ageing/news/conclusions-1st-day-conference-partners-27th-february-2018_en) last accessed 29 September 2018.

<sup>49</sup> This thinking is picked up again in PROGRESSIVE deliverable, D9.1, on co-production.

<sup>50</sup> Cumming E & Henry WE (1961). Growing Old. New York: Basic Books, p. 227.

<sup>51</sup> European Parliament resolution of 4 July 2017 on European standards for the 21st century 2016/2274 (INI) <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P8-TA-2017-0278+0+DOC+XML+V0//EN> last accessed 24 September 2018.

<sup>52</sup> See the resolution’s example articles, such as Articles 64, 71 and 81 (the latter two of which are Recommendations).

<sup>53</sup> On 11 September 2018, the Austrian Presidency of the European Union emphasised the need for taking forward a catalogue of standards, which was one of the several Recommendations made by the European Parliament in 2017.

In this respect, the ethics report reflects or echoes the European Commission's championing of the Responsible Research and Innovation (RRI) approach to ethics which encourages researchers to adopt a holistic view of their research area. It also places an emphasis on notions of societal reflection and engagement (the approach requires that **societal actors work together** across the whole spectrum of research and innovation **to produce appropriate research results**)<sup>54</sup>. The ethics report discusses the possibility for **products and services** to become obsolete or fail in their purpose if they are not **sufficiently usable or accessible in practice (including financially accessible)**: hence, **design for all**<sup>55</sup> can play a role in safeguarding older people against such negative outcomes.

### 2.1.1.3 Innovative approaches: accessibility, design for all, and interoperability

It is often said that digitisation needs, and is driven by, innovation at a rapid rate<sup>56</sup>. Any innovation which takes place at speed, and in competitive markets, risks potentially omitting the RRI approach. When used intelligently, however, **standardisation processes that reinforce the application of stringent standards, can ensure that this oversight does not occur**. For example, the ethics report identifies that the new ISO/TC 314 on Ageing Societies<sup>57</sup>, with its 18 participating, and 13 contributing, members<sup>58</sup>, includes both accessibility and design for all as two main areas of relevance for ageing and for older people.

More specifically, **design has cost implications**. The ethics report points to the risk that specialised and niche products incur relatively higher development costs than do mass-produced ones: it calls therefore for products and services to have built-in flexibility or reconfigurability to meet personal needs: to be designed for all. As a result, **innovation in production design and methods** could also benefit both older people and people with specific disabilities.

For ICT to work well for older people **there needs to be a good level of interoperability**. The ethics report places an emphasis on this connectedness. It cites the need for technical, semantic, legal, and organisational interoperability. Because innovation often arises from the work of a myriad of 'developers', **interoperability becomes key in ensuring the efficacy and accessibility of new products and services that can benefit AHA**.

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<sup>54</sup> An expansion of such collaboration in the AHA field might incorporate cross-generational "twinning" e.g., between digital natives/millennials and older people.

<sup>55</sup> See the section of the PROGRESSIVE ethics report on co-production.

<sup>56</sup> This is a view taken in recently published reports by major business consultancies, such as Deloitte, EY, McKinsey, and PCW, as well as by the World Economic Forum: <https://www.weforum.org> last accessed 29 September 2018.

<sup>57</sup> <https://www.iso.org/committee/6810883.html> last accessed 24 September 2018.

<sup>58</sup> <https://www.iso.org/committee/6810883.html?view=participation> last accessed 24 September 2018.

There are concerns which also extend to the **sharing of data, now regulated by the 2017 GDPR<sup>59</sup>. Innovations both in ICT and in services must build in safeguards for personal data.** The ethics report points, however, to the **vulnerability of legacy equipment** in this respect. Current thinking on personal data and who should control it **mirrors changing attitudes to the relationship between individuals and corporate and social entities.** With respect to ICT for AHA, keen attention to **the nature, needs and aspirations of older people requires further changes in attitudes and behaviour.** Co-design implies that such changes are best achieved through a two-way process.

#### **2.1.1.4 Innovative approaches: recognising the importance to society of older people, including the oldest old**

The ethics report reflects on the paucity of statistics that are available on the oldest old; the increasing need for individuals to keep working later into life; and the drop-off in access to new technologies, and support in using them, as people leave work and grow older. **These realities mean that (today) the very oldest people, who could most benefit from innovations in ICT, are among those least likely to be taken into consideration during their development or to have access to the final products.**

The implication for (good) practice is that, if ICT is to help people to achieve active and healthy ageing on their own terms, there need to be **changes in the understanding of ageing, and greater awareness of the wide range in preferences, needs and abilities of older people.** These new approaches need to feed into the processes of innovation.

#### **2.1.2 Use cases and interoperability**

**Description:** The work of WP7 relates to use cases and interoperability in the context of different service models. Deliverable D7.1 'Use Cases Defined' provided a starting point for PROGRESSIVE discussions about use cases. It focused on ICT to support AHA, and particularly in terms of smart homes and smart housing. Deliverable D7.2, on 'Interoperability Frameworks for Use Cases in Different ICT and Service Contexts', proposed and applied a European interoperability framework on use cases in the fields of smart housing and well-being (it called this framework the Generalised Refined eHealth European Interoperability Framework ((g)ReEIF)). The two reports are referred to here as the 'use case report' and the 'interoperability report'.

**Use cases** may be used both to **explore the impact of innovations and to hypothesise the potential impact of innovations that are still under development.** Use cases may be used by standardisation organisations and groups<sup>60,61</sup>.

<sup>59</sup> Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) (Text with EEA relevance) <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32016R0679> last accessed 24 September 2018.

<sup>60</sup> Although designing a use case does not necessarily imply using a co-production methodology, it may fit well with the ten co-production methods identified by PROGRESSIVE as being of relevance to ICT for AHA.

PROGRESSIVE's use case report observed that **use cases may be used in situations that are relatively concrete** and that generally cover real-life issues, or they **can also be applied in hypothetical or idealised cases** to enable modelling or developmental work. PROGRESSIVE has explored the use of use cases largely as **structured narratives that encourage a general understanding of how ICT might impact upon AHA**. The consortium also acknowledged that use cases can be **schematic or diagrammatic portrayals of the uses of technology**.

The **use cases** selected for inclusion in the use case report drew out several points about **innovation**. The example of Mijn Huis Op Maat ('My Home Fits')<sup>62</sup>, an online platform for checking of possible improvements to one's home for independent living, points to the innovative approach of **support for self-checking by older people of the use of possible ICT solutions in their own homes**, with the intention for them to **increase their individual or personal autonomy**.

Similarly, another use case describes global positioning bracelets used by the French Red Cross, partnered with Bluelinea<sup>63</sup>, to improve the autonomy and safety of people living with a degree of dementia, again potentially increasing personal autonomy. (This innovative use of geolocation technologies is being trialled or introduced in other physical or geophysical locations. It points not only to the re-orientation of useful ICT originally developed for other purposes, but also to innovation or re-orientation in general attitudes to the ethics and efficacy of the use of such technologies.)

The use case example of the 3Rings smart plug<sup>64</sup> enables remote monitoring of an older person's use of various devices in the home. It shows a **change in attitudes towards ICT for the protection, monitoring, or connection between older people who may have vulnerabilities and the family or personnel or services that actively care for them**.

The use case of networked living in the neighbourhood (Networked Living in the Neighbourhood [or VWiQ in German], in Hamburg, Germany<sup>65</sup>) points to the confluence of innovation, interoperability, and the need for ease of use/control. As a result, **older people can benefit from the application of ICT for everyday living, as they grow older**. This use case was explored in-depth in PROGRESSIVE's interoperability report (D7.2) in two settings: smart homes specifically, as well as health and care.

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<sup>61</sup> Depending on a person's area of experience or expertise, some approaches to standardisation may appear to be innovative and others not. Innovation often occurs when an approach that is commonplace in one discipline is adopted or absorbed in another field.

<sup>62</sup> <https://www.mijnhuisopmaat.nl> last accessed 24 September 2018.

<sup>63</sup> <https://bluelinea.com/teleassistance-domicile-senior/bracelet-dautonomie-bluegard/> last accessed 24 September 2018.

<sup>64</sup> <https://www.3rings.co.uk> last accessed 24 September 2018.

<sup>65</sup> <http://www.vernetztes-wohnen-hh.de/> last accessed 24 September 2018.

Another way of aligning the everyday, lived experience of older people with developments in ICT is the **use of illustrative scenarios based on imagined real lives**. The use case report (p 14), comments on one such use. A 2011 booklet produced by the BRAID project (BRAID 2011<sup>66</sup>) presented 30 different scenarios of four different life settings in which older people might gain support through ICT. These are described in the use cases report as corresponding to the four main areas of life in which older people may need to be supported as they age. By keeping such scenarios fresh, and in line with the lived experiences of older people in different social and employment settings, this **scenario methodology** may be used to model the effects – including ethical implications – of ICT innovations in different contexts. Several current initiatives are similarly applying use cases, personas, and scenarios in the European context (see the EIP on AHA Blueprint<sup>67,68</sup> and NESTORE examples<sup>69</sup>).

In PROGRESSIVE, with regard to interoperability specifically, an interoperability framework suited for analysing services in the ICT for AHA field has been proposed by PROGRESSIVE under the provisional name of “Generalised Refined eHealth European Interoperability Framework - (g)ReEIF”. The framework was developed based on an existing interoperability framework that had previously been endorsed for just one service, eHealth. The main principles and the practical applicability/workability of the **generalised interoperability framework are demonstrated in the interoperability report through the analysis of ICT for AHA use cases in two areas**: smart housing and well-being. This application of the (g)ReEIF technique is understood to be among the first in the AHA-related field<sup>70</sup>.

Some of the findings of this interoperability report may **become instrumental for the STAIR-AHA platform** that will be initiated at the end of October 2018. Its aim is to

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<sup>66</sup> BRAID (2011). *ICT & Ageing Scenarios*. Edited by UNINOVA – CoDIS Group: Luis M. Camarinha-Matos, João Rosas, Filipa Ferrada, Ana Inês Oliveira; University of Amsterdam – FCN Group: Hamideh Afsarmanesh, Miriam Briemann with inputs from the projects AALIANCE, CAPSIL, ePAL, SENIOR, and BRAID consortium.

[http://www.healthyageing.eu/sites/www.healthyageing.eu/files/resources/BRAID\\_Ageing\\_scenarios.pdf](http://www.healthyageing.eu/sites/www.healthyageing.eu/files/resources/BRAID_Ageing_scenarios.pdf)

<sup>67</sup> [https://ec.europa.eu/eip/ageing/blueprint\\_en](https://ec.europa.eu/eip/ageing/blueprint_en) last accessed 24 September 2018. Several upcoming EIP on AHA workshops, due to be held in November and December 2018, will explore dedicated ICT-related personas and scenarios. At the present time, they do not include matters relating to standardisation.

<sup>68</sup> The European Blueprint on Digital Transformation of Health and Care for the Ageing Society (the ‘Blueprint’), which dates from December 2016, is to reflect a shared policy vision on the digital transformation of health and care for the ageing society. Among its 2017-2018 goals are to identify key relevant use cases and scenarios to be targeted for large-scale deployment of this digital transformation. The targets involve reaching out to more than 50 regions, ensuring a total of €500 million investment, and contacting 4 million more people in Europe who will benefit from digital innovations in active and health ageing <https://ec.europa.eu/digital-single-market/en/blueprint-digital-transformation-health-and-care-ageing-society> last accessed 29 September 2018.

<sup>69</sup> <https://www.nestore-coach.eu/web/ns/home> and <https://www.nestore-coach.eu/web/ns/use-cases> last accessed 24 September 2018.

<sup>70</sup> A presentation on 25 September 2018 at the AAL Forum 2018 by members of the PROGRESSIVE team described the application of the (g)ReEIF technique, among other initiatives: <https://www.aalforum.eu/programme/full-programme/tues-1400-1530/?workshop=1> last accessed 24 September 2018.

continue the work of PROGRESSIVE, in particular in supporting the expression of the voices of older people<sup>71</sup>.

### 2.1.3 Co-production and inclusion

Description – D9.1 is a set of guidelines for user co-production in standardisation, geared particularly towards national level. National standardisation committees are encouraged to reach out to underrepresented user groups and solicit their opinions on relevant standardisation questions. The guide offers advice on when and how to solicit input from stakeholders, using a wide variety of co-production methods. By facilitating these inclusive, participatory approaches, PROGRESSIVE argues that it will improve the quality of standards and encourage standardisation processes to become more legitimate to wider groups of stakeholders/end-users.

Deliverable D9.1 is referred to here as the ‘co-production report’. The work covered by the co-production report identified that, in the field of standardisation, it is now becoming much more widely accepted that it is important for **any new standardisation initiative to draw on the widest possible representation of stakeholder interests**.

For a number of reasons, unfortunately, **it is not always easy in practice to achieve this goal. Some stakeholders, too, are much more difficult to engage than others**. More strategic, therefore, would be to ensure that this innovation is embedded in the work of (national) standardisation committees.

In the case of standards for ICT for AHA, PROGRESSIVE has identified in several work packages (e.g., on ethics and on good practice) **the importance of involving older people on the grounds of justice, validation, and the improvement of standards so that they have a better ‘fit’ with older people’s lives**. The project considers that obtaining the views of older people is fundamental to developing effective standards in ICT for AHA. Yet, with few exceptions, older people – especially those in minority groups and/or with health conditions which present barriers to involvement – are among those groups of people which are harder to engage in standardisation processes.

The co-production report specifies how co-production methods can be taken up in (national) standardisation committees. Hence, **by using innovative (co-production) methods, innovations can be brought into the standards themselves**. PROGRESSIVE argues that a part of this innovation can be the addition of the perspectives/insights of the actual older people who will, in future, be users of the relevant ICT.

There are at least nine different methods of co-production: they are listed here in alphabetic order. They include customer journeys; Delphi exercises; the development of personas; focus group discussions; ‘game storming’ workshops; gaming; problem tree analysis; photoscan; and users/citizens’ panels. It is good for standardisers to understand what the methods are; why, when, and how to use them; what an example of a

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<sup>71</sup> See section 3.2 of this report.

particular method looks like, some samples for further reading, and special hints for its use. An increasingly popular co-production method being used is persona development. A 2013 example is shown below; more contemporary examples are available in late 2018 in the work of the EIP on AHA Blueprint team.

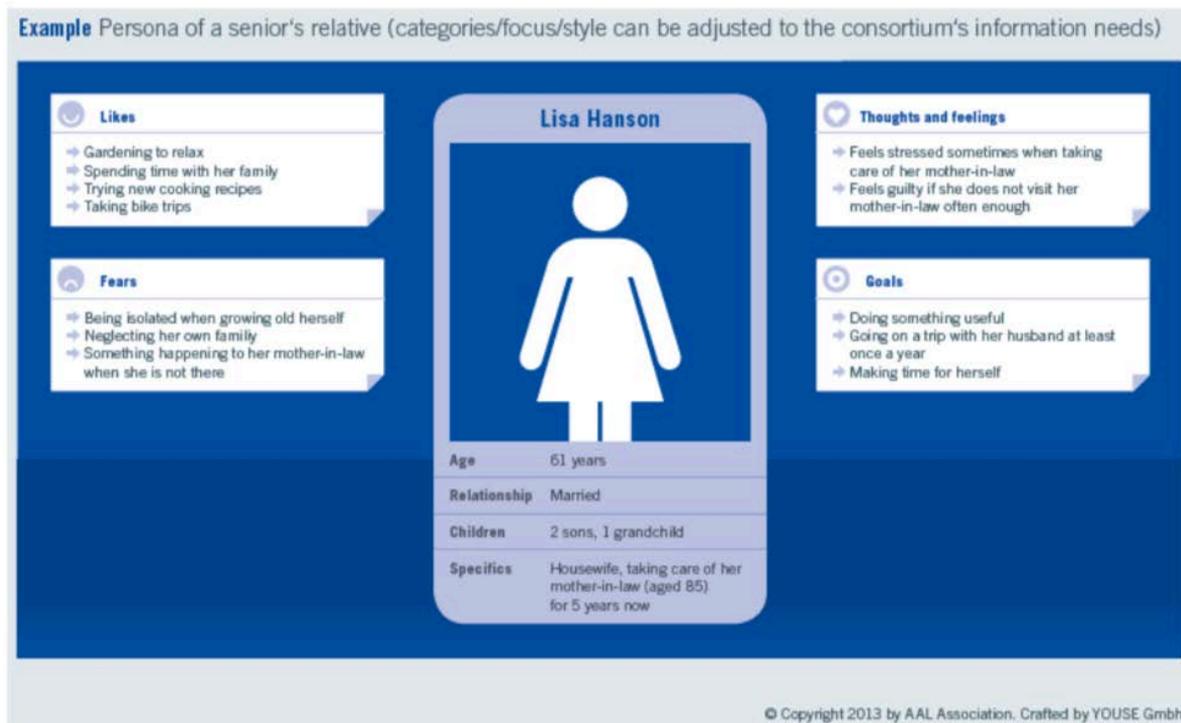


Figure 2: Persona of an older person's relative<sup>72</sup>

### 2.1.4 Smart homes and smart housing

**Description:** The D10.1 'Guidelines/Roadmap for Standards around ICT for AHA for Smart Homes that are age-friendly' examines standards relating to the application of ICT that contribute to the creation of age-friendly smart homes and environments.

The idea of optimising housing to accommodate the demands of later life is an old one (whether applied to purpose-built housing or adaptations to existing properties, including embracing technological developments and design concepts)<sup>73</sup>. The application of ICT to make homes generally more safe, comfortable, sustainable, and connected is a more recent development.

The smart homes report on age-friendly smart homes and environments (called here simply the 'smart homes report') identifies the growing interest in applying ICT in smart homes in the specific case of age-friendly homes and environments. Given the global increases in longevity (including people living longer while needing some kind of med-

<sup>72</sup> Extracted from the 'co-production report', p.20. Original source: AAL (2013) Guideline: The art and joy of user integration in AAL projects. [http://www.aal-europe.eu/wp-content/uploads/2015/02/AALA\\_Guideline\\_YOUSE\\_online.pdf](http://www.aal-europe.eu/wp-content/uploads/2015/02/AALA_Guideline_YOUSE_online.pdf) last accessed 29 September 2018.

<sup>73</sup> K. Croucher, L. Hicks, & K. Jackson (2006) Housing with care for later life. A literature review. York: Joseph Rowntree Foundation. <https://www.jrf.org.uk/sites/default/files/jrf/migrated/files/9781859354384.pdf> last accessed 24 September 2018.

ical or social support), and continuing advances in technologies, the innovations identified in the smart homes report can be highly significant.

#### 2.1.4.1 Innovative approaches: the combination of ‘smart home’ and ‘age-friendly’

The smart homes report points out that the rapid speed of technological developments makes it hard to pin down either a common definition or minimum requirements for an age-friendly smart home. In refocusing the definition of a smart home from a technological-based approach to one that is more user-centred, **PROGRESSIVE has created a new definition which combines the concepts of ‘smart home’ and ‘age-friendly’**: a home “*which features automated devices and communication systems that can assist security, management and energy efficiency, and can enable people to access information and use services - including those relating to care and support.*”

The smart homes report looks at standards, projects and initiatives in age-friendly smart home environments. **Standards and guidance are often developed in response to innovations in technologies that are happening at speed** and, as a result, may forego consideration of the fundamental ethical tenets that ought to guide their development.

#### 2.1.4.2 Areas of importance in age-friendly smart housing and smart homes

**Innovations may be made in response to specific identified needs** that relate to ageing or disability, or **innovations** made for some other purpose **may be appropriated for use in age-friendly smart environments**.

The smart homes report therefore **looks at these two sources of innovation via the consideration of a set of ethical tenets**. These ethical tenets are identified as applicable to smart homes that can enable active and healthy ageing:

- Autonomy/empowerment.
- Inclusion and non-discrimination.
- Accessibility and usability.
- Care protection and support.
- Interoperability.
- Privacy, safety and security.<sup>74</sup>

For example, in considering the first ethical tenet of autonomy and empowerment, illustrations are given of various projects where ICTs have been deployed specifically to strengthen people’s independence and/or autonomy.

The discussions of concerns such as inclusion/non-discrimination, and accessibility/usability point to the **essential need for innovations in how standards and guidance are produced so that they align as closely as possible with the actual**

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<sup>74</sup> These six ethical tenets are an adaptation of the nine originally cited in PROGRESSIVE’s D2.1.

**needs of older people and the services that work with/for them.** This includes taking on board methodologies for co-production and design for all.

The extension of the definition of smart homes to include care and support brings into **greater focus innovations in telecare and telehealth than might be expected in smart homes that are not age-friendly.** The smart homes report therefore considers examples of personal telecare devices and platforms both within and outside the home.

In part because of the inclusion of health/care devices and the emphasis on support in age-friendly smart homes, the smart homes report observes that **issues of interoperability are even more relevant in smart homes so as to ensure that the technologies will be effective, private, safe, and secure.**

## 2.2 Summary

Four innovative approaches to ICT and AHA have been described in this chapter. They are ethics, use cases and interoperability, co-production and inclusion, and smart housing. The chapter stresses the newness of some of the thinking in the four areas. Clearly, at least one of these fields is a very ancient area of philosophy – ethics: it is now, however, turning its attention to age-friendliness in ICT. The chapter that follows (chapter 3) assesses the implications of these innovative approaches both in the present and for the future.

### 3 Implications of these Innovative Approaches

Chapter 3 describes how each of the previous topics – ethics, use cases and interoperability, co-production and inclusion, and smart housing – has implications for innovative approaches in ICT for AHA standardisation. It categorises the main messages emerging from each mostly into two sets<sup>75</sup>: one set relates to contemporary society and the other set relates to future developments. They are each entitled: “Main messages on innovation and \_\_\_ today” and “Main messages on innovation and \_\_\_ for the future”. In certain cases, the importance of exploring the implications of specific technologies is highlighted: examples include robotics and artificial intelligence (AI). It completes the approach by expressing the importance of the Standardisation, Innovation and Research (STAIR) platform for developing and introducing new areas of standardisation around ICT for AHA.

#### 3.1.1 Ethics, standardisation, and ICT for AHA

In general, in situations where societal barriers or social norms have decreased the autonomy or self-determination of older people, new applications and services have the positive potential to rebalance personal capacity. This includes the situation of people who have cognitive impairments: here, innovation in ICT, approaches to care and societal expectations offer prospects of new means and methods of communication. Yet there is an **apparent paradox** that some ICT applications may have the potential to increase isolation or exclusion for some people. This **challenge requires serious consideration by innovators**. For example, in relation to personal autonomy, certain decisions may be influenced, moderated, or even taken over by technologies.

Among the most recent ICT impacting AHA, the growth in robotics, pervasive technologies, and applications of AI have given rise to questions of ethics. **Innovations in these three – and other – fields have the capacity both for doing good (‘beneficence’) and doing bad (‘malfeasance’)**.

##### Main messages on innovation and ethics today

- **Shift towards more open, inclusive ways of thinking and acting:** Needs a change in what have previously been ageist and dismissive attitudes. AHA must embrace individuals’ capabilities and potential in their own terms.
- **Change mind-sets:** Change attitudes and behaviour towards ageing, raise awareness of the wide range in preferences, needs and abilities of older people, and ensure that these notions are fed into the processes of innovation.
- **Involve older people:** Involve the very older people who could most benefit from innovations in ICT, but also incorporate cross-generational approaches.

<sup>75</sup> On occasions, just the future set of implications is laid out.

- **Adopt a set of appropriate principles to encourage buy-in:** Consider use of an appropriate set of ethical principles ('ethical tenets') in term of ICT for AHA. For example, these can be the nine ethical tenets developed by PROGRESSIVE (in its deliverable D2.1).

### Main messages on innovation and ethics for the future

- **Follow the resolution(s) of the European Parliament on standardisation:** Adopt the recommendations of the European Parliament's 4 July 2017 resolution on standards for the 21st century which advocates including people of all abilities in the development of standards.
- **Apply the content of the Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016** on the protection of natural persons with regard to the processing of personal data and on the free movement of such data. Ensure that older people, and the services they use, understand and apply these principles.
- **Work together using co-production methods:** Work together to produce acceptable results e.g., in standards as well as in research and innovation<sup>76</sup>.
- **Focus on innovation in production design and methods:** Enable design to benefit older people and people with specific disabilities.
- **Consider certain paradoxes:** Explore, through RRI, the implications of making certain technological and societal choices (since innovations in fields like ICT for AHA have the capacity both for doing good and doing bad).
- **Focus on some specific areas of new technologies:** Explore the implications of robotics, pervasive technologies, and AI for older people, and for standardisation of ICT for AHA. Other emerging technologies may need similar investigation/exploration.
- **Focus on interoperability:** Expand the application of interoperability (since it is key to ensuring the efficacy and accessibility of new products and services that can benefit AHA).
- **Explore data sharing:** Explore what it means societally, and for AHA in particular, that the concept of data sharing is altering<sup>77</sup>.

### 3.1.2 Use cases and interoperability

Among lay people/end-users, there is a general lack of knowledge or understanding of standardisation as a process and of the significance of related concepts, such as interoperability and ethical frameworks. As a result, **innovative ways of communicating clear, simple, and engaging explanations is becoming an essential component in moving standardisation beyond standardisation communities towards increased engagement by ordinary people, for example, older people.**

The use case report argues that use cases can provide **innovative ways of explaining concepts so that they can more readily be understood by lay people, i.e. people who have a stake in the effectiveness of standards and interoperability** but who do not necessarily have specialist or detailed knowledge of these processes. While use cases can be particularly useful for older people, they may also provide

<sup>76</sup> See the PROGRESSIVE messages on co-production in the relevant section of this report.

<sup>77</sup> See, for example, the implications of some of the use cases identified by PROGRESSIVE for consideration that may pose concern in terms of surveillance and monitoring.

clear explanations to others who work with older people to maintain and enhance their living environments.

Attention is also drawn to much simpler explanations, e.g., through the use of video, such as a YouTube explanation of interoperability produced by the Interoperability Solutions for European Public Administrations, Citizens, and Businesses (ISA) Programme. In it, the analogy of an orchestra harmoniously playing music together accompanies the explanation that interoperability is about “machines [that] can talk to each other”<sup>78</sup>.

For innovations in ICT for AHA to be beneficial for older people (rather than irrelevant or detrimental), the PROGRESSIVE consortium has taken the view that **older people’s engagement is essential in the processes of developing and establishing standards and guidance**. This approach is reiterated in these two reports: it is seen as increasingly imperative to seek the opinions of older people and their representatives on the relevance and relative importance of use cases in PROGRESSIVE-related policy areas. In addition, it is **viewed as increasingly important to investigate and assess those issues that older people themselves consider to be significant and have an ethical implication: their solutions can probably – as a result – be best expressed through good practices**<sup>79</sup>.

The implication of this for sustainable innovation and beneficent policy development is that for ICT to be beneficial for AHA, **future horizon scanning and planning requires innovative ways to involve older people in processes**.

### 3.1.2.1 Main messages on innovation, use cases and interoperability today

- **Support self-checking by older people on standards**: Encourage older people to use ICT solutions in their own homes, thereby increasing their individual or personal autonomy, e.g., by using appropriate tools and techniques.
- **Encourage engagement in standardisation processes**: Enhance older people’s engagement with the processes of developing and establishing standards and guidance (see co-production and STAIR).
- **See what is important to older people themselves**: Emphasise the importance of investigating and assessing those issues that older people themselves consider to be significant and of ethical importance e.g., personal autonomy, and what they would mean in terms of good practice(s).
- **Focus on clear, simple communication**: Develop innovative ways of explaining concepts such that they can more readily be understood by lay people who have stakes in the effective-

<sup>78</sup> Similarly, the ISO home page uses the analogy of a “symphony”: <https://www.iso.org/standards.html> last accessed 29 September 2018.

<sup>79</sup> Following the observations in these reports, and advice from external experts, PROGRESSIVE built on consultation and guidance from a group of task force members (representatives of associations and organisations working with and for older people) more proactively into its work. This guidance has been reported largely in a series of PROGRESSIVE newsletters published since summer 2018. The opinions that these experts have expressed have reinforced the initial insights of these two reports.

ness of standards and interoperability relevant to ICT for AHA, e.g., use of use cases or of videos.

### 3.1.2.2 Main messages on innovation, use cases and interoperability for the future

- **Innovate ways of explaining concepts so that they can more readily be understood by lay people/older people:** Involve people who have a stake in the effectiveness of standards and interoperability.
- **Get older people engaged with the processes of developing and establishing standards and guidance:** Apply PROGRESSIVE ideas on co-production, STAIR, and the future of STAIR.
- **Investigate and assess those issues that older people themselves consider to be significant and of ethical importance e.g., personal autonomy, and what they would mean in terms of good practice(s).** Set up task forces and advisory boards that have older people and their representatives as members.
- **Involve older people in future-oriented processes:** Explore examples like future horizon planning and scanning.
- **Apply the (g)ReEIF technique in settings other than purely health and care:** Explore examples like employment; transportation and travel; and social inclusion.
- **Consider introducing the (g)ReEIF technique into the STAIR platform context:** See the section on the STAIR platform; consider the planning of the future agenda(s) of the STAIR and other standardisation-related work plans.

### 3.1.3 Co-production and inclusion

PROGRESSIVE has developed a guide on user co-production in standardisation for ICT in AHA which applies to national standardisation committees. It encourages standardisation committees to expand their competencies in user co-production and increase their outreach to under-represented user categories.

For each of ten suggested methodologies, the guide describes the method and why and how it should be used, and at what point in the process, and it gives hints and examples of the use of each.

The guidance provided is indicative rather than definitive, and committees are encouraged to innovate further by considering other co-production methods and uses.

PROGRESSIVE is proposing that the way forward on co-production can be through the launch of a STAIR platform<sup>80</sup>, an initiative to get the standardisation body, CEN-CENELEC, and their associated national committees, to adopt co-production methods in standardisation work.

#### Main messages on co-production and innovation today

<sup>80</sup> See a related section of this report on the proposed STAIR platform.

- **Support stakeholder engagement in standardisation:** Start to apply specific methods of involving stakeholders in standardisation.
- **Use co-production methods in standardisation:** Use innovative co-production methods to bring innovations – including the views of older people – into standards themselves.

#### **Main messages on co-production and innovation for the future**

- **Use a guide on co-production in standardisation:** Apply and use the PROGRESSIVE guide on user co-production in standardisation for ICT in AHA in national standardisation committees.
- **Apply up to ten co-production methods in standardisation:** Use the PROGRESSIVE guide on user co-production to choose which of the ten methods laid out in the guidelines can best be used and at what point in the standardisation process.

### **3.1.4 Environments and homes conducive to active and healthy ageing**

In the context of rapidly changing and developing technologies, innovation and obsolescence create a constantly changing field of technologies, many of which might be used to create age-friendly smart homes.

In its smart homes report, PROGRESSIVE advocates an innovative way of looking at technologies. It **adopts the lens of a set of ethical tenets that are (older) person-centred (rather than just person-centred).**

This report breaks new ground in two ways:

- By bringing together the concepts of smart homes and age-friendly environments at a detailed level of standardisation<sup>81</sup>.
- By enabling consideration of how standards across a wide range of technologies can work together to produce environments conducive to active and healthy ageing.

This approach has implications for projects and initiatives that are aiming to produce age-friendly smart homes. It particularly relates to:

- How older people are involved in the process of designing and producing age-friendly smart homes.
- The need to focus on interoperability.

#### **Main messages on age-friendly smart housing and innovation for the future**

- **Use a new definition of “age-friendly smart homes”:** Apply the PROGRESSIVE new definition of “age-friendly smart homes”.
- **Consider a variety of options for age-friendly smart homes:** Age-friendly smart homes are homes that may place more emphasis on telecare, telehealth, and interoperability than do smart homes generally.
- **Use standards that respond to technologies that are developing at speed:** Think about using ‘agile’ and ‘scrum’-based approaches. While responding to technologies that are developing

<sup>81</sup> The smart homes report proposes a list of suitable standards for age-friendly smart homes.

at speed, however, be aware that such rapid development may pose certain challenges when working with older people.

- **Ensure that innovations in standards consider ethical tenets:** Consider as many as possible of the nine PROGRESSIVE ethical tenets<sup>82</sup> when innovating ICT for AHA standards. The standards will need to align with the needs of older people, and with the services that work with/for them.
- **Be older person-centred not just person-centred.** Consider that to be ‘older’ person-centred may be as important or indeed, more important, than simply person-centred.

### 3.2 The standardisation process itself: the foundation of the STAIR-AHA platform

**Description:** Deliverable D5.5 is a brief report which proposes the set-up of a “Standardisation, Innovation and Research” (STAIR) platform on active and healthy ageing. It outlines the basic terms of reference of this new STAIR platform, due to meet for the first time at the end of October 2018 and to hold two meetings during the course of the anticipated remainder of the PROGRESSIVE project (the second meeting is due to be held in January 2019).

Standardisation, Innovation and Research (STAIR) platforms “accompany” research and innovation projects co-funded by the European Union. The platforms are “instruments” (or “tools”) created by the European Committee for Standardization (CEN) and European Committee for Electrotechnical Standardization (CENELEC).<sup>83,84</sup> The purpose of STAIR platforms is to form communities of people – including those who work in the standards field, researchers, and innovators – that will discuss and identify standardisation needs and opportunities for a specific area of concern (in this case, AHA). They are temporary, interim, mechanisms.

The platforms are said to be a relatively modern initiative. In recent years, there has been, for example, a STAIR platform on nano-technologies. Another STAIR platform (STAIR-IPI) on the innovative process industry was established on precisely the same date as the STAIR platform on Active and Healthy Ageing (STAIR-AHA).

The CEN-CENELEC Technical Board/Working Group (BT/WG) “Standardisation, Innovation and Research” (CEN-CENELEC BT WG STAIR) established STAIR platforms as a mechanism suitable for research and innovation (R&I) projects which have standardisation as their main objective<sup>85</sup>.

<sup>82</sup> See the relevant section of this report.

<sup>83</sup> See <https://www.cencenelec.eu/aboutus/Pages/default.aspx> last accessed 24 September 2018. On their website, CEN and CENELEC describe themselves as “business catalysts in Europe, removing trade barriers for European industry and consumers. Their mission is to foster the European economy in global trading, the welfare of European citizens and the environment. Through their services they provide platforms for the development of European Standards and other technical specs.”

<sup>84</sup> Limited information exists on the CEN-CENELEC website: <https://www.cencenelec.eu/research/innovation/Pages/default.aspx> last accessed 24 September 2018.

<sup>85</sup> Although the PROGRESSIVE project is a coordination and support action, it can be included within this category of project-type.

The STAIR-AHA has been created, using the momentum of the PROGRESSIVE project to support its launch. This is written up in PROGRESSIVE's Deliverable D5.5, which is called here the 'STAIR platform report'.

A STAIR platform's duration is closely related to the length of the R&I project with which it is associated. In the case of the STAIR-AHA platform, a decision on the possible continuation of the platform for a longer time-period will be taken at the end of the PROGRESSIVE project, during the second meeting of the STAIR-AHA.

### 3.2.1 Implications of the STAIR-AHA platform for innovation

STAIR platforms are not innovative in their own right. As a result, the STAIR-AHA platform is not, as such, an innovative mechanism. Rather, its purpose is to encourage the standardisation community to improve the quality of standards that relate to AHA, and to improve the legitimacy of the process involved in creating, designing and applying standards relevant to older people.

The platform forms the basis for **discussion and dialogue among multiple stakeholders** in the standardisation field related to AHA. Its endorsement by CEN-CENELEC therefore carries considerable weight.

Two observations are important: First, **because so few other committees or task forces of this sort exist** in the field of standardisation communities, the STAIR-AHA constitutes **an interesting pilot**. Second, while no other international organisation is involved with this planning besides CEN and CENELEC, the PROGRESSIVE consortium nevertheless expects several technical committees – covering other stakeholder groups – from the ISO and International Electrical Commission (IEC) to contribute to the STAIR-AHA's activities.

The main impacts of the STAIR-AHA are likely to be those cited (below) in relation to implications for the future. The platform will tend to guarantee a higher profile for the sustainability of actions in standards on ICT for AHA, and thus highlight implicitly the achievements of the PROGRESSIVE project.

### 3.2.2 Implications of innovative approaches related to the STAIR platform for the future

The platform **can capture or identify new or future needs for standardisation** related to AHA in general. Key to this activity will be the **capacity of the platform to facilitate such proposals for standardisation to be adopted and/or carried forward**.

**Major elements for these purposes** may include: the use of co-production methods, and the fields of smart housing as well as, for example, fields that have been relatively

less well explored by PROGRESSIVE, such as employment, and transportation and travel. More adventurously still, the potential impact and meaning of such technologies as robotics, pervasive technologies, and AI for standardisation for ICT in AHA could be explored.

#### **Main messages on STAIR-AHA and innovation today**

- **Focus on the core activities of the STAIR platform**: PROGRESSIVE is helping to start up a STAIR platform on the kinds of standards needed in the future on ICT in AHA. While not innovative as a mechanism in its own right, the STAIR platform on ICT for AHA will have several main innovative foci: first, to encourage the standardisation community to improve the quality of standards that relate to ICT and AHA ; second, to improve the legitimacy of the process involved in creating, designing, and applying standards relevant to older people; third, to ensure the sustainability of standards on ICT for AHA.

#### **Main messages on STAIR-AHA and innovation for the future**

- **Capture or identify new or future needs for standardisation in ICT for AHA**: The work of the STAIR-AHA platform should be future-oriented.
- **Carry forward proposals for standardisation adoption through the STAIR platform**: When standardisation for ICT for AHA needs are identified, get standards adopted or carried forward. Examples could come from employment, smart housing, transportation, and travel. Even more future-oriented technologies could be robotics, pervasive technologies, and AI.

### **3.3 Summary**

This approach to innovation in standardisation is completed by suggesting the importance that a Standardisation, Innovation and Research (STAIR) platform for developing and introducing new areas of standardisation around ICT for AHA.

## 4 Discussion and Insights into Possible Recommendations

From an assessment of standardisation on ICT in AHA, it can be seen that a number of innovative approaches are emerging from the PROGRESSIVE project. These include:

- **Ethics:** The ethical dimension seems to go beyond the strict field of (ICT) standardisation. For example, one member of the PROGRESSIVE task force reported on a successful appeal in a particular municipality to maintain personal face-to-face processes, while providing services to older people, for a while so as not to ‘lock out’ older generations from service provision. Hence, the nine PROGRESSIVE ethical tenets (in D2.1) are holistic, and go beyond standardisation process as such.
- **Use cases and interoperability:** PROGRESSIVE use cases reflect the state-of-the-art. They highlight **innovative approaches to services** for older people, and ICT for AHA, rather than innovative approaches to standardisation.
- **Standards and standardisation:** A wide approach is evident from quite a few entries in the PROGRESSIVE online platform standards database. These include guidelines and recommendations rather than only standards and interoperability profiles.
- **Co-production/co-creation approaches to standardisation:** An under-utilised innovative approach to standardisation involves applying the principles of co-creation more widely and, in particular, involving older people in them.
- **Using the STAIR platform to move ICT for AHA forward:** This platform can indeed have an important influence on developing and introducing new areas of standardisation around ICT for AHA.

These five areas may need special attention, and adaptation to the possible recommendations for the future that follow, including in relation to good practice(s).

### 4.1 Possible recommendations as a next step

As a result of its work, PROGRESSIVE is able to suggest a number of policy-related messages for the future. They can also be viewed as ‘recommendations’. In terms of ICT for AHA, they refer to:

- Ethics
- Use cases and interoperability.
- Co-production and inclusion.
- Smart housing.
- The foundation of the STAIR-AHA platform.

In particular, consultation and feedback on the proposed recommendations should be sought from the community of older people, and especially their representatives. PROGRESSIVE has various mechanisms for doing this: such a process could be taken on board during the last months of operation of PROGRESSIVE.

Recommendations more relevant to contemporary society ('today') are included only in chapter 3 and are not repeated here.

#### 4.1.1 Ethics

- **Follow the resolution(s) of the European Parliament on standardisation:** Adopt the recommendations of the European Parliament's 4 July 2017 resolution on standards for the 21st century which advocates including people of all abilities in the development of standards.
- **Apply the content of the Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016** on the protection of natural persons with regard to the processing of personal data and on the free movement of such data. Ensure that older people, and the services they use, understand and apply these principles.
- **Work together using co-production methods:** Work together to produce acceptable results e.g., in standards as well as in research and innovation<sup>86</sup>.
- **Focus on innovation in production design and methods:** Enable design to benefit older people and people with specific disabilities.
- **Consider certain paradoxes:** Explore, through RRI, the implications of making certain technological and societal choices (since innovations in fields like ICT for AHA have the capacity both for doing good and doing bad).
- **Focus on some specific areas of new technologies:** Explore the implications of robotics, pervasive technologies, and AI for older people, and for standardisation of ICT for AHA. Other emerging technologies may need similar investigation/exploration.
- **Focus on interoperability:** Expand the application of interoperability, since it is key to ensuring the efficacy and accessibility of new products and services that can benefit AHA. Look at interoperability in ways in which it is meaningful to older people.
- **Explore data sharing:** Explore what it means societally for older people themselves, and for AHA in particular, that the concept of data sharing is altering<sup>87</sup>.

#### 4.1.2 Use cases and interoperability

- **Innovate ways of explaining concepts so that they can more readily be understood by lay people/older people:** Involve people who have a stake in the effectiveness of standards and interoperability.
- **Get older people engaged with the processes of developing and establishing standards and guidance:** Apply PROGRESSIVE ideas on co-production, STAIR, and the future of STAIR.
- **Investigate and assess those issues that older people themselves consider to be significant and of ethical importance e.g., personal autonomy, and what they would mean in terms of good practice(s).** Set up task forces and advisory boards that have older people and their representatives as members.

<sup>86</sup> See the PROGRESSIVE messages on co-production in the relevant section of this report.

<sup>87</sup> See, for example, the implications of some of the use cases identified by PROGRESSIVE for consideration that may pose concern in terms of surveillance and monitoring.

- **Involve older people in future-oriented processes**: Explore examples like future horizon planning and scanning.
- **Apply the (g)ReEIF technique in settings other than purely health and care**: Explore examples like employment; transportation and travel; and social inclusion.
- **Consider introducing the (g)ReEIF technique into the STAIR platform context**: See the section on the STAIR platform; consider the planning of the future agenda(s) of the STAIR and other standardisation-related work plans.

#### 4.1.3 Co-production and inclusion

- **Use a guide on co-production in standardisation**: Apply and use the PROGRESSIVE guide on user co-production in standardisation for ICT in AHA in national standardisation committees.
- **Apply up to ten co-production methods in standardisation**: Use the PROGRESSIVE guide on user co-production to choose which of the ten methods laid out in the guidelines can best be used and at what point in the standardisation process.

#### 4.1.4 Age-friendly smart homes

- **Use a new definition of “age-friendly smart homes”**: Apply the PROGRESSIVE new definition of “age-friendly smart homes”.
- **Consider a variety of options for age-friendly smart homes**: Age-friendly smart homes are homes that may place more emphasis on telecare, telehealth, and interoperability than do smart homes generally.
- **Use standards that respond to technologies that are developing at speed**: Think about using ‘agile’ and ‘scrum’-based approaches. While responding to technologies that are developing at speed, however, be aware that such rapid development may pose certain challenges when working with older people.
- **Ensure that innovations in standards consider ethical tenets**: Consider as many as possible of the nine PROGRESSIVE ethical tenets<sup>88, 89</sup> when innovating ICT for AHA standards. The standards will need to align with the needs of older people, and with the services that work with/for them.
- **Be older person-centred not just person-centred**. Consider that to be ‘older’ person-centred may be as important or indeed, more important, than simply person-centred.

#### 4.1.5 The STAIR platform

- **Capture or identify new or future needs for standardisation in ICT for AHA**: The work of the STAIR-AHA platform should be future-oriented.
- **Carry forward proposals for standardisation adoption through the STAIR platform**: When standardisation for ICT for AHA needs are identified, get standards adopted or carried forward. Examples could come from employment, smart housing, transportation, and travel. Even more future-oriented technologies could be robotics, pervasive technologies, and AI.

<sup>88</sup> See the relevant section of this report.

<sup>89</sup> Note that, in PROGRESSIVE, there are nine ethical tenets but ten co-production methodologies.

## 4.2 Possible recommendations and good practices

There are future possibilities for the ways in which these recommendations could be brought **together with good practice(s)**:

- Closer liaison with the EIP on AHA could be sought.
- Use cases and ‘owners’ of standards considered to be ‘good practices’ by PROGRESSIVE could be encouraged to register as EIP on AHA good practices or innovative practices, especially when they are leading to scaling-up.
- Several of the areas of work of the EIP on AHA could be encouraged to explore with PROGRESSIVE what these findings/recommendations means for older people.
- Regions, as well as nations, could be encouraged to explore with PROGRESSIVE what this means for older people.
- Standardisation initiatives in the ICT for AHA could be encouraged to register as EIP on AHA commitments.
- The gaps spotted in such fields as employment and transportation, travel and mobility could be covered more adequately under the EIP on AHA. Similarly, the implications of future-oriented technologies, such as robotics, pervasive technologies, and AI could be covered there.

## 4.3 Summary

This report illustrates what is new and innovative that has emerged from the field on ICT on AHA, often in specific relation to standardisation. Coverage includes topics such as ethics, use cases and interoperability, co-production and inclusion, smart housing, standards and the standardisation process. Particular attention is paid to the foundation of a Standardisation, Innovation and Research (STAIR) platform on active and healthy ageing (AHA).

This report shows that innovations in ICT for AHA are occurring in many different fields other than simply in the **technologies/devices themselves**. This fact has many **implications for a wide range of standards**, not simply those that exist in technologically-related fields.