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Age-Friendly Standards Around ICT:
The Challenge of Co-Production With Older People

Verina Waights, The Open University, UK
Caroline Holland, The Open University, UK
Estelle Huchet, AGE Platform Europe, Belgium
Malcolm Fisk, De Montfort University, UK

ABSTRACT

As the European population ages, there is an escalating need for age-friendly standards to support development of effective products and services involving information and communication technologies (ICT), thereby improving usability for all consumers, including older people. Co-production with users through inclusive and participatory processes provides several benefits to standardization, including enhanced understanding of market needs, clearer identification and mitigation of risks, and increased legitimacy of the standards developed. Ideally, co-production includes users from a range of backgrounds. However, older people, especially those aged over 80 years, are often the least likely in the population to be involved. This paper reports on barriers and challenges to inclusive co-production from the perspectives of a range of stakeholders participating in the European Commission-funded project PROGRESSIVE: Progressive Standards around ICT for Active and Healthy Ageing. It identifies potential ways to improve the participation of older people in the co-production of standards.

KEYWORDS

Active and Healthy Ageing, Capacity, Engagement, Inclusiveness, Policy, Practice, Processes, PROGRESSIVE, Standardization, Standardization Bodies

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INTRODUCTION

Over recent years, it has been recognized across a wide range of fields, spanning research, design and delivery of public and healthcare services, product design and standards development, that good practice includes co-production with relevant stakeholders. With regards standardization development, relevant stakeholders are identified by the standardization body concerned. However, an independent review (European Commission [EC], 2015) of the European Standardisation System noted that "inclusiveness" was a strategic objective (European Union [EU], 2011), that requires involving a wide range of participants including consumers and representatives of elderly and disabled people (p. 4).

Where standards relating to products and services that require citizens to engage with information and communication technologies (ICT) are concerned, the authors believe that it is vital to include older people and older people's organizations to ensure the standards developed are relevant and can contribute to active and healthy ageing (AHA). Such inclusion is regarded as especially important given the rapidity of technological developments and the threats (as well as opportunities) posed by robots, robotics and Artificial Intelligence (AI). However, citizens' organizations and standardization bodies have recognized that engaging older people in standardization can be challenging (European Committee for Standardisation [CEN], 2017). As Shin et al. (2015) highlighted "we need to find productive ways of making standards for newly emerging technologies in order to maximize social welfare" (p 156).

In 2016, the European Commission recognized that the role of standards related to ICT for AHA was under-explored and funded the Progressive Standards Around ICT for AHA (PROGRESSIVE) project (2016 - 2019). This culminated in the formation of the STAIR-AHA (STAndards, Innovation and Research in AHA) through the joint CEN-CENELEC (European Committee for Electrotechnical Standardization) framework, bringing together standardizers, researchers and innovators to identify standardization needs and opportunities and produce recommendations for future action.

The objective of this paper is to report on findings from the PROGRESSIVE project; exploring moves towards co-production and outlining its potential to improve the engagement of older people in standard production, thereby enhancing the relevance and validity of the standards.

BACKGROUND

The global age profile-is increasing, with a predicted rise in those aged 60 and over from 12.3% in 2015 to 16% by 2030 (United Nations [UN], 2017a, p 3). Furthermore, the European age profile is increasing more rapidly - 25% of Europeans are aged over 60, projected to rise to 35% by 2050 (UN, 2017b), with the largest increase in those aged over 80 (Eurostats, 2020). These ageing profiles led the World Health Organization (WHO, 2007) to advocate moving "towards an age-friendly world… [that] helps people stay heathy and active even at the oldest ages". This goal drives

many current global and European policies, which should include a continuum of "affordable, accessible, high-quality and age-friendly health and social services that address the needs and rights of people as they age" (WHO, 2002) and the "process of developing and maintaining the functional ability that enables well-being in older age" (WHO, 2015).

As standards are highly influential and "major drivers of choice and change" (Ali-Vehmas, 2016), there is an increasing need for establishing age-friendly standards to support the development of effective products and services for ageing populations. This was recognized by the European Parliament that noted that demographic ageing requires "systematic incorporation of the needs of older persons in the development of standards to help achieve an active and ageing society" (EU, 2017, consideration 64).

Standards have a significant impact on the usefulness and usability of products and services for older people, yet often they are under-represented in development processes (CEN, 2017). The challenge, therefore, is to increase the engagement of older people in standardization at all stages. From their involvement in PROGRESSIVE, the authors attest that the interests of all adults, including older people, may be best achieved through co-production, which can be defined as "working in partnership with citizen users in the generation of ideas, decision-making and development of [standards for] a product or service" (adapted from National Development Team for Inclusion [NDTi], 2013). NDTi, reviewing co-production in UK health and care services, noted that this is a value-led approach characterized by inclusive processes and participatory activities "that brings together different voices and perspectives on a common issue or problem – a shared agenda – to achieve positive change at different levels" (p. 2).

Co-Production in Standardization

Organizations at international, European and national level set explicitly documented standards, which are used voluntarily by companies and public bodies in the production and delivery of products and services. According to the International Organization for Standardization principles (ISO, 2010), national standardization bodies are committed to informing and seeking input on any new project from a broad range of relevant stakeholders, including national and international governments, consumer associations, non-government organizations (NGOs) and academia. Indeed, Ali-Vehmas (2016) highlighted that "success of a standardization process depends on a large number of different factors including characteristics of the supporting companies, standardized technology itself and actions of all the stakeholders" (p 35). Standardization bodies are therefore expected to ensure the best possible representation so that all stakeholder interests are appropriately considered (ISO, 2010). It is particularly important to engage citizens that use or will use products and services that require them to interact with ICT, as they can contribute real-world requirements (Graz & Hauert, 2011; Jakobs et al., 2001), yet consumers are often under-represented in the standardization process (Graz & Hauert, 2019). Despite the ISO principles (2010), a continuing need to improve the inclusiveness of standardization work in Europe has been highlighted by stakeholders, including civil society organizations (Graz & Hauert, 2019) and the EC's

Joint Initiative on Standardization (2016). This EC initiative highlights specifically: inclusiveness, transparency and effective participation of all stakeholders (Action 9, p 12) and collaboration and coordination between stakeholders (policy makers, industry and society) to improve quality and timeliness of European standards (Action 10, p 12). These needs are recognized within the European standardization system (see CEN, 2017).

In addition, the EC's Rolling Plan for ICT Standardization (2019) continues to focus on AHA as an important societal challenge that needs to be addressed in standardization activities. Products and services to promote AHA and assist older people to live independently and fully participate in society are increasingly incorporating ICT: e.g. smart homes and smart public buildings, assistive and wearable technologies, telemedicine, telecare, geolocation, digital transport signage. Standardization of such smart applications requires consensus across a range of disciplines, which may challenge current processes and reinforces the need for citizen involvement (van den Brink et al., 2019).

To facilitate the involvement of all relevant stateholders by the European standardization organisations, CEN, CENELEC and ETSI (European Telecommunications Standards Institute), the EU is providing resources to enable participation of representatives from ANEC (European Consumer Voice in Standardisation), ETUC (European Trade Union Confederation), ECOS (European Environmental Citizen's Organisation for Standardisation. However, despite some consumer organizations at European and national level involving older persons' organizations on specific projects, standardization organizations reported difficulties in engaging older people (CEN, 2017).

This part of the PROGRESSIVE project asked: What is preventing the practice of co-production in standardization processes? PROGRESSIVE drew on the perspectives of a range of stakeholders to identify any shortcomings in involving stakeholders in standardization processes; understand what may be achievable regarding co-production; and identify new ways of working to enhance co-production with citizen users, particularly older people and their organizations.

METHODS

A combination of methods was used. This iterative process, engaging a range of stakeholders from across Europe, enabled refining of ideas to identify potential ways of improving co-production in standards development. Stakeholders included: standardization bodies, older people and older people's organizations, consumer associations, disability organizations, trade unions, small businesses, service providers, national and international public bodies, health and care organizations and academia.

Method One: Semi-structured interviews with 14 executives across the range of stakeholders

Method Two: Workshops with stakeholders - 75 participants from 15 EU member states plus Norway and Switzerland.

Method Three: Focus groups with members of the PROGRESSIVE Task Force of Older Persons (representatives of 14 older people's organizations from six EU countries).

Method Four: Workshops at meetings of the STAIR-AHA: first (31 participants from 11 EU countries plus Australia, 2018); and second (105 participants from 16 EU countries plus Australia, 2019).

Method Five: Problem Tree Analysis – the causes and consequences of the low level of participation of older people in the development of standards for AHA was investigated using problem tree analysis during the STAIR-AHA meeting. 22 participants were split into 3 groups, each with a moderator and rapporteur. The problem forms the trunk. Group members identified the causes (roots) and then the actual or perceived consequences of the problem (branches). This analysis enhances participants' understanding of the issues to enable more relevant solutions.

Thematic analysis of transcripts of interviews, focus groups, data from the workshops and problem tree analysis was carried out by a sub-group of the PROGRESSIVE consortium. They worked independently initially and then collaborated to identify barriers, challenges and opportunities of older people's engagement in standardization from the perspectives of the range of stakeholders listed above.

Ethics approval was given by the appropriate bodies in each of the participating member states of the consortium, including the ethics committees of the two universities leading this part of the project. All data was stored on password-protected computers accessible only by the consortium.

FINDINGS

Thematic analysis of data from the five methods identified barriers, challenges and opportunities regarding older people's engagement in standardization.

Barriers

The following barriers were identified: processes, awareness, engagement, resources and access.

Standardization Processes

It was noted that the standardization bodies at national and international levels worked very independently: liaison was often based on information sharing, rather than collaborative working. This lack of coordination contributed to standardization processes being perceived by participants as lacking transparency, it was not always clear where standards were developed. Also, the processes were considered quite inflexible, making it difficult for people who had relevant expertise, but were not formally involved in standards development, to contribute.

Consumer groups and older people's organizations that had participated in standardization reported that far too detailed technical knowledge of products, services and standards development was required and surveys for stakeholder consultation were

often difficult to understand. However, participants noted that standardization bodies were becoming aware of these issues. A policy officer from a European disability organization noted "improvements to the documents have been made but it is still not enough for the participation of some groups".

Awareness of Co-Production in Standards

Participants reported that there was little awareness of the need to engage citizen users, especially older people, in relevant standards production. Standardization activities were poorly publicized, so citizens had little understanding of what standards were, how they affected them personally or might benefit older people and were unaware that they could become involved. In addition, older people's and consumer organizations generally did not prioritize standards development, unless it aligned with their priorities and was within their resources. A policy officer from a national standardization body believed that raising awareness about standardization processes needed to target "Primary (end) users of the AHA product or service; Secondary users: formal and informal carers, service providers; Tertiary users: organizations and institutions that organize, pay for, or enable AHA solutions". These categories were adapted from Ageing Well in a Digital World (AAL, 2020).

Engagement in Co-Production of Standards

The barriers relating to lack of engagement fell into two main categories: the perspectives of standardization bodies and those of consumer and older people's organizations. Standardizers reported that older people were not easy to reach; it was difficult to achieve consumer representation and there was poor engagement by older people's organizations. However, consumer and older people's organizations believed that, as they were not seen as experts, they were not asked by standards developers to contribute. An executive from a consumer organization in Europe reported that "some national standardization bodies have consumer councils but most of them are not composed of consumers".

Participants described the paucity of specific projects relating to standards appropriate for older people to participate in as they were less likely to engage with theoretical issues. In addition, participants noted that often older people became isolated from civil society and did not know how to contribute, even though they had relevant expertise and useful perspectives.

Lack of engagement was also due to older people's perceptions that standardization was too complex for them to engage with. However, even when consumer and older people's organizations had the knowledge and experience to participate in standards development, they often had competing priorities. An officer from a Swiss older people's organization explained how a "decisive factor in the involvement of a partner lies in the alignment of a standardization action with the other advocacy priorities of the organization, i.e. how does the standard under development fit into the priority themes and strategic objectives".

Resources for Co-Production of Standards

All participants highlighted the lack of resources to finance participation. These barriers included: membership fees to enable active participation, fees to access published standards and the cost of involvement (including travel), particularly for organizations whose members were volunteers. A policy officer from a disability organization in Europe summed these issues up succinctly "the standardization business model is a nonsense; you need to pay to contribute and pay to see the results of your contributions. Civil society organizations do not have the resources to pay these fees". In addition, as noted by an officer of an older people's organization in France, due to their limited resources, it is not possible for associations "to commit their own resources, especially from [their members' annual] membership fees, because it [standardization] is an area of action difficult to justify to members".

Participants had sought State funding without success and perceived such under-resourcing to be a political issue: as an executive of a consumer organization in Europe stated, "National governments… are not interested in supporting civil society organizations". Another barrier reported by participants from consumer and older people's organizations was time. Participation in standardization was regarded as very time-consuming and therefore challenging for people in paid work or with caring responsibilities, and for consumer and older people's organizations that did not always have sufficient staff to contribute.

Access to Co-Production of Standards

Lack of access was reported as being much broader than ensuring physical accessibility for people with disabilities. Participants alluded to poor user interfaces, the dynamics of face-to-face meetings and language barriers because, at European or international level, documents on developing standards are generally produced in English. Moreover, they described how the extensive travel required to participate fully in national, European or international meetings was prohibitive. In addition, participants also reported the challenge, for many, of poor computer literacy.

Furthermore, in many countries limited internet provision prevented access to relevant information and online standardization meetings. One older participant noted that the 'impact of digitalization is still underestimated', and another that our "abilities do not necessarily change but the technologies do". Indeed, older people believed there was a generation gap between the developers and users of technologies, which was exacerbated by social stereotyping. One standardization body at least was aware of this: "Sexist and ageist stereotypes … are not addressed, which has strong implications in terms of self-limitation of older women" (an industry director, Standardization expert group).

Challenges

The aforementioned barriers can result in consequences that are challenging for standardization bodies and consumer or older people's organizations to overcome. These included: recruitment, processes, legitimacy and meeting the needs of older people.

Recruitment of Older People for Co-Production of Standards

Several participants noted that for co-production of standards to be effective, standardization bodies needed to include representatives from a broad spectrum of consumers. Some consumer organizations were sure that better representation in standardization will only occur when it is enshrined in law. For example, an officer of a consumer organization in Europe believed that consultation of specific consumer groups was insufficient at both policy and standardization levels, "it is important for societal stakeholders to mobilize to advocate for a political framework first, then they will be able to have a role in standardization in the frame of the newly adopted law"

Where older people were concerned, participants explained why selection based on age was insufficient and that it was important to avoid standardization bodies or legal entities setting such criteria. Participants pointed out that older people, regarded as older workers aged 55 - 64 (EC, 2017), or retirees aged over 64 (Eurostats, 2020) are not homogeneous groups but have widespread and differing interests, abilities, needs and preferences, which all require consideration during standard development. The policy director of a French consumer group highlighted the risk that "representatives selected to participate in the standardization processes on behalf of older users are not fully representative, [therefore] it should be left to organizations themselves to decide how and who to designate".

Co-Production Processes

Consumer groups emphasized that standardization bodies commencing standards development needed to clearly understand the expectations of users of that product or service. This required co-production with users at all stages of standardization, including evaluation of the finalized standard. Some consumer groups stressed that co-production should not require technical expertise. The director of a consumer group in France summed up the view that standard bodies should support stakeholders – such as older people, and explain "how does the standard work? what are the different uses of a standard? what is at stake in standardization? …it is up to the technical experts to translate the users' needs into the standard". However, other civil organizations stressed that technical expertise was vital to achieve full participation in standardization processes. An officer from an organization in Europe for people with disabilities stated "Technical expertise is needed. Here [we] rely on our network of experts. The selected expert is required to follow the policy decisions and statements made [by us] about this standard work".

Legitimacy of Standards

There was wide consensus across participants that not engaging older people in co-production could lead to a lack of adequacy or relevance such that wider endorsement and implementation of the standard(s) was unlikely to be achieved, thereby reducing their legitimacy. Legitimacy of standards was also considered crucial as many standards give support to legislation.

Participants described how these shortcomings might result in standardization becoming separated from wider society, leading to poorer quality products and services that failed to adequately meet the needs of older people and other consumers. This may also incur high costs for companies if they followed inadequate standards believing them to be robust, however, participants believed that preventing such separation between standardization and society required older people's organizations to work together to consider new technological advances and more fully inform standard development. For example, an executive from a European consumer organization highlighted that one such technological advance is the rapidly expanding field of robots that interact with people directly. They observed that "robots are being more and more standardized, but the older persons' movement has not defined a consensus on how robots should be used e.g. in the provision of care services". Such a consensus would enhance the "voices" of older people and increase their opportunity to influence standards. A Senior Expert from the European Commission described how the EU also recognized that ensuring legitimacy of standards was vital as "many standards give support to legislation… users have to be involved in standards development".

Meeting the Needs of Older People

There were concerns that where test methods did not reflect people's real use of appliances and services, standards' requirements might not meet consumers' expectations, with products and services unable to be used properly - especially by older people. Participants described how such failings in products and services made their life even more complicated and increased age-segregation in society by excluding older people from fully participating and furthering their dependence on others. However, to avoid potential stigmatization, design-for-all principles (Cambridge, 2010) should be used to ensure products and services address the needs of all, rather than specifically older people. As a director of a non-governmental care organization in Luxembourg noted "Older people feel discriminated against by some online services, such as online banking. [All] banks have a different application. [We need] standards regarding accessibility functions and standards regarding terminology used".

Opportunities

Despite the plethora of barriers and challenges, stakeholders also identified specific opportunities for enhancing older people's engagement in standardization. These were: inclusion for impact, awareness-raising and capacity-building, involvement as an equal and recognition of older people's endorsement.

Inclusion for Impact

The various stakeholder groups concurred that the primary consideration of AHA standardization should be people, products and services. Interoperability and technology were secondary, so the balance of stakeholders involved in standardization processes should reflect this. They noted that older people and consumers brought expertise of use, which did not necessarily require technical knowledge but richly informed standards. As a member of a national pensioner's organization in the UK

highlighted "with inclusion, we are not tomorrow's problem but part of tomorrow's solution".

Standardization development is based on a consensus principle. Thus, as a director from a consumer group in France remarked, the participation of users "if supported by sound arguments and evidence can shift the lines, especially since industrial stakeholders clearly have an interest to listen to the market and final consumers". It was noted that some standardization bodies, e.g. Standards Norway, the Swedish Standards Institute and DIN (Germany) specifically included older people on their consumer panels.

Participants recommended that to maximize public, and especially older people's, participation in standards development, standardization organizations should build further on grass-roots initiatives, share draft standards more widely and seek less formalized feedback. Participants noted that standards had more effect if they were supported by public opinion and stressed the importance of giving feedback to the public following these consultations to demonstrate that their contributions were valued.

However, participants also debated the efficacy of solutions proffered by users, describing how auto-limitation or self-censorship could bias consultation results. One consumer group participant offered the example of someone falling at night when going to the toilet in the dark, who, when consulted, did not think of suggesting their route lights up as they walk because they were not aware that this was possible.

Participants agreed that the collection of needs and user requirements were necessary but insufficient conditions to develop standards. Therefore, it was important to involve users alongside technical experts from early stages through to testing prototypes so that solutions were considered in terms of users' needs.

Awareness-Raising and Capacity-Building

Participants reported that involvement in national standardization processes often comprised passive observation or monitoring by a limited number of actors. They proposed triggering the active involvement of communities through awareness-raising campaigns and capacity-building. They also highlighted the need for assessing communities' subsequent influence on standards development.

Participants from consumer organizations identified that they relied on other organizations, such as ANEC to develop training and formal capacity-building activities for their members These activities included free eLearning courses for consumers interested in standardization, one developed by the ISO Committee on consumer policy (ISO/COPOLCO) and another by CEN-CENELEC in collaboration with ANEC, ETUC and ECOS.

Involvement as an Equal

Participants from civil society organizations (CSOs) emphasized the importance of being fully involved in the standardization process, with equal rights to speak and vote. In some committees CSOs only had monitoring or observer roles and believed

a move to full membership with decision-making rights was achievable but might need political backing to ensure change. One participant described good practice in Sweden, where public authorities and standardization organizations worked together to identify standardization activity that required participation of Civil Society Organizations (CSOs), with public authorities funding the CSOs' participation. However, participants would like to take this further: a policy officer from a European disability organization suggested that standardization organizations have structural dialogue with CSOs regarding prospective work and priorities, giving opportunities "for CSOs to identify relevant fields where to get involved and express views about missing standards and gaps"

Many participants thought that co-production of standards with stakeholders should go further. They considered there should be opportunities for co-creation, i.e. in the initiation and strategic planning of standardization for products and services, such as in the assisted living sector, where different ICT-based and service-based industries are operating. For example, an officer from a consumer organization in Europe proposed that CSOs, including older people's organizations, should "Partner with local authorities and different industries to develop a new cooperation paradigm for standard development".

Assigning a Mark of Older People's Endorsement

One opportunity posited was to provide consumers with a Standards Conformity Measures label - to testify that the product or service met the appropriate standards and was therefore fit for purpose and had been developed in consultation with older people. A member of a French older person's organization described how this type of endorsement already occurs "older people are participating in more than 100 tests a year to validate products and services". The resulting AFNOR certification provided confirmation of testing in real situations by older people and experts.

CONCLUSION

Globally, incorporating standards into products and services is generally undertaken voluntarily by manufacturers and service providers, primarily to reduce costs, increase interoperability or provide routes into specific markets. However, standards are playing increasingly important roles: underpinning government legislation; providing a prerequisite for public procurement of products and services; and being vital for assuring public confidence (Villaronga & Golia, 2019). This has led the EU, governments, international and national standardization bodies and civic organizations to recognize that standardization should involve a broad range of stakeholders. This has been particularly evident since publication of the ISO principles (2010) and the EU review of standardization processes (2015), which concluded that many stakeholders were under-represented. CEN (2017) highlighted that this under-representation reduces the confidence of standard users that standards are scientifically and technically sound and reflect the concerns and priorities of society across the population.

Despite these publications, standardization bodies and civil organizations reported that engaging consumers, and especially underrepresented groups such as older people, remains challenging. Our study showed that standardization processes were still perceived as time-consuming, complicated and costly, which supports previous research (e.g Hauert et al. 2015; Shin et al., 2015) and review (EC, 2015). Indeed, these perceptions are not new: Villaronga and Golia (2019) observed that, with respect to emerging technologies, Tully (2007) had highlighted 12 years previously that only manufacturers, unlike consumer groups and civil organizations, had the resources for sustained engagement with standardization processes. Participants in our research acknowledged progress had been made during the intervening years, but it was insufficient to facilitate engagement of all stakeholders. Our research also showed that societal organizations were required to have high levels of technical knowledge and expertise to participate in standard development, echoing the situation in Switzerland (Graz & Hauert, 2019).

Our study shed new light on barriers to co-producing standards with citizen consumers, especially older people, such as: difficulty in understanding survey questions; of accessing face-to-face meetings through disability or prohibitive travel distance and costs; poor computer literacy for reading standardization documents or increasingly participating in online-surveys; language barriers at EU and International level; and social stereotyping including age and gender.

One of the main barriers was the difficulty in determining which stakeholders, if any, were contributing as each standardization body appeared to be working independently. This reflects concerns raised by the EU review (2015) about the "representativeness of actors" in standards development. Moreover, the review noted that the 5 biggest national standardization bodies run 80% of the technical committees. Our study showed that progress in standardization initiatives was documented in reports that were not published or publicly available and were accessible only to participants of the technical committees who often paid membership fees to access the materials. This lack of accessibility and transparency limits civil organizations' contributions to standards development, hindering critical analysis of draft standards and providing little opportunity for influencing outcomes.

Our study also highlighted that standardization bodies were not reaching out to the public sufficiently and people who were interested in standards often found the standards landscape too complicated. Furthermore, older people's organizations perceived they were poorly consulted by standardization bodies. This is concerning because, as observed by Wickson and Forsberg (2014), standards development that includes negotiating across a wide range of perspectives - social, political and economic as well as technical and scientific - can often be considered "moral projects, given how they come to define and shape who we are, what is right to do and how we should live".

Participants from civil organizations across Europe also alluded to the challenge of aligning standards development with competing priorities, the costs of engagement and the lack of State financial support. This mirrors observations in Switzerland (Graz & Hauert, 2019) but is not unique to civil organizations as public organizations may

also fail to prioritize standards development (Lundsten & Paasch, 2017). It appears that only a few groups of stakeholders are consulted or able to engage fully, reducing the breath of user expertise within committees. Indeed, Lundsten and Paasch (2017) noted that although the motives of individuals to participate in standardization are many (see also Blind & Mangelsdorf, 2016; Riillo, 2013), participants representing organizations with frequent contact with stakeholders, such as interest groups, engaged with standards development because they had a vested interest in ensuring their stakeholders' needs were met. Canarslan (2015) suggested such individuals need careful selection and training in order to be effective. This is compatible with our findings.

Civil society organizations may also not prioritize standards development because they perceive that their capacity to influence negotiations in standardization is limited. For example, as standardization aims for reporting consensus from consumer panels or technical committees, without commenting on dissenting opinions (ISO, 2010), any opposing views of civil organizations will be unrecorded (Graz & Hauert, 2019). Moreover, authors (Jakobs, 2017; Jakobs et al., 2001) have highlighted that within standardization bodies there is potential for a single individual (a bulldog, Spring et al., 1995) to dominate meetings and influence the outcome even if the majority held opposing views, or for small entities to hire a guru to represent them (see also Bousquet, 2003), and maximize their influence by assuming committee leadership roles. Furthermore, organisations can influence committees through hiring individuals who bring rich relationship-based resources (Dokko & Rosenkopf, 2010) and larger organizations' influence may increase the complexity of standards (de Vries, 2006). Standardization bodies are more susceptible to such influences when they do not have formal procedures for decision-making (Jakobs, 2011; Jakobs, 2017), however, such procedures may be insufficient to reduce these influences as the EU review (2015) noted that some standards were accepted with only 30% of positive votes. The authors suggest that a user co-production friendly committee would encourage collaboration, build mutual respect, and provide means for communication, thereby reducing the influence of bulldogs, gurus and larger organizations and strengthening the voices of societal stakeholders.Our study also revealed tensions regarding the level of technical expertise required for consumers, especially older people, to participate in standardization. According to ISO principles (2010), there is an expectation that stakeholders have expert knowledge. Some participants described how their organization had responded to this by capacity-building a network of technical experts within their organization, in collaboration with other organizations and standardization bodies. However, others believed strongly that older people's expertise lay in being users of products and services, therefore they could contribute ideas and test possible options and it was the role of the technical experts to interpret the ideas and feedback into the standard(s). This complements the perspective of some standardization bodies, such as BSI (2016), that regard an understanding of citizen user requirements to be expertise relevant to their work. This may be important in standards around ICT as this is a fast-moving field, especially when considering the rapid increase in technologies that interact directly with people or store and analyze personal data. Future examples may include

personal care and home delivery robots, where industry and standardization bodies are leading standards development (Villaronga & Golia, 2019).

Our research has also highlighted some opportunities. Civil organizations discussed how by being well prepared and formulating clear arguments they could impact the consensus in standardization committees, but this could only occur when they have equal standing and rights as other stakeholders.

Clearly, in the fast-changing field of ICT, older people need to engage in the co-production of standards, resulting in standards that are age-friendly and provide guidance for policymakers, designers, manufacturers and service providers. The authors propose that co-production enables citizen users, including older people, to be involved in standardization processes without the demands of full committee participation. This also addresses the perceived homogeneity of consumer and older people's organizations by widening the pool of potential representatives. In 2018, PROGRESSIVE developed guidelines to assist standardization bodies to enhance their approach to working with users and societal stakeholders, especially older people, in co-production of standards. These guidelines recommend 10 creative methods for co-production, including problem tree analysis, and identify where in the standards' life cycle they are most useful: Define or review; Drafting; Enquiry; Publication.

Co-production should combine different methodologies, depending on the questions to be asked and the life-cycle stage. Committees should plan and implement the processes for citizen user co-production activities. These typically include the following steps: set targets and create understanding; specify target user group(s); consider the ethics relating to user engagement; select appropriate methodologies; recruit and incentivize the users; connect the process to a specific agenda or decision; be clear about the process and purpose; define the added value for the participants and the standardization work; mobilize online and offline engagement with other stakeholders, including technical experts; follow an iterative process of repeat and correct; report back to the users. The flexibility offered by co-production methods when strategically embedded within standards development provides opportunities for all stakeholders to benefit from better involvement of users.

The work undertaken by PROGRESSIVE resulted in a series of recommendations for practice. Here the authors summarize the recommendations for enhancing older people's engagement in standardization through co-production and include further recommendations from the work discussed in this paper, thereby promoting the development of age-friendly standards.

Recommendations for International, European and national standardization bodies:

- Raise awareness of the mutual benefits, for older people and standards organizations, of the inclusion of older people's needs in standards, products and services,
- Revise standardization processes to enable the participation of older people's representatives, as relevant stakeholders, to all initiatives of significance to older people,

- Use creative co-production methods to engage all end-users, including underrepresented groups such as older people, in standardization processes (see PROGRESSIVE, 2018),
- Promote participation of older people's representatives in national standardization bodies, thereby enabling debate in their primary language.

Recommendations for Older People's Organizations;

- Raise awareness of the benefits of standards and their role in production of quality products and services and the importance of older people working with other stakeholders and the standardization bodies to co-produce such standards,
- Encourage members to pro-actively participate in forums, e.g. the STAIR-AHA, to discuss issues related to AHA standardization.

Furthermore, the authors recommend that standardization bodies and public policymakers, e.g. governments and civic bodies:

- Move from engaging older people in co-production of standards at the level of service design and implementation to full co-creation of standards for services through commencing their inclusion at the initiation and strategic planning stages,
- Resource civil society organizations to enable participation in standardization debates and processes.

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REFERENCES

AAL Programme. (2020). Retrieved from http://www.aal-europe.eu/ageing-well-universe/i-am-a-user-2/

Ali-Vehmas, T. (2016). Complex network perspective on collaboration in the ICT standardization. *International Journal of Standardization Research*, *14*(2), 33–64. doi:10.4018/IJSR.2016070103

Blind, K., & Mangelsdorf, A. (2016). Motives to standardize: Empirical evidence from Germany. *Technovation*, *48–49*, 13–24. doi:.technovation. 2016.01.00110.1016/j

Bousquet, F. (2003). Dealing with standardization: do you need a guru? Paradoxes and tricks of standardization management. In *Proceedings of the 3rd Conference on Standardization and Innovation in Information Technology*, (pp. 51-57). IEEE. doi:10.1109/SIIT.2003.1251194

Brandsen, T., & Honingh, M. (2018). Definitions of Co-Production and Co-Creation. In T. Brandsen, T. Steen, & B. Verschuere (Eds.), *Co-production and co-creation: engaging citizens in public services* (pp. 9–17). Routledge. doi:10.4324/9781315204956-2

BSI. (2016). *A standard for standards – Principles of standardization*. British Standards Institution. Retrieved from https://www.bsigroup.com/Documents/30342351.pdf

Cambridge University. (2010). *Inclusive design model toolkit*. Retrieved from https://www-edc.eng.cam.ac.uk/research/inclusivedesign/

Canarslan, G. (2015). The Individual in Standard Setting – Selection, Training, Motivation in the Public Sector. Enterprise Interoperability: Interoperability for Agility, Resilience and Plasticity of Collaborations (I-ESA 14 Proceedings). doi:10.1002/9781119081418.ch34

de Vries, H. J. (2006). Standards for business - How companies benefit from participation in international standards setting. In A. L. Bement, T. Standage, T. Sugano, & K. Wucherer (Eds.), *International Standardization as a strategic tool - Commended papers from the IEC Centenary Challenge 2006* (pp. 130–141). IEC.

Dokko, G., & Rosenkopf, L. (2010). Social Capital for Hire? Mobility of Technical Professionals and Firm Influence in Wireless Standards Committees. *Organization Science*, *21*(3), 677–695. doi:10.1287/orsc.1090.0470

European Commission. (2015). *Independent review of the European Standardisation System.* Retrieved from https://publications.europa.eu/en/publication-detail/-/publication/18221a52-2a07-46e3-be6e-e1b7d98a2ee8

European Commission. (2016). *Joint initiative on standardisation under the single market strategy.* Retrieved from http://ec.europa.eu/DocsRoom/documents/31621

European Commission. (2017). *Joint Employment Report*. Retrieved from http://data.consilium.europa.eu/doc/document/ST-6887-2017-INIT/en/pdf

European Committee for Standardisation. (2017). *Standardisation and societal stakeholders.* Retrieved from https://www.cencenelec.eu/societal/Pages/default.aspx

European Union. (2017). *European Parliament resolution of 4 July 2017 on European standards for the 21st century (2016/2274(INI).* Retrieved from https://www.europarl.europa.eu/doceo/document/TA-8-2017-0278_EN.pdf?redirect

European Union. (2019). *2019 Rolling Plan for ICT Standardization.* Retrieved from https://ec.europa.eu/digital-single-market/en/news/2019-rolling-plan-ict-standardisation

Eurostats. (2020). *Population structure and ageing*. Retrieved from https://ec.europa.eu/eurostat/statistics-explained/index.php/Population_structure_and_ageing#Past_and_future_population_ageing_trends_in_the_EU

Graz, J.-C., & Hauert, C. (2011). The INTERNORM Project: Bridging Two Worlds of Expert-and Lay-Knowledge in Standardization. *International Journal of IT Standards and Standardization Research*, *9*(1), 52–62. doi:10.4018/jitsr.2011010103

Graz, J.-C., & Hauert, C. (2019). Translating Technical Diplomacy: The Participation of Civil Society Organizations in International Standardization. *Global Society*, *33*(2), 163–183. doi:10.1080/13600826.2019.1567476

Hauert, C., Bütschi, D., Graz, J., Audétat, M., & Kaufmann, A. (2015). The international standardisation arena and the civil society participation stakes: results of the INTERNORM project. *European Economic, Employment and Social Policy (ETUI Policy Brief) N° 14/2015*. Retrieved from file:///C:/Users/vw3/Work%20Folders/Documents/progressive/co-production/HAUERT_2015_INTERNORM.pdf

International Organization for Standardization. (2010). *Guidance for ISO national standards bodies, Engaging stakeholders and building consensus*. Retrieved from https://www.iso.org/files/live/sites/isoorg/files/archive/pdf/en/guidance_nsb.pdf

Jakobs, K. (2011). How People and Stakeholders Shape Standards – The Case of IEEE 802.11. In J. Filipe & J. Cordeiro (Eds.), Proceedings of Web Information Systems and Technologies 2010, LNBIP, (pp.1-13). Berlin: Springer.

Jakobs, K. (2017). Two dimensions of success in ICT standardization - A review. *ICT Express*, *3*(2), 85–89. doi:10.1016/j.icte.2017.05.008

Jakobs, K., Procter, R., & Williams, R. (2001). The Making of Standards – Looking Inside the Work Groups. *IEEE Communications Magazine*, *39*(4), 102–107. doi:10.1109/35.917511

Lundsten, J., & Paasch, J. M. (2017). Motives for Participation in Formal Standardization Processes for Geographic Information: An Empirical Study in Sweden. *International Journal of Standardization Research*, *15*(1), 16–28. doi:10.4018/IJSR.2017010102

National Development team for Inclusion. (2013). *Coproduction involving and led by older people - An Evidence and Practice Review*. Retrieved from https://www.ndti.org.uk/uploads/files/Personalisation_-_dont_just_do_it_coproduce_it_and_live_it%21_a_guide_on_understanding_coproduction_and_making_it_happen_with_older_people.pdf

PROGRESSIVE. (2018) *Guidelines for User co-production in Standards* Retrieved from progressivestandards.org

Riillo, C. (2013). Profiles and motivations of Standardization Players. *International Journal of IT Standards and Standardization Research*, *11*(2), 17–33. doi:10.4018/jitsr.2013070102

Shin, D., Kim, H., & Hwang, J. (2015). Standardization revisited: A critical literature review on standards and innovation. *Computer Standards & Interfaces*, *38*, 152–157. doi:10.1016/j.csi.2014.09.002

Spring, M. B., Grisham, C., O'Donnell, J., Skogseid, I., Snow, A., Tarr, G., & Wang, P. (1995). Improving the standardization process: working with bulldogs and turtles. In B. Kahin & J. Abbate (Eds.), *Standards Policy for Information Infrastructure* (pp. 220–252). MIT Press.

Tully, S. (2007). *Corporations and International Lawmaking*. Martinus Nijhoff. doi:10.1163/ej.9781571053725.i-508

United Nations. (2017a). *World Population Ageing*. Retrieved from https://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2017_Report.pdf

United Nations. (2017b). *World Population Prospects: The 2017 Revision.* https://www.un.org/development/desa/publications/world-population-prospects-the-2017-revision.html

Van den Brink, L., Folmer, E., & Jakobs, K. (2019). On Multi-Disciplinary Standardisation – The Case of Spatial Data on the Web. In *Proceedings of the 32nd Bled eConference: Humanizing Technology for a Sustainable Society*, (pp. 467-484). University of Maribor Press. doi:10.18690/978-961-286-280-0.25

Villaronga, E. F., & Golia, A. (2019). Robots, Standards and the Law: Rivalries between Private Standards and Public Policymaking for Robot Governance. *Computer Law & Security Review*, *35*(2), 129–144. doi:10.1016/j.clsr.2018.12.009

Wickson, F., & Forsberg, E. (2014). Standardizing Responsibility? The Significance of Interstitial Spaces. *Science and Engineering Ethics*, *2014*. Advance online publication. doi:10.1007/s11948-014-9602-4 PMID:25344842

World Health Organization. (2002). *Active Ageing: A Policy Framework*. Geneva, Switzerland: WHO.

World Health Organization. (2007). *Towards an age-friendly world*. https://www.who.int/ageing/age-friendly-world/en

World Health Organization. (2015). *What is Healthy Ageing?* Retrieved from https://www.who.int/ageing/healthy-agei

Verina Waights (PhD) is a Co-Qualification Director in Healthcare and Nursing Associate Practice at the Open University (United Kingdom). She has over 25 years' experience in education and research and has been the OU lead for EU- funded research projects and participated in Advisory Boards for related research projects. She has been an invited speaker and expert at international conferences and workshops including MOPACT, INNOVAGE, CARERPLUS and CARICT, developing recommendations for future EU policy and research. Her research interests include: the role of technologies in enhancing the quality of life and social inclusion of carers and older people, and developing older people's knowledge and skills through informal learning. Her role in enhancing e-inclusion was recognised through an Award in the Open University's Public Engagement with Research Scheme, 2015.

Caroline Holland, following over 20 years as Research Fellow/Senior Research Fellow at The Open University, continues, post-retirement, an involvement with several research projects as an Honorary Associate of the OU. She has been a principal, co-investigator or senior researcher on a series of research projects with the UK and the EU many of which related to the uses and non-uses of technologies by older people. EU-funded projects have included Opt-in; Value Ageing (as a Marie Curie I-APPA Senior Fellow); and PROGRESSIVE.

Estelle Huchet, holding a dual Master degree in political science, joined AGE Platform Europe in 2016. On behalf of the older persons she represents, she participates in several European projects dealing with housing, digitalisation, health, and well-being. In that frame, she organises participatory processes to ensure that older people have their say and works towards the popularization of these issues to lay audiences. In 2018, she became campaign officer and coordinated the #AgeingEqual campaign, a global awareness-raising effort against ageism. Today, she continues to run community building and stakeholders' engagement activities with AGE members and partners to shape new narratives about later life.

Malcolm Fisk (PhD) is Senior Lecturer in Information Systems at De Montfort University, Leicester (United Kingdom). He is on the roster of Experts to assist the World Health Organization in their work on Digital Health. His work, over more than 30 years, has focused on the use of technologies by older people. He has led two recent European Commission funded projects that, respectively, developed a European (now International) Code of Practice for Telehealth Services; and addressed the range and adequacy of ICT standards to support active and healthy ageing – see www.progressivestandards.org . Malcolm's other positions include that of representing ANEC (the European Consumer Voice on Standards) on the CEN Technical Committee on the 'Quality of Services for Older People'; and he is an expert on a standards committee for the National Institute for Care and Health Excellence (NICE, UK). Previously, amongst many other things, Malcolm was Chair of Age Cymru (Wales' main charity of and for older people) and the Chair, appointed by Welsh Government, of the National Partnership for Older People in Wales.