

Research Article

Wrinkles and Smiles — What is Good Aging? A Technology Assessment Perspective

Niklas Gudowsky^{*}, Ulrike Bechtold, Leo Capari, Mahshid Sotoudeh

Institute of Technology Assessment, Austrian Academy of Sciences, Apostelgasse 23, 1030 Vienna, Austria; E-Mails: Niklas.Gudowsky@oeaw.ac.at; Ulrike.Bechtold@oeaw.ac.at; leo.capari@oeaw.ac.at; msotoud@oeaw.ac.at

* **Correspondence:** Niklas Gudowsky; E-Mail: niklas.gudowsky@oeaw.ac.at

Academic Editor: James S. Powers

Special Issue: [Got Aging? Examining Later-life Development from a Positive Aging Perspective](#)

OBM Geriatrics

2019, volume 3, issue 2

doi:10.21926/obm.geriatr.1902058

Received: January 31, 2019

Accepted: June 05, 2019

Published: June 27, 2019

Abstract

Background: Quality or healthy aging refers to well-being in an older age. In the light of recent changes in the discourse on approaches on positive aging, we aimed to study the way “quality aging” is understood, expressed, and dealt with as a part of contemporary technology assessment (TA), since the nexus between demographic and technological changes has remained a staple topic in TA for at least three decades.

Methods: A bottom-up qualitative content analysis was performed to identify the concepts of quality aging in the final reports of a sample of five recent national and international (predominantly participatory) TA projects (pTA). Despite being highly variable in contexts, methods, topics, and funding schemes, these projects display a common core of investigating desirable frameworks and futures for an aging society from the perspective of a citizen, stakeholder, and expert. We identified overarching patterns across different reports through clustering of codified texts and meta-analysis.

Results: As a recurring pattern, we identified seven primary topical sectors, known as the building blocks of what may be attributed a *TA perspective* on quality aging: ethics,



© 2019 by the author. This is an open access article distributed under the conditions of the [Creative Commons by Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium or format, provided the original work is correctly cited.

resources, activity, interaction, education, health, and policy. These are described by referring to a network of more than 40 topical sub-themes.

Conclusions: The findings from the present study emphasize the need for a changed view on aging for individuals, their peers and society; a discussion of resources required to choose, understand, purchase, install, and properly maintain supportive technologies; and more integrated policy measures creating trust in communal services and infrastructure; and avoiding marginalizing and stigmatizing aging as a problem and as an ever-lasting economic challenge.

Keywords

Quality aging; technology assessment; qualitative content analysis; participation

1. Introduction

The idea of improving the quality of life of older adults is not new, and advice on aging well has been abundantly observed in several cultures and across time. “Wrinkles should merely indicate where the smiles have been,” a quote by Mark Twain [1] describes the universal wish for a happy and care-free life. However, Plato (427–346 B.C.) attributes the basic personality traits to good aging, and thus renders it a personal ability: “He who is of a calm and happy nature will hardly feel the pressure of age, but to him who is of an opposite disposition, youth and age are equally a burden.” Furthermore, Jung [2] provides an evolutionary perspective by stating: “A human being would certainly not grow to be 70 or 80 years old if this longevity had no meaning for the species to which he belongs. The afternoon of human life must also have a significance of its own and cannot be merely a pitiful appendage to life’s morning.” This corresponds well with the Hasidic saying “for the unlearned, old age is winter; for the learned, it is the season of the harvest.” Abundant inspiring and reassuring quotes on good aging seem to provide an answer to a universal need arising from a trivial—even if biologically complex—issue, yet a (perceived) problem most people face. However, this requirement entails and nurtures the existence of an extensive and growing *successful-active-positive-aging-well industry* that in itself contributes significantly to creating and maintaining the demand, especially in industrialized countries undergoing unprecedented demographic changes.

In the 20th century, research in the field of geriatrics and biogerontology focused on increasing life span; a more recent shift in these areas could be perceived toward increasing the health span to add more quality years rather than just more years to the life [3]. However, the aging well discourse offers more differentiated views and approaches to what quality aging is besides maintaining good health. Positive aging approaches include shifting from focused research to lifetime perspective, emphasizing capacities instead of deficits, revealing and overcoming (hidden) stereotypes, and highlighting societal contributions of older adults [4-6]. On an individual level, a more positive attitude toward aging may be linked to newly achieved freedoms (more years, better lives) and relaxed worldviews.

When Rowe and Kahn [7] introduced the concept of successful aging in their most influential publication, they critiqued aging research emphasis on deficits and argued for an increased focus

on factors that would positively influence the aging process: “Within the category of normal aging, a distinction can be made between usual aging, in which extrinsic factors heighten the effects of aging alone, and successful aging, in which extrinsic factors play a neutral or positive role.” In summary, they proposed a shift in the focus of research on aging from treating it to preventing diseases. Bülow and Söderqvist [8] reviewed this concept’s broad reception, critique, and evolution, and stated that over the course of a quarter century, researchers have increasingly emphasized multi-dimensional categories in their inquiries: “interdisciplinarity; the interaction between biology, psycho-social contexts, and lifestyle choices; the experiences of elderly people; life-course perspectives; optimization and prevention strategies; and the importance of individual, societal, and scientific conceptualizations and understanding of aging.” A major criticism regarding the term successful, however, remains the close association with its counterpart failure, reflecting societies’ rather binary perception of aging, placing the burden of succeeding on the shoulders of aging and the environment.

Another comprehensive network-based literature review, referring to research from more than 100 years, concluded that successful aging was based on two distinct “mutually exclusive concepts.” The main distinction referred to who was judging, and thereby who was defining what was successful: the older persons themselves or the researchers applying objective measurements [9].

These two perspectives are the basis of the extensively discussed disability paradox, which for instance [10] describes individuals with serious disabilities reporting an experience of good or excellent quality of life, whereas most external observers judge their everyday life as undesirable. Among others, psychological phenomena such as adaptation and coping strategies, self-control and optimism, psycho-social engagement, as well as cultural differences are the accredited reasons [9, 10]. However, with different theoretical backgrounds, subjective well-being and quality of life are not interchangeable concepts [11].

While the research on the quality of life aims at finding objective or objectified indicators and tools for measuring the quality of life, the concept itself nevertheless remains a dynamic construct [12, 13]. Considering the fact that defining “quality aging” depends on mindsets, values, access to information, knowledge, and other issues that influence our frameworks of world making, we may also need to zoom out and observe what role technology plays when it comes to “quality aging.”

1.1 Broadening the Discourse on Aging and Technology

Undoubtedly, certain technological innovations have had great enabling power and impact on the quality of life of older adults in the course of human history, from the first walking stick to wheelchairs, reading glasses, titanium knees, or dating applications; similarly, social innovations, such as pension systems, care worker migration or game nights. However, rather unspecifically, technology has been seen as providing great promises for solving existing and emerging challenges that older adults and aging societies face such that at times technology development seems to be the aim rather than the measure. The current aging and innovation discourse’s logics legitimize large investments on gerontechnology, portraying triple-win rhetoric with exclusive benefits for the society, economy, and individuals, thereby overseeing the distinction between useful and non-useful technologies [14]. Yet, it seems that often these investments fail to achieve the promised scale and impact [15]. One of the primary reasons for the failure of this technology-driven

approach is the underlying assumption of a negative image of aging. In this regard, Durick et al. [16] identified and deconstructed six basic myths about older adults reflected in current technology design practices, assuming they are the same; socially isolated and lonely; a burden on society; chronically ill; incapable of learning new, mainstream, technology; and unable to use the technology. Such ageism has been described in literature since the late 1960s; however, it still remains a serious social issue, impacting the health and well-being of older adults [17]. Peine [18] reviewed critical science and technology studies and found that (i) aging and technology mutually shaped each other, (ii) older persons often were agents and co-creators in innovation processes, that (iii) the design paternalism still often leads to ageist assumptions in technology projects. Here, Wanka and Gallistl [19] applied the sociological theory to ambient-assisted living (AAL) and stated that if “a different understanding of age emerges in the gerontological field or logics changed in the technological field, the AAL doxa will most likely change the correspondence.”

1.2 Aging and Technology Assessment

Since mid–1980s onward, the role of technology in dealing with challenges for individuals, society, services, research, and governance arising from demographic changes has become a relevant field of inquiry for technology assessment (TA) against the backdrop of rapid innovation cycles in highly technology-driven societies and pervasive socio-technical change [20]. In the present study, we mainly referred to the TA and not health technology assessment (HTA), which shares the same origins. However, HTA primarily applies a comparatively narrow methodology (more disciplinary, expert-oriented, and quantitative, often clinical studies) to answer questions of (cost) effectiveness of medical technologies [21]. In general, TA attempts to anticipate future development of technologies and their possible impacts to bring this assessment to relevant decision arenas [22]. Furthermore, TA is “a scientific, interactive, and communicative process that aims to contribute to the formation of public and political opinion on societal aspects of science and technology” [23]. TA practice provides recommendations on science, technology, and innovation governance as well as technology development: “The aim of TA is to identify technology-induced risks early enough, to analyze in detail the range of possible social, economic, legal, political, cultural, and ecological effects, to process results in a problem-oriented manner, to present alternative decision-oriented options, and at the same time to point out various social interests and value judgments linked to the development and use of new technologies” [24].

The methodological spectrum of TA is considerably broad and not limited to one specific set of methods. Therefore, qualitative as well as quantitative approaches may be used in TA studies. Constructive TA (cTA), for instance, aims at broadening the design and development of technology by including more aspects and more actors than usually found in such processes [25]. Historically, this notion has co-evolved with concepts such as co-design [26] and co-production [27] against the background of the participatory turn in science [28]. During the 1990s, participatory technology assessment (pTA) was strengthened, referring to the “methods and procedures of assessing socio-technological issues that actively involve various kinds of social actors as assessors and discussants” [29].

Broadening the scholarly, political, and societal discourse through extending the basis of the information, engaging actors, arguments, and timeframes have been pivotal to TA practice [30]. As knowledge-based policy advice is one of the cornerstones of TA, this diversification of methods

and inclusion of perspectives are necessary; otherwise, a slanted perception of any respective thematic area would possibly lead to policy responses non-conforming with complex real-world situations. With regard to aging and technology debate, especially perspectives from the social sciences seem important since “the human factor” tends to be ignored [31].

Recent TA studies on the nexus of aging and technology have investigated technology development processes that impact the life of older people [32], future of aging and technology from different actors’ perspectives [33, 34], co-creation of desirable futures for aging in cities [35], and applying participatory methods. Their merit is that they did not start from a specific technology (application) but from the view of those involved in research on aging and technology, or application and evaluation of technologies (Stakeholders in PTA-aging, value-aging, PACITA, DiaLogbuch AAL, see 2.1) or those affected (citizens in CIVISTI-AAL, see 2.1): laymen who are not unified but their views are appreciated in high diversity (coined by different age, sex, education, occupation, cultural background, area of residence, etc.). None of the investigated TA-projects predefined what quality or good aging meant. The only normative guidelines that were set included the social acceptability of technologies.

1.3 Aim

With this background, we questioned if we could (de-)construct a “TA perspective” on quality aging, by searching for overarching patterns across the final reports of different recent research projects, which integrated the views of multiple actor groups. With this exploratory study, we aimed to contribute to a holistic view of governing the socio-technical development of aging societies. Thus, our analysis of these patterns will shed light on the following research question, contributing to the discourse on quality aging:

- What are the overarching patterns of requests and preconditions for “good aging” in a recent sample of (participatory) TA projects?

Our results should be seen as one perspective from the field of TA; we do not aim to define quality aging in general. Investigating a different set of TA projects, for instance, non-participatory ones, may lead to a different view on premises for good aging, whereas adjacent research fields, e.g., STS, may derive a similar perspective. Describing and evaluating similarities and differences between our results and other possible perspectives on quality aging is beyond the scope of this study, but could very well be a fruitful aim for further research.

2. Materials and Methods

In a search for a (participatory) “TA perspective” on quality aging, we reviewed a sample of five national and international—predominantly participatory—research projects conducted in the past decade at the Institute of Technology Assessment (ITA), Vienna, Austria. The investigated data were derived from the respective final reports and concluding book-sections. We excluded all other material from the analysis, e.g., interim reports and information material, as all relevant data to answer the above-mentioned research question, already present in the final reports. Furthermore, selecting the final outputs ensured greater comparability of the texts.

2.1 Selected TA Projects on Aging and Technology

As a sample, we selected all major projects on aging and technology conducted at ITA during the last decade. These included a high variability in contexts, methods, topics, and funding schemes. These, however, displayed a clear common core of investigating desirable frameworks and futures for an aging society from a citizen, stakeholder, and expert perspectives and identified possible pitfalls for assistive technologies for elderly people. The following sections present a short description of the five projects, their aims, and the scope of their final outcomes (Table 1).

Table 1 An overview of selected TA projects on aging and technology.

Project	Duration	Funding	Main Aim	Method	Actor-groups involved
PTA Ageing: Participatory approaches for technology and autonomous aging	11/2007 - 08/2008	Austrian Research Promotion Agency (FFG)	To advise the Austrian R&D program; benefits: Identifying areas of interest for potential future topics, the relevant groups in terms of key players, stakeholder and (end-)users, as well as potential pitfalls	Explorative grouping and individual interviews	Experts and older adults
Value Ageing: Incorporating European Fundamental Values into ICT for Ageing	10/2010 - 08/2014	European Commission (FP7), Marie Curie Industry-Academia Partnerships	Fostering co-operation between non-commercial and commercial entities in incorporating European fundamental values in information- and communication technologies for aging.	Scenario building and assessment	Experts, stakeholders, and citizens
PACITA – Future Ageing: Parliaments and Civil Society in Technology Assessment	03/2014 - 02/2015	European Commission (FP7), Capacities: Science in society	To advise the national and European parliaments in meeting the societal and technological challenges and opportunities of an aging population.	Participatory scenario building and assessment	Experts and Stakeholders
CIVISTI-AAL: Citizens Visions on Science, Technology, and Innovation – Ambient Assisted Living	02/2013 - 08/2014	ZIT – Economy and Technology Agency, City of Vienna	Participatory method development and to advise the smart city agenda of the City of Vienna: From citizens visions of desirable futures to recommendations on fostering autonomous living of older adults	Long term participatory demand-side foresight: CIVISTI	Citizens, Experts, and stakeholders
DiaLogbuchAAL: Dialogues on Active and Assisted Living	10/2015 – 06/2016	Innovendo/IT A	To present an overview of the use of information and communication technologies in the fields of health, mobility, communication, work, and care, with particular attention to the needs of older people.	Focus groups	Experts and stakeholders

2.1.1 PTA Aging

PTA aging was a study with a focus on identifying potential topics that define the social and organizational context of innovative technical solutions for the autonomous living of older people

[36]. It furthermore identified key-actors, behavioral patterns, and modes of user-integration with the overall aim of providing guidance to the Austrian research and technology development funding program “Benefit”. The final report [36] provides lessons learned from the development of assistive technologies by explicating the challenges for research and development, success factors with regard to requirements, socio-economic and organizational issues, concluding with recommendations for the above-mentioned research program development, technology development, and long-term issues.

2.1.2 Value Aging

Incorporating European Fundamental Values into ICT for Ageing: a vital political, ethical, technological, and industrial challenge (VA) aimed to contribute to closing the gaps between these spheres and improving communication between different stakeholders and target groups (VA is a 48-month Marie Curie Industry-Academia Partnerships and Pathways Action funded by the Seventh Framework Program of the European Commission. For more information, visit <http://www.valueageing.eu/>). A primary goal of VA was to link scholars and practitioners, to explore relevant aspects of the incorporation of ethics and social considerations into technology for aging. These included understanding how technology affects its users, what values are inherent to the respective technology, and how technology choices are taken by different stakeholders and users and influenced by decision-makers [37].

2.1.3 PACITA

A case study on Future Ageing–Tele-assistance in Aging Societies: Within the pan-European project “Parliaments and Civil Society in Technology Assessment,” this case study assessed the challenges arising from aging societies and the role of technology in finding their respective solutions. Its primary aim was to identify and balance the future demands of an aging society, technological possibilities, and the perspective of involved actors and stakeholders. In a participatory process, experts and relevant stakeholders (i.e., technology developers, researchers, and practitioners in the fields of technology, geriatricians, medical personnel, and professional care providers) co-created three scenarios mainly addressing a spectrum of possible developments, based on diverging assumptions (e.g., what if future healthcare providers will be private or public or what if citizens and society organize themselves). The case study culminated in a national [38] and a transnational policy report, providing recommendations for policymakers [39].

2.1.4 CIVISTI-AAL

The participatory study “Citizens Visions on Science, Technology, and Innovation—Ambient-Assisted Living” was designed to cross-link “knowledge of citizens, experts, and stakeholders to include a wide variety of perspectives, rationalities, and values on the topic of future aging in the City of Vienna. Making implicit knowledge of citizens visible and explicit, the process aimed at broadening the setting of agenda by identifying additional and alternative ways to contribute to long-term planning of urban socio-technical systems” [35]. Thus, social and cultural contexts of assistive technologies and (smart-) city services—which are often overlooked—were emphasized to be considered by decision-makers to contribute to socially robust, sustainable solutions in

research and development (R&D) policy, technology development, city planning, and administration.

2.1.5 DiaLogbuchAAL

The book entitled “Dialogues on Active and Assisted Living” investigated the future of AAL technologies in Austria in the form of dialogues between 35 experts. AAL refers to the use of information and communication technologies in the areas of health, mobility, communication, work, and care, with particular attention to the needs of older people. It aims to provide services and technologies that preserve and improve the well-being, autonomy, and safety of older people, as well as their health and social inclusion [40]. The dialogue format aimed at providing low barriers of accessibility to information and pressing questions within the topic to diverse readership students, experts, and decision-makers.

2.2 Qualitative Content Analysis

While quantitative content analysis has been applied since the 18th century, it became popular among health researchers only during the 1990s [41] after pioneering efforts in the communication sciences and psychology from 1960s to 1980s [41, 42]. The qualitative content analysis grounds in the methodological basis of quantitative content analysis; however, it deviates in terms of “assigning categories to text passages as a qualitative-interpretative act, following content-analytical rules” [43], thereby analyzing content and contextual meaning of the text [41]. In our explorative study with inductive category development [43], we followed what [41] was described as a conventional approach in qualitative content analysis, allowing for categories to flow from the data to allow new insights to emerge. We chose to perform an exploratory study with inductive category development, or open coding as referred to in the grounded theory [44], since this aims “at a true description without bias owing to the preconceptions of the researcher, an understanding of the material in terms of the material” [43]. After defining our research question and the scope of the study, our analytical approach consisted of four consecutive steps, which the authors executed collectively (1, 3, 4) and individually (2). This procedure is congruent with seven steps of inductive category development that Mayring [43] has described.

1. **Developing a common lens for comparison:** This served for defining criteria for concepts we studied. Quotes of “good quality aging” are extracted from the final reports, if they at least partially answer the following questions:

- What is quality (good) aging?
- How should the process of aging or its framework conditions improve in the future?
- What are already good/sufficient aspects and conditions that should not change?

We included quotes large enough to provide sufficient context to derive a somewhat abstracted description that justified the selection of the quote in relation to quality aging. Additionally, we assigned preliminary topics with a rather high degree of abstraction (e.g., autonomy, mobility, societal status, etc.).

2. **Bottom-up scan and collection** of issues, attitudes, and definitions in final reports with respect to QA.
 - Two independent readings per project, with an internal and an external perspective of the respective project. Internal perspectives were defined as roles within the

project, such as project leader or main contributor, whereas an external perspective was derived from no or only minor involvement in the respective project.

- Findings of both readers were integrated for each project. This was conducted as an additive process; afterward, readers discussed the differences bilaterally between their assessments and produced a final list of consensus-based quotes. In most cases, the similarities largely outweighed the differences. Differences were less about the same phrases being coded differently; these were mostly related to the depth of analysis— one reader sometimes included more details than the other when describing the quote’s relation to quality aging.
3. **Comparison of findings** (inter-project level) and systematization: After combining all quotes into one database, the initially assigned topics were checked by all four readers for applicability, redundancy, and uniformity, and, if necessary, were grouped or reassigned. To provide more depth to this assessment, we assigned affiliations to up to three levels (primary, secondary, and tertiary). Then, we clustered all quotes in relation to their primary affiliation into topical sectors (e.g., activity, ethics, health, policy, etc.). The aim was to reach a number of sectors, where the single sectors combine enough topics to reach a meta-level aggregation. Further, this meta-level aggregation organizes the topics into a graspable size, while keeping the possibility to still describe the sectors in sufficient detail without rendering them overly abstract. The sectors were labeled bottom-up in some cases, i.e., a topic name was used if it well fitted as a superordinate descriptor for other topics in that sector (e.g., policy); in other words, if it already had been describing higher-level aggregations. In other cases, new labels were assigned, when no primary topic description seemed appropriate (e.g., ethics).
 4. **Building** requests and preconditions for “good aging”: We described the topical sectors by stating their composition of affiliations to subtopics and provided context by explicating with representative quotes from the readers’ analysis as well as original quotes.

3. Results and Discussion

In the present study, we identified a total of 338 quotes that were directly or indirectly related to “good aging.” These were attributed to more than 40 topical subthemes and then clustered into seven topical sectors. The following section provides an overview of the assignment of topics and topical sectors of selected abstracted descriptions that justified the selection of respective quotes in their relation to quality aging. Figure 1 illustrates the aggregated topics and topical sectors. Annexure 1 provides exemplary results of the qualitative content analysis, displaying original quotes and clustering. Table 2 provides an overview of the identified numbers of quotes per category and project.

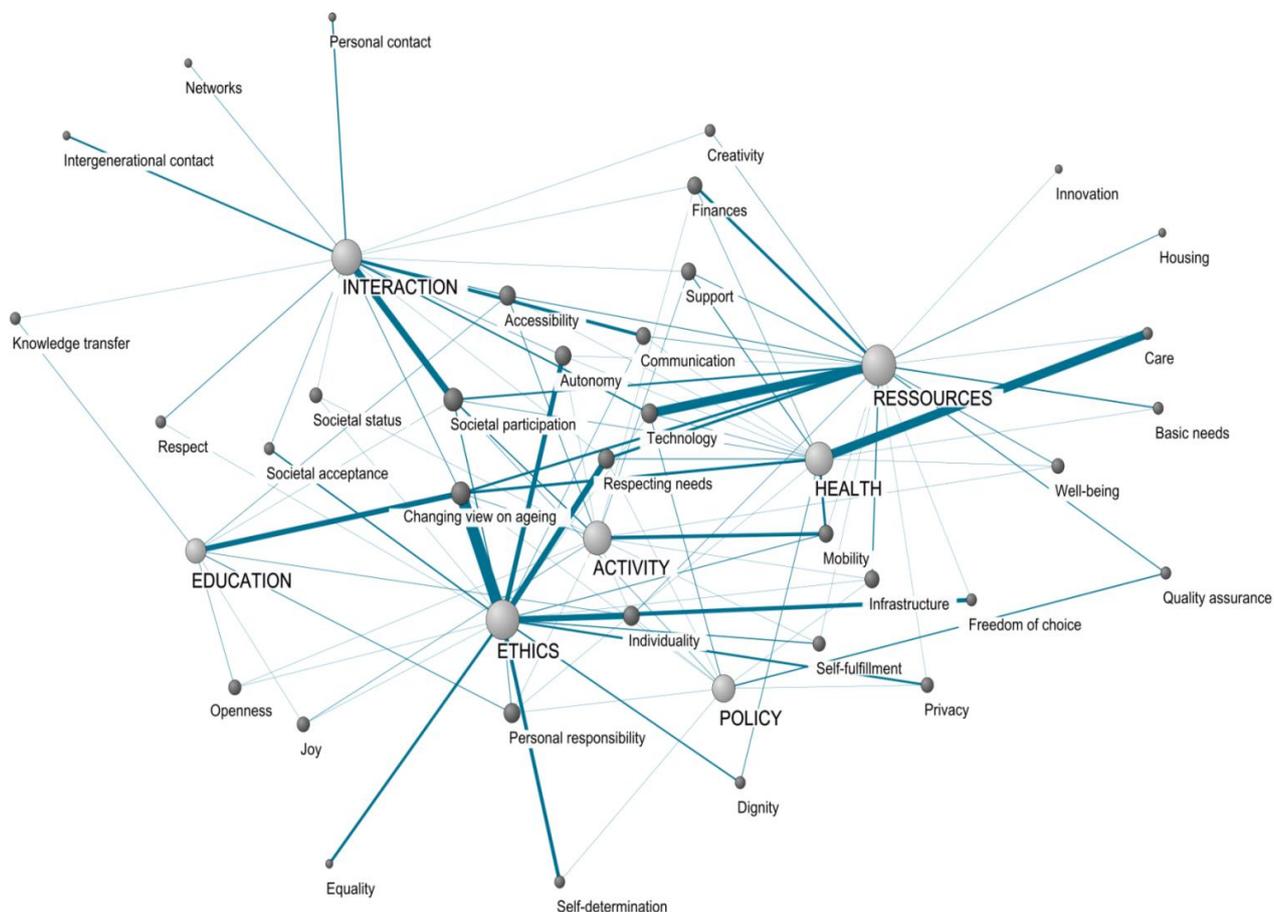


Figure 1 Network of topical sectors and related subclusters as visualization of results. Figure 1 shows a network representation of the clustered results. Large light grey nodes represent the seven topical sectors (Education, Ethics, Interaction, Policy, Activity, Health, Resources) while the small dark grey nodes represent the underlying and thus defining subclusters, which were derived from clustering the extracted quotes. The node size corresponds to the affiliation count, while line weight represents the strength of a connection between the connected terms (i.e., how often a subcluster was named in the context of the respective topical sector). In most cases, the topical sectors are defined by a few subclusters. ACTIVITY, for example, has a strong connection to mobility. Other topical sectors are defined by more subclusters like for ETHICS.

Table 2 Frequencies of quotes in relation to topical sectors and projects.

Project Sector	Ethics	Resources	Activity	Interaction	Education	Health	Policy	Sum
PTA Ageing	7	4	3	3	0	3	0	20
Value Ageing	20	7	0	6	3	3	1	40
PACITA – Future Ageing	36	14	1	14	8	22	4	99
CIVISTI-AAL	14	14	11	19	11	7	5	81
DiaLogbuchA AL	40	22	8	11	3	10	4	98
Sum	117	61	23	53	25	45	14	338

3.1 Description of Topical Sectors

As stated in Section 2.2, the methodology of qualitative analysis, the following overarching topical sectors were found in the material: ethics, resources, activity, interaction, education, health, and policy. These are described and discussed below.

3.1.1 Ethics

Many quotes comprise ethical issues, thus indicating its relatively high importance. Autonomy and independence, as well as self-determination, constitute a major part of the ethics-related quotes. The most important aspect is the change in the view toward aging that includes the perception of aging or older people, the need for being respected by the outside world, or the ability to make use of or maintain freedom of choice and autonomously take decisions. This also includes barriers in terms of attitudes toward older adults, and the public representation of aging, e.g., aging should not be a taboo topic, neither in public nor in personal discourses. It should be seen as the responsibility of the relevant stakeholders to prevent the generation of a skewed image of ageing via their communication channels. Quality aging is therefore achieved by a positive societal and medial aging culture. In relation to this, dignity and equality, freedom of choice, individuality, privacy, societal acceptance, and self-fulfillment are other important components of the ethics cluster, e.g., “For society as a whole, this first of all means thinking about comprehensive integration and inclusion and putting the independence and authenticity of the individual at the forefront” (CIVISTI-AAL, Newsletter from the future p.7 [own translation]), or “Ageing with dignity is a product of the interplay between human rights, equity and public health [...], equity focuses on the promotion of social justice and fair distribution of resources in society” (Value Ageing, p.19). The importance of respecting the needs of older people is strongly mentioned in relation to the topics such as technology development, maintaining societal participation, and most prominently the recognition of individuality and individual needs, e.g., “And the user has no choice, i.e., no alternative to technology. Also, the control over data and data transfer is not given, [...] automatic connections may be established that cannot be perceived, understood, and therefore not controlled by users” (Dialogbuch AAL, p. 255 [own translation]).

3.1.2 Resources

Resources are the second most important cluster owing to their frequent occurrence in the material. This cluster illustrates the dependency between resources and quality aging. Basic economic security and financial support (security benefits) strengthen the participation and contribution to the society in a meaningful way, e.g., “[unconditional] basic income enables autonomous activities and work, and therefore an autonomous life” (CIVISTI-AAL, Newsletter from the future p.7)” [own translation]. Accessibility of resources is mentioned. Resources include financial resources (affordability, financial support, and security), and infrastructure in a broader sense (affordable and barrier-free housing, competence centers). Services and technologies are described as important requisites for quality aging in maintaining and improving well-being, autonomy, and safety of older adults, as well as their health and social integration. Here, technology is prescribed with certain attributes that may promote quality aging. For instance, when helping to coordinate, being modular and especially when being needs-centered: “A

machine-oriented developer's language must be brought into harmony with the means of expression of (worried) affected persons. [...There is a need for] critical examination of the current technology development process and the possibilities of research funding" (Dialogbuch AAL, p. 246).

3.1.3 Activity

Activity is defined by a diverse spectrum of factors; however, it is most prominently described by issues of mobility and societal participation. In a broader sense, aspects related to activity and therefore quality aging include barrier-free environments and the availability of infrastructure, e.g., affordable, reliable, efficient, and available public transport; barrier-free and accessible toilets in public places; and sufficient safe space for walking and biking. "The mobility concept of the city enables unhindered and efficient mobility of all citizens and visitors. An area-wide network, "around the clock," which is affordable for everyone and integrates the city into its surroundings, provides movement and mobility to all generations (CIVISTI-AAL, Newsletter from the future p. 12)" [own translation]. The general degree of freeness from barriers could here be seen as an indicator for social acceptance of older people in the respective society. As activity is also defined by the degree of societal participation, mobility and accessibility become main enabling factors of the participation and therefore also the societal status of older people, even if societal participation does not necessarily require a great range of mobility. For example, "This calls for an aging culture 2.0 that takes age (s) more into account and also offers the framework conditions for older people to both participate more actively in (public) life and become older in their own four walls in a self-determined manner (Dialogbuch AAL, p.253)" [own translation]. Activity is also considered an important aspect of well-being in general. Moreover, it is an integral part of participation in public life. This can be achieved by providing physical and digital (infra-) structures that allow older people to continuously contribute to and participate in public life. Other defining factors for activity include self-fulfillment, education, well-being, openness, and societal status.

3.1.4 Interaction

Interaction is an important aspect for human beings to thrive in society. This also holds true for older adults. Within the pTA projects, interaction serves as the central pillar and is defined by several aspects, which can be split into three categories: communication, societal participation, and intergenerational contact. Similar to other aspects, both individual and a societal perspective are considered, e.g., "Good supportive relationships between the person with dementia and their caregiver can reinforce the sense of dignity. It is important to consider how the life of caregiver and patients change when technology is introduced in the house (Value Ageing, final report, p.20). For instance, describing the basic requirements for interaction, or stating the necessity of providing barrier-free and transparent information as well as stating the need for a dialog and the willingness of the society to protect the rights of older people for inclusion. In general, the current and predominant communication patterns on aging are criticized in terms of hampering a taboo-free discourse on issues, such as frailty or death and constructing the lop-sided image of a "successful silver-ager" as healthy, active and younger than his/her actual age. Technology can facilitate this interaction but face to face communication still remains a crucial factor for quality aging. "Of particular importance is the attempt to provide ATs allowing older people to increase

their quality of life and ensure their ability to actively participate in social life” (pTA-Aging, final report p. 15). The risk of social isolation is mentioned several times; technology, on one hand, acts as a tool for relieving age-related problems and on the other hand, is responsible for causing this very issue.

3.1.5 Education

In our sample quotes from pTA projects, education is predominately defined as a need to act as a catalyst to create the spark and encourage a changed view of aging in society. It also involves responsible decision making by an individual: “People who need care and assistance can decide themselves on the type of care and assistance services they want to make use of (PACITA final report, p. 26).” This changing societal perspective pertaining to the life and older people and the process of aging, in general, is considered a major prerequisite for increasing the quality of aging and thus the quality of life for the aged and their peers. Measures described to bring a change in the perception toward aging primarily comprise three components. The first component addresses the individuals (i.e., older adults), the second component addresses the outer world, and the third component relates to skills and ability for common understanding. The first component can best be illustrated by the concept of life-long learning in terms of maintaining mental flexibility and openness or taking personal responsibility for it. Also, the learning process of aging (learn how to age well) defines it as a personal responsibility plus a target for education systems and educational activities to be mainstreamed: “[...] early preparation for aging requires new training approaches and coaching concepts (PACITA final report, p.6).” Here, a need for a change in providing education to caregivers and family members is specifically mentioned. Moreover, the value of and the need for fostering knowledge transfer between generations and common understanding in the society are parts of this component.

3.1.6 Health

In the extracted quotes, health acts as the central pillar of quality aging, and is primarily related to care settings and arrangements. This cluster includes several aspects (e.g., on the organizational level). Better networking of relevant actors is recommended, or a comprehensive and guaranteed provision of care services in rural areas, or the risk of voluntary work being exploited to cut the expenditures on state-run care services. “The local government authorities are responsible for ensuring that there is proper healthcare for its inhabitants, including monitoring the quality of the care provided. The local municipalities are required to deliver some health services, to manage licenses for private operators and to mobilize the coordination of the volunteering organizations” (PACITA, final report, p.22). The data also suggest that informal care work urgently needs an augmented societal status to contribute to quality aging settings: “[...] the value of volunteer work, such as the care of relatives, social commitment, etc., all of these meaningful, necessary, but unpaid activities for society should be gaining importance” (CIVISTI AAL, Newsletter from the future p.7). Moreover, preventive measures, such as combating stress-based health issues in early age are seen as factors contributing to quality aging, as well as the issue of being able to get and accept the support not only in case of emergencies but also well before that. However, for this earlier onset of using support to be realized, a changed view on aging in individuals and society is seen as a prerequisite.

3.1.7 Policy

The policy cluster addresses the requirements for long-term policy planning for aging. For maintained or increased aging settings, this cluster highlights the need for continuous quality assurance of services and fostering the need-based infrastructure and societal participation. Here, the urgency of an individual commitment and an adapted political framework for solutions gets evident. For example, “This means that governments should create the conditions under which individuals can as much as possible determine what they want and what they value (Value Ageing, final report p. 27). It needs knowledge-based and forward-looking decisions on technology development, and integration of central actors (e.g., social security, health insurance, etc.) for understanding and fulfilling the actual needs of older people. This is especially important in the case of technology development, which needs to be tailored to the needs of the elderly and not as a means for cost reduction. This also includes the definition of technology standards. “The stakeholders called for the establishment of legal framework conditions concerning telemedicine, accountability, provision of services, etc. [...]. More transparency in the decision-making processes and the involvement of citizens in these processes need to be fostered” (PACITA, final report, p. 39).

A meta-perspective (in terms of an attempt of interpretation) and a detailed (in terms of the clusters) approach divide all thematic clusters into three different dimensions:

- The view of older people and those who are close to them (mainly referring to topical cluster activity and health).
- The perspective of an outside world and (mainly referring to topical cluster interaction, resources, and education).
- The interaction between these two perspectives (mainly referring to topical cluster policy, which was addressed in all projects).

3.2 Simultaneously Restricting and Extending the Discourse

Due to its orientation and approach, TA takes a special look at the subject of high-quality aging, desirable futures, and a human-centered approach. Thus, TA studies underlying this study are equally subjected to both a limitation and a broadening of the perspective.

3.2.1 Restriction

None of the investigated studies predefined “good aging” or set out to define what it is, but investigated the nexus between technology and aging. Although none of the selected projects that served for this analysis did explicitly started from a specific technology (perspective), TA studies necessarily displayed a “technology bias,” because they at least include a technological level in the choice and investigation of the object of this investigation, if they do not even focus on it. Inevitably, this has an impact on the results of the investigation of such a broad and not necessarily technology-driven topic as quality ageing. Even if the investigated technologies or socio-technical developments are critically questioned and their unintended negative consequences, e.g., society or certain population groups are investigated, a focused view on technology (as a solution for societal problems) may remain. Social and political factors can thus easily fall back to their significance in such a discussion.

3.2.2 Broadening

At the same time, TA often seeks to broaden the debate on socio-technical developments, e.g., by applying participatory approaches. This is also reflected in the results, as in relation to (quality) aging, topics such as individuality of people, freedom to choose non-technical options, or the protection of privacy are strongly emphasized and a non-paternalistic attitude toward the elderly and aging is demanded from the industry, society, and decision-makers. Some of these aspects are underestimated in the current mainstream discourse on “aging and technology,” which is strongly driven either by classical topics, such as autonomy, health infrastructure or strongly dominated by an innovation push. This push is based on the unquestioned promises of (IC-) technologies to solve the societal and individual challenges related to demographic changes. Here, an urgent need exists for critically scrutinizing the given and often replicated promises of (IC-) technologies, alleviating the economic burden on national economies, creating growth, and impacting new markets as several new customers will buy these products while they unrestrictedly raise the quality of life of the elderly by allowing them to stay (technologically supported) in their homes longer or providing more efficient care services for institutions.

4. Conclusions

An analysis of the overarching patterns of requests and preconditions for “good aging” in a recent sample of (participatory) TA projects identified seven thematic clusters: activity, education, ethics, health, interaction, resources, and policy. According to the multidimensionality of quality aging, the policy cluster should receive special attention as it clearly affects all other clusters either by creating public opportunities (e.g., rights to access certain services) and freedom (e.g., providing different forms of housing) or limiting individual choices and options (e.g., financial issues). All clusters together provide a holistic picture of what quality aging may mean in a TA context and clearly underline a positive approach toward aging, which recently conquers the aging discourse.

According to the topical sectors and their interconnections, and the three dimensions, we may formulate the following overarching recommendations to promote quality aging, which is not necessarily TA specific, but seems to capture the essence of what TA projects on aging (and technology) conclude implicitly and explicitly.

Ethical issues need to be embedded within a broader societal discourse in relation to quality aging: the way a society, its institutions, and media view, deliberate and treat issues connected with aging is closely (if not inseparably) related to its ability to implement ethical considerations. The latter cannot succeed as mere rules; however, its realization is strongly linked to a more positive attitude to aging at large: the changed view on aging includes a new culture of aging, that includes, accepts, and integrates aging as a core aspect of all lives rather than trying to hide, avoid, and cure aging (and most importantly the aged).

- A discussion of technology as part of quality aging cannot be led without considering the resources needed to choose, understand, purchase, install, and properly maintain these supportive technologies. These resources include financial means and interpersonal assistance, which facilitate continuity for the user on a technological as well as interpersonal level. The lifetime of technological systems exceeds the usual lifetime of

technologies, and the personal assistance needed to properly familiarize with the new technological system consists of buddy-systems that provide personal continuity.

- The fact that policy as a category seems important in itself, but remains considerably unconnected to other thematic clusters in our network, may be read as a perception of either absent or ineffective policy. However, more integrated policy measures, which build trust in communal services and infrastructure, and avoid marginalization and stigmatization of aging as a problem and ever-lasting economic challenge, may help connect policy and quality aging in a way it deserves.

The necessity of an integrated discourse, e.g., ethical aspects in the light of what aging as such may mean, and discussing technological assistive devices in the light of welfare distribution—inherent to the mentioned recommendations—may also involve distinguishing the levels of the affected individuals themselves, their relatives and surroundings, as well as the dimension of how these interact in a meaningful way to realize quality aging. At first, explicitly addressing the level of the affected older people themselves, secondly, their relatives and surrounding persons, and thirdly, the interactions between these two may help develop new technologies and spreading and implementing them successfully. Yet, it may also be of significance when discussing, weighing, and implementing new policies relevant to older people as well as the relations between different demographics (e.g., pension system, care arrangements, etc.). The results are derived through TA methodologies, which prove to be sensitive for identifying different nuances of the topic, such as the importance of a changed view on aging in different contexts: for older people themselves (e.g., as a precondition for an active and integrative lifestyle throughout one's life), for their recognition in society (e.g., a different framing of discourses around aging), and for those working with and for older adults (e.g., a higher valuation of works connected to support and care). However, the results also implicate a shared responsibility to achieve QA as they address different actors from decision makers to technology developers to a broader society. And here, one might describe one of the assets of a TA approach: TA aims to uncover options for action, identifies responsibilities, and asks who is affected, who will benefit, and who will lose by introducing certain measures or rules. The policy dimension that a TA approach necessarily touches upon may be seen as an added value in the context of quality aging analyses.

Acknowledgements

This research did not involve human beings and did not obtain data on living individuals and did not require IRB review.

Author Contributions

N.G. conceived and designed the study. N.G., U.B., L.C. and M.S. discussed the idea, added methodological and conceptual considerations, collected and analysed data. N.G. took the lead in writing the manuscript. All authors provided critical feedback and helped shape the research, analysis and added to the manuscript. L.C. performed network analysis.

Funding

This study was funded internally by ITA-ÖAW. Funding for the case studies see Table 1.

Competing Interests

The authors have declared that no competing interests exist.

References

1. Twain M. *Following the Equator*. American Publishing Company; 1897. p. 709.
2. Jung CG. *Modern man in search of a Soul* New York. Harcourt, Brace and Company; 1934.
3. Bagley M, Davis T, Latimer J, Kipling D. The contribution of biogerontology to quality ageing. *Qual Ageing Older Adults*. 2011; 12: 26-32.
4. Zhang B, Lin Y, Gao Q, Zawisza M, Kang Q, Chen X. Effects of aging stereotype threat on working self-concepts: An event-related potentials approach. *Front Aging Neurosci*. 2017; 9: 223.
5. Møllegaard S, Jæger MM. The effect of grandparents' economic, cultural, and social capital on grandchildren's educational success. *Res Soc Strat Mobil*. 2015; 42: 11-19.
6. Weiss D, Kornadt AE. Age-stereotype internalization and dissociation: Contradictory processes or two sides of the same coin? *Curr Dir Psychol Sci*. 2018; 27: 477-483.
7. Rowe JW, Kahn RL. Human aging: Usual and successful. *Science*. 1987; 237: 143-149.
8. Bülow MH, Söderqvist T. Successful ageing: A historical overview and critical analysis of a successful concept. *J Aging Stud*. 2014; 31: 139-149.
9. Kusumastuti S, Derks MG, Tellier S, Di Nucci E, Lund R, Mortensen EL, et al. Successful ageing: A study of the literature using citation network analysis. *Maturitas*. 2016; 93: 4-12.
10. Albrecht GL, Devlieger PJ. The disability paradox: High quality of life against all odds. *Soc Sci Med*. 1999; 48: 977-988.
11. Stewart-Brown SL. Public mental health: An interdisciplinary subject? *Brit J Psychiat*. 2015; 2017: 192-194.
12. Allison PJ, Locker D, Feine JS. Quality of life: A dynamic construct. *Soc Sci Med*. 1997; 45: 221-232.
13. Skevington SM, Bohnke JR. How is subjective well-being related to quality of life? Do we need two concepts and both measures? *Soc Sci Med*. 2018; 206: 22-30.
14. Neven L, Peine A. From triple win to triple sin: How a problematic future discourse is shaping the way people age with technology. *Societies*. 2017; 7: 26.
15. Peine A, Neven L. From intervention to co-constitution: New directions in theorizing about aging and technology. *Gerontologist*. 2018; 59: 15-21.
16. Durick J, Robertson T, Brereton M, Vetere F, Nansen B. Dispelling ageing myths in technology design. *Proceedings of the 25th Australian Computer-Human Interaction Conference: Augmentation, Application, Innovation, Collaboration*; Adelaide, Australia. 2541040: ACM; 2013. p. 467-476.
17. Sargent-Cox K. Ageism: We are our own worst enemy. *Int Psychogeriatr*. 2017; 29: 1-8.
18. Peine A. Technology and ageing—theoretical propositions from science and technology studies (STS). In: Neves BB, Vetere F, editors. *Ageing and digital technology: Designing and evaluating emerging technologies for older adults*. Singapore: Springer Singapore; 2019. p. 51-64.

19. Wanka A, Gallistl V. Doing age in a digitized world—a material praxeology of aging with technology. *Front Sociol.* 2018; 3: 6.
20. Smits R, Leyten J, Hertog Pd. Technology assessment and technology policy in Europe: New concepts, new goals, new infrastructures. *Policy Sci.* 1995; 28: 271-299.
21. Banta D. The development of health technology assessment. *Health Policy.* 2003; 63: 121-132.
22. Rip A. Technology assessment. In: Smelser NJ, Baltes PB, editors. *International encyclopedia of the social & behavioral sciences.* Oxford: Pergamon; 2001. p. 15512-15515.
23. Decker M, Ladikas M. Bridges between science, society and policy. *Technology assessment — methods and impacts.* Berlin, Heidelberg: Springer; 2004.
24. Sotoudeh M, Peissl W. Impact assessment as a means to train future engineers for sustainable development. *GAIA.* 2010; 19: 58-60.
25. Rip A. Constructive technology assessment. *Futures of science and technology in society.* Wiesbaden: Springer Fachmedien Wiesbaden; 2018. p. 97-114.
26. Sanders EBN, Stappers PJ. Co-creation and the new landscapes of design. *CoDesign.* 2008; 4: 5-18.
27. Voorberg WH, Bekkers VJJM, Tummers LG. A systematic review of co-creation and co-production: Embarking on the social innovation journey. *Public Manage Rev.* 2014; 17: 1333-1357.
28. Jasanoff S. Technologies of humility: Citizen participation in governing science. *Minerva.* 2003; 41: 223-244.
29. Joss S, Bellucci S. *Participatory technology assessment – European perspectives.* . London: University of Westminster; 2002.
30. Bauer A, Kastenhofer K. Policy advice in technology assessment: Shifting roles, principles and boundaries. *Technol Forecast Soc Change.* 2019; 139: 32-41.
31. Domínguez-Rué E, Nierling L. *Ageing and technology perspectives from the social sciences.* Domínguez-Rué E, Nierling L, editors: Transcript Verlag; 2016.
32. Bechtold U, Sotoudeh M. Assistive technologies: Their development from a technology assessment perspective. *Gerontechnology.* 2013; 11: 521-533.
33. Decker M, Weinberger N, Krings BJ, Hirsch J. Imagined technology futures in demand-oriented technology assessment. *J Resp Innov.* 2017; 4: 177-196.
34. Bechtold U, Capari L, Gudowsky N. Futures of ageing and technology – comparing different actors' prospective views. *J Resp Innov.* 2017; 4: 157-176.
35. Gudowsky N, Sotoudeh M, Capari L, Wilfing H. Transdisciplinary forward-looking agenda setting for age-friendly, human centered cities. *Futures.* 2017; 90: 16-30.
36. Bechtold U, Sotoudeh M. *PTA Ageing: Participatory approaches for technology and autonomous ageing.* Vienna: 2008 ITA-Projektbericht Nr.: D34.
37. Mantovani E. *Value Ageing - Final Report of WP2: ICT impacting on freedom and autonomy of older persons.* 2015.
38. Capari L, Sotoudeh M. *PACITA Deliverable 6.6: National report – Scenario workshop in Austria.* Edited by PACITA (Parliaments and Civil Society in Technology Assessment) consortium, Edited by Pc; 2014 2014-10-15. Report No.
39. Barland M, Lovett H. *The Future of Ageing Policy report on technology, innovation and organisation in European health care.* 2014.

40. Bechtold U, Waibel U, Sotoudeh M, editors. DiaLogbuch AAL - Dialoge zu Active and Assistive Living. Vienna: OCG - Austrian Computer Society; 2016.
41. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. *Qual Health Res.* 2005; 15: 1277-1288.
42. Kohlbacher F. The use of qualitative content analysis in case study research. *Forum Qual Soc Res.* 2006; 7: 1-30.
43. Mayring P. *Qualitative content analysis: Theoretical foundation, basic procedures and software solution.* Klagenfurt; 2014.
44. Strauss A, Corbin JM. *Basics of qualitative research: Grounded theory procedures and techniques.* Thousand Oaks, CA, US: Sage Publications, Inc; 1990. p. 270-270.



Enjoy *OBM Geriatrics* by:

1. [Submitting a manuscript](#)
2. [Joining in volunteer reviewer bank](#)
3. [Joining Editorial Board](#)
4. [Guest editing a special issue](#)

For more details, please visit:

<http://www.lidsen.com/journals/geriatrics>

Annexure 1 Exemplary quotes and clustering.

Project name	Direct quote (Quotes from CIVISTI-AAL and DiaLogBuch were translated from the original language German to English)	Relation of quote to QA (readers' analysis, if not a direct quote)	Topical sector	Primary affiliation	Secondary affiliation	Tertiary affiliation
CIVISTI-AAL	The mobility concept of the city enables unhindered and efficient mobility of all citizens and visitors. An area-wide network, "around the clock", which is affordable for everyone and integrates the city into its surroundings, offers movement and mobility for all generations. (Newsletter from the future p.12)	QA is affordable, reliable, efficient, available, public transport	ACTIVITY	Mobility	Finances	
DiaLogbuch	This calls for an Ageing Culture 2.0 that takes age(s) into account and also offers the framework conditions for older people to both participate more actively in (public) life and become older in their own four walls in a self-determined way. (p.253)	QA has conditions that older adults can actively participate in public and live autonomously at home.	ACTIVITY	Societal participation	Autonomy	
CIVISTI-AAL	He/she can be meaningfully active for society and enjoy high status. Each individual is supported in his or her work by technical innovations that also take into account his or her abilities and interests. (Newsletter from the future p.7)	Doing meaningful work upgrades the societal status of aging.	ACTIVITY	Societal status	Societal participation	
PACITA	[...] early preparation for aging requires new training approaches and coaching concepts (p.6 final report)	Preparing people to age	EDUCATION	Changing view on aging		

PACITA	Free access to care and assistance and a softening of governmental structures. People who need care and assistance can decide by themselves on the type of care and assistance services they want to make use of. (p. 26 final report)	Technical education of older adults	EDUCATION	Changing view on aging	
CIVISTI-AAL	For society as a whole, this meant first of all thinking about comprehensive integration and inclusion and putting the independence and authenticity of the individual in the foreground. (Newsletter from the future p.7)	Cherish autonomy and authenticity of every individual	ETHICS	Autonomy	Individuality
DiaLogbuch	It is undisputedly a question of getting away from deficient and negative images of old age. (p.244)	QA depends on societal views and norms on aging turning away from a focus on deficit and negativity	ETHICS	Changing view on aging	
Value Ageing	Aging with dignity is a product of the interplay between human rights, equity, and public health. Public health is defined in relation to the so-called social and economic determinants of health, which includes decent housing, transport, and social connectivity, in addition to the diagnosis and treatment of disease. Equity focuses on the promotion of social justice and fair distribution of resources in society. In this connection, human rights and social justice (Rawls, 1985) attempt to determine the rules	Equity: promotion of social justice and fair distribution of resources in society.	ETHICS	Equality	Changing view on aging

	that govern the equal treatment of people (equity) (p.19)				
DiaLogbuch	And the user has no choice, i.e., no alternative to technology. Also, the control over the data and the data transfer is not allowed. This could also play an important role in a smart city or smart home concepts. Here, automatic connections can be established that cannot be perceived or understood by users and therefore cannot be controlled themselves. This also leads to the aspects of the protection of freedom of choice, self-determination, and autonomy. (p. 255)	QA includes the right of users to refuse technical solutions and their access to alternative solutions.	ETHICS	Freedom of choice	Changing view on aging
DiaLogbuch	Freedom of choice in the use of technology or technical assistance also plays a role in the issue of self-determined death. The importance of the living will be uniformly underlined here. (p.243)	QA is being able to autonomously decide on one's own death in terms of, e.g., assisted suicide or shutting down life-prolonging measures.	ETHICS	Freedom of choice	Changing view on aging
DiaLogbuch	It should be taken into account here that older people have become older with their very individual life histories and sometimes for various reasons do not react positively to a concrete change in their immediate living environment. (p. 254)	QA needs understanding for the individual history of older adults and their reasons for their aversion and dislike of special changes in their living environment.	ETHICS	Individuality	Changing view on aging

DiaLogbuch	However, the needs of older people should also be considered at different levels. Often, in order to create simple categories about "age", it would simply be assumed that older people were a separate category and whose interests and needs were homogeneous in themselves, instead of assuming that the whole diversity of life is also reflected in the process of aging and that a continuum can be assumed here. (p.67)	Societal acceptance of diversity of older adults, diversity of interests and needs	ETHICS	Individuality	Societal acceptance	Respecting needs
DiaLogbuch	This is more challenging since the current society reacts little to the expectations of the older generation and these often find poor framework conditions to participate in a creative social shaping process. (p.110)	For QA: society needs to react to the needs and expectations of older adults in terms of providing framework conditions that allow inclusion.	ETHICS	Respecting needs	Societal participation	
Value Ageing	One way to ensure that dignity is respected is to follow the so-called person-centered approach, as laid forth by Nolan et al. (2004). The basic assumption of the person-centered approach is for Nolan that professionals and patients/clients are equals. (p. 19)	Person-centered approach to care fostering dignity: equality between caregiver and cared-for Quality of Life determined by good supportive relationships	HEALTH	Care	Respecting needs	Individuality
PACITA	The local government authorities are responsible for ensuring that there is proper	Municipalities responsible for	HEALTH	Care	Policy	

	healthcare for its inhabitants, including monitoring the quality of the care provided. The local municipalities are required to deliver some health services, to manage licenses for private operators, and to mobilize the coordination of the volunteering organizations. (final report, p.22)	delivering and managing proper healthcare services				
PACITA	The results of the stakeholder workshop (feedback on the scenarios, visions & recommendations) emphasize: [...], participation and inclusion (p.6)	Participation and Societal inclusion	INTERACTION	Societal participation		
pTA Ageing	Of particular importance is the attempt to provide ATs that allow older adults to increase their quality of life and ensure their ability to actively participate in social life. (final report p. 15)	ATs as possible solutions to increase social participation	INTERACTION	Technology	Societal participation	
DiaLogbuch	Here, the individual commitment will have to go hand in hand with the setting of political framework conditions. It needs: - Knowledge-based and foresighted decisions as to what AAL can be used for and for whom, - integration of the central network partners (e.g., social insurance carriers), - empathy for the right incentives and - adapting requirements to needs (p. 258)	QA needs knowledge-based and forward-looking decisions on technology development, integration of the central partners (e.g., social security, health insurance, etc., providers) for understanding and fulfillment of real needs.	POLICY	Personal responsibility	Technology	Respecting needs

PACITA	The stakeholders called for the establishment of legal framework conditions concerning telemedicine, accountability, provision of services, etc. In addition, the government is responsible for the regulatory work (i.e., norms and standards need to be defined top down). Furthermore, the stakeholders stressed that it is important that institutions and municipalities should perceive each other as partners that enable and fund projects and ideas. More transparency in decision-making processes and the involvement of citizens in these processes need to be fostered. In addition, the institutions and local government authorities should act in a holistic, transcultural, and interdisciplinary way. A care cluster consisting of the three aspects, people, rights and ethics needs to be established. (Final report, p.39)	Framework conditions (legal, social, economic, norms & standards)	POLICY	Policy	Quality assurance
Value Aging	This means that governments should create the conditions under which individuals can as much as possible determine what they want and what they value (p.27)	Policies for strengthening self-determination	POLICY	Policy	Self-determination
DiaLogbuch	AAL aims to provide services and technologies that maintain and improve the well-being, autonomy, and safety of older	Services and technologies are important for QA to	RESSOURCES	Technology	Self-determination

	people, as well as their health and social integration. (p. 7)	maintain and improve the well-being, autonomy, and safety of older adults, as well as their health and social integration.			
DiaLogbuch	A machine-oriented developer's language must be brought into harmony with the means of expression of (worried) affected persons. Users could also take on the role of clients, as the innovation dialogue group is found. It is also about a critical examination of the current technology development process and the possibilities of research funding. (p.246)	QA needs a common understanding between technology developers working with semantic of machines and users in the real world.	RESSOURCES	Technology	Quality assurance
CIVISTI-AAL	The basic income secures a self-determined activity time model and thus the greatest possible self-determined life. (Newsletter from the future p.7)	Basic universal income enables autonomous activities and work, and therefore an autonomous life.	RESSOURCES	Finances	Self-determination