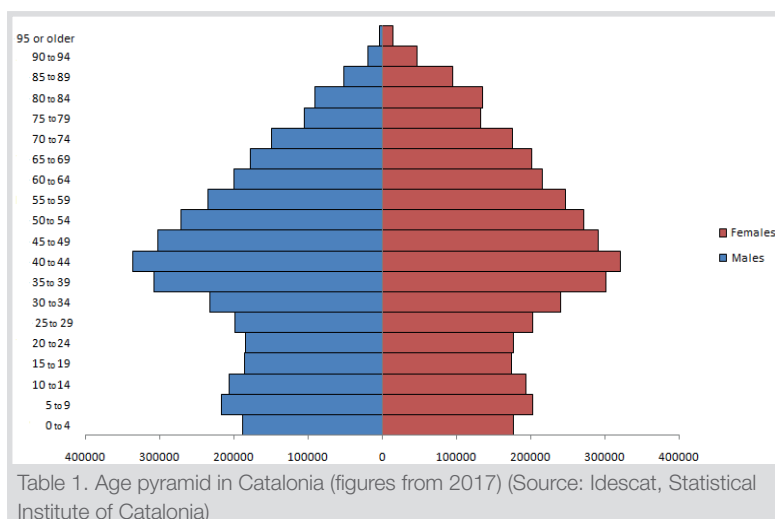


## Technology in elderly care



### Key ideas

- Every year, the percentage of the population aged over 60 continues to grow. At the same time, there is a sharp drop in birth rates. One in five people live in a very precarious situation.
- Despite the booming increase in access to new technologies, older people continue to be the main age group wherein digital literacy rates are the lowest. This trend contributes to the digital divide and leads to exclusion due to the loss of opportunities.
- The Catalan institutions have made progress in the application of digital services, particularly in the field of healthcare, focusing on mobile health and prevention. Nevertheless, at the legislative level, there is a need to rethink budgets in order to maintain and ensure the wellbeing of older people.

### 1. Elderly population

#### 1.1. Facts and figures

In Catalonia today, there are two problems in the area of technology for elderly care, namely poverty and the digital divide, which are layered upon the problems stemming from ageing, primarily the lack of autonomy and the dearth of sufficient resources to use all the technological means available to achieve better wellbeing.

The baseline fact in Catalonia is that 24% of the population is currently age 60 or older (see Table 1). However, there has also been a steep decrease in the birth rate since the 1970s, which has led to a narrowing of the base of the age pyramid. Therefore, if we extrapolate this to 20 years from now, the population of persons age 60 or over may reach 40%.

We should bear in mind that around 30% of the population age 65 and older has some kind of moderate or severe limitation, and 9.1% of the total population has difficulty performing basic activities. With regard to the problem of poverty, in late 2018, the At Risk of Poverty and/or Exclusion (AROPE) rate in Catalonia was 41% before counting all kinds of social transfers. Once all the social transfers are counted, this percentage was only lowered to 20.6%, revealing that the

current social measures to mitigate poverty leave one out of every five people in highly precarious situations.<sup>1</sup>

#### 1.2. Digital maturity

With regard to the issue of the digital divide, namely the problem of the increasing socioeconomic difference and the gap in opportunities arising from being «connected» or «not connected» to the outside world via the information and communication technologies (ICT), it is worth noting that the existing inequality is increasing and leading to a gradual rise in the number of elderly persons at risk of poverty or exclusion because they miss out on opportunities.

Digital illiteracy affects a major swath of the population, especially individuals born before the 1960s. According to a survey by the INE (National Statistical Institute, a state-wide organisation in Spain) on information technologies equipment and use, in the period 2010 to 2018, elderly persons' access to the ICT in the most recent three months increased from 13.8% to 49.1%, which is the steepest growth in all the age groups for Spain as a whole.<sup>2</sup> Mobile Internet has heavily penetrated Spain is a fact, even though smartphones and complex devices are used by the elderly in a more limited fashion.

The Punt TIC network is comprised of a wide variety of centres and spaces, both publicly and privately owned, which make available to citizens the equipment and personnel needed to provide them with access to ICT and thus to the Knowledge Society. The vast majority of centres offer digital literacy aimed particularly at the elderly in an effort to close the digital divide. Of all the centres which are open to the public at large, the general public at more than 50 is primarily comprised of elderly persons, and they therefore provide specialised training targeted at this population segment.<sup>3</sup>

## 2. Current status of the use of technology and social innovations in elderly care

At the level of both the institutions of Catalonia and most of the Catalan town halls, all administrative procedures have been streamlined so they can be done without being personally present, in terms of both municipal administrative services and especially the «e-salut» healthcare service, which is one of the services used the most widely by the elderly.<sup>4</sup> Catalonia has made a major effort to generate and incorporate new technologies into its healthcare services, such as electrical wheelchairs and remote assistance buttons, which have increased the security and autonomy of many elderly persons. Despite these advances, the e-services that technology currently allows do not yield all the desired results, first because of elderly persons' difficulty accessing IT tools, but also because of the rejection that public service IT applications cause; the fact that they are not very intuitive or are excessively complex can demotivate people from using them.

As a technology centre, we should mention the Eurecat programme, which has different divisions and several working lines in the field of health, such as the development of implants, orthosis, technical assistance

systems, remote assistance services and remote medicine based on new devices or sensors or systems to support decision-making for diagnosing and classifying patients. In the sphere of healthcare, a personal assistance robot is being developed which consists in an autonomous mobile platform which communicates with the user via a screen.<sup>5</sup>

Catalonia is participating in some of the 25 most influential European projects on technologies applied to active, healthy ageing. The study by the European Commission entitled Impact of EU-Funded Research and Innovation on ICT for Active and Health Ageing - The Top 25 Most Influential Projects<sup>6</sup> analyses the results of the projects financed by the EU within the seventh Framework Programme on Research and Innovation 2007-2013, the Innovation and Competitiveness Framework Programme 2007-2013 and the current Horizon 2020 programme. Catalonia's most prominent participation is the following:

- Badalona Serveis Assistencials (BSA) is part of the Beyond Silos project, which develops integrated services in seven European regions.

- Ateknea Solutions, the Universitat Politècnica de Catalunya (UPC), the Fundació Tic Salut, the Hospital Clínic de Barcelona, the Sistema d'Emergències Mèdiques and Flowlab are partners in the FATE (Fall Detector for the Elderly) programme, which has validated a digital solution to detect when elderly persons fall.

- The company Pal Robotics is a participating partner in the «Grow Me Up» programme, which has developed a smart learning robot.

- The Fundació Hospital Asil in Granollers and the Universitat Politècnica de Catalunya (UPC) are participating in the «I Don't Fall» project, which provides solutions to prevent falls.

- The Fundació Hospital Asil in Granollers and the company Sensing & Control Systems are participating in the «Radio» (Robots in Assisted Living Environments) project, which is working on caregiving robots.

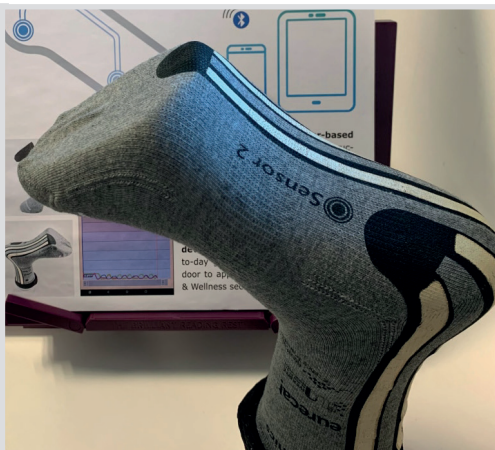
- The Agència de Qualitat i Avaluació Sanitàries de Catalunya (AQuAS) and the Hospital de la Santa Creu i de Sant Pau of Barcelona are participating in the «Stop and Go» programme, which seeks to pilot an innovative shopping process to improve the life of the elderly.

Other examples in which Catalonia has recently participated include:

The study carried out by the European Commission reveals a strong presence of projects relating to assistive robotics, which have had an important impact on the creation of a set of open standards and integrated platforms, and have helped to improve the quality of life for users at home. (Source: Study by the European Commission, courtesy of KOMPAI Robotics)



On the 19th of March, 2019, a prototype 'smart sock' was unveiled in Munich. This sock has force sensors and conductive tracks printed with flexible, conductive ink. A mobile application collects data that allows for the application of preventative or corrective measures. (Source: Eurecat)



– The CREB (Biomedical Engineering Research Centre) at the UPC and the company Sensing & Control Systems are developing a system, currently in the pilot phase, based on gas sensors and artificial intelligence to monitor the elderly, along with a device that detects risky situations, such as if the gas is left on, if the ventilation is poor or if there is spoiled food in a room.<sup>7</sup>

– The Eurecat technology centre and AST (Aquitaine Science Transfert), a company specialising in technology transfer, are unveiling a smart sock prototype that monitors movement while walking with the goal of checking balance and helping prevent falls.<sup>8</sup>

– A team at the Terrassa Campus of the UPC can objectively determine the thermal comfort of homes for the elderly.<sup>9</sup>

Within the city of Barcelona, in 2019 the Barcelona Town Hall announced a call for applications to care for elderly persons in situations of dependence using technological solutions. Also in 2019, Mobile World Capital Barcelona, the Barcelona Town Hall and 5G Barcelona launched a new call for applications through the d-LAB programme to provide innovative technological solutions to improve the quality of life of the elderly.<sup>10</sup>

### 3. Implications for elderly, staff and workplaces

If we analyse the regulations approved in Catalonia, we first and foremost find societal awareness of protection of the elderly, yet we also notice the scant influence of all the tech-based considerations. Therefore, it seems recommendable to once again update the legislative texts bearing in mind the possibilities afforded by current and future technological resources.

The importance of the healthcare sector, both from the social standpoint and because of the size of its market, makes it a field of

interest for the industrial and services sectors. There are many companies in Catalonia that offer services ranging from providing personnel for cleaning and domestic tasks or escorts, to comprehensive services, remote assistance services, physiotherapy services or special services.

Catalonia also has its own tech providers of not only services but also products. The industry supplying these products can respond to local initiatives, or they can supply international companies which have moved to Catalonia because of the competitive advantages they garner from its rich industrial and knowledge environment. This industry comprises everything from the development of special apps for mobile phones to simple devices that make the homes of individuals with physical or sensorial disabilities safer and more functional, such as sound indicators on the level of liquid in glasses for individuals with visual impairments and pictographic communicators, along with more complex equipment like the autonomous caregiving humanoid robots produced by Pal Robotics, a company from the United Arab Emirates mentioned above which operates out of the city of Badalona, very close to Barcelona.

### 4. Future prospects and reflections (Societal and political debates and TA-perspectives)

In the forthcoming decades, it is obvious that the sciences and technologies will provide important tools to diagnose illnesses better, more quickly and earlier, or to better track therapies or physical conditions, based on all kinds of highly sensitive, non-invasive, wearable and connected sensors. Less obvious yet perhaps even more important in the middle term, and with more profound effects, are the advances in direct action on the nervous system and the brain through optogenetic techniques, one of whose prime motivations is to treat the neurodegenerative diseases that affect the elderly.

The use of the new technologies is a huge opportunity to extend the number of years people can live healthily and independently, provide access to training and entertainment opportunities at all ages, and offer the chance to fully participate in society, yet it also entails formidable challenges in relation to the preservation of privacy, a subject of in-depth ethical debates. These challenges cannot just be left in the hands of committees of scholars or experts, who must obviously participate, but instead should be tackled by society as a whole. It is very important

for citizens of all ages and social statuses to be informed of the latest scientific and technological advances, as well as their practical applications and implications.

As Carl Sagan said, «Who is running the science and technology in a democracy if the people don't know about it?» It is very important for concerned institutions to work not only to divulge the existing knowledge but also to promote public debates which enable citizens to be informed about the latest advances and their implications.

In the forthcoming years, this technology will be complemented by the addition of other technological gadgets which are just emerging now (electrical devices with one, two, three or four wheels; drones, personal robots; etc.), and by the implementation of cyberneural systems which will provide new solutions to caregiving, mobility and autonomy. The fact that the cost of these gadgets keeps going down should allow their use within universal social benefits to be normalised, provided there is political will. To achieve this, more resources must be allocated for this purpose, and this entails reconsidering the priorities regionally, state-wide and throughout the entire European Union.

Clearly, a new balance should be found between spending invested in infrastructures

and the military industry and spending which should ensure the wellbeing of the elderly and environmental preservation.

## References

1. You can check the figures on the AROPE rate by sex and age for 2018 at: <https://www.idescat.cat/pub/?id=ecv&n=7705>.
2. See: [http://www.ine.es/jaxi/Datos.htm?path=/t25/p450/base\\_2011/a2018/I0/&file=02002.px](http://www.ine.es/jaxi/Datos.htm?path=/t25/p450/base_2011/a2018/I0/&file=02002.px).
3. See the Punt TIC website, which reports on important news for the elderly, projects, events, calendar, etc.: <http://punttic.gencat.cat/en/taxonomy/term/56>.
4. In order to encourage research and transfer in the e-health sector, the government of Catalonia has created the Fundació TIC Salut i Social (ICT Health and Social Foundation), which operates out of the Department of Health and works to promote the development and use of ICT and networking in the sphere of health. Its mission is to facilitate a transformation of the social assistance and healthcare model via ICT. It also promotes research and development geared at fostering industrial development with technology meant for this sector. See: <https://ticsalutsocial.cat/>.
5. See: <https://eurecat.org/sectors/salut/>.
6. You can see the report at: [http://ec.europa.eu/newsroom/dae/document.cfm?doc\\_id=50441](http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=50441). You may also check the information at: <https://ec.europa.eu/digital-single-market/en/news/top-25-influential-ict-active-and-healthy-ageing-projects>.
7. See: [http://www.accio.gencat.cat/ca/accio/premsa-comunicacio/cercador-premsa-actualitat/article/20190407\\_ASIVI](http://www.accio.gencat.cat/ca/accio/premsa-comunicacio/cercador-premsa-actualitat/article/20190407_ASIVI). 8. See: <https://eurecat.org/presenten-mitjo-intelligent-objectiu-ajudar-preveure-caigudes/>.
9. See: <https://gric.upc.edu/ca/projectes>.
10. See: <http://ajuntament.barcelona.cat/premsa/2019/05/24/53-projectes-de-5g-opten-al-repte-tecnologic-de-barcelona-per-millorar-lautonomia-de-la-gent-gran-a-casa-seva/>.

Public institutions should not only promote public debates and ensure the dissemination of healthcare advancements among citizens, but they should also work to standardise universal provision, through the allocation of resources and by reviewing existing laws. (Source: <http://www.dem-care.eu/>)

