

EDULEARN²³

**15TH INTERNATIONAL CONFERENCE
ON EDUCATION AND NEW LEARNING
TECHNOLOGIES**

**PALMA (SPAIN)
3RD-5TH OF JULY, 2023**



CONFERENCE PROCEEDINGS



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Preface

Welcome to the conference proceedings of EDULEARN23. This compilation of papers and research findings were written by a diverse array of education experts and scholars who participated in the 15th EDULEARN conference, held in Palma, Spain from the 3rd to the 5th of July 2023. The conference brought together academics and researchers from the field of education to exchange knowledge, inspire new ideas and share their insights.

The theme of EDULEARN23 covers the fields of education and educational research. EDULEARN23 provided different keynote speeches, parallel thematic sessions, networking activities, workshops, and interactive sessions. The extensive number of international experts who attended the conference allowed attendees to network and share innovative ideas, promoting cross-country collaboration. The keynote speeches are available at IATED Talks (iated.org/talks/).

The EDULEARN23 Proceedings, which are exclusively in English, include the accepted contributions presented at the EDULEARN Conference, which will be included in the IATED Digital Library (library.iated.org). They represent the collective efforts of the authors to advance knowledge in their field. The EDULEARN23 International Program Committee is composed of lecturers and researchers from many different countries. A blind peer review process was followed in order to guarantee the quality and relevance of the final publication. During this process, the following points were evaluated: information content, relevance to the educational field, general structure, clarity of contents, originality, and relation to the conference topics and disciplines.

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We extend our sincere gratitude to all the authors who submitted their valuable work to these EDULEARN23 Proceedings. We also wish to express our gratitude to all participants and attendees for their engagement, dedication, and passion for education.

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EDULEARN23 Keynote Speakers

Keynote Speakers

Ashok K. Goel – *Georgia Institute of Technology, United States*

Donald Clark – *Wildfire, United Kingdom*

Ashok K. Goel – Georgia Institute of Technology (USA)



Keynote speech:
Teaching and Learning in the Age of AI

Millions of adults of various ages need reskilling and upskilling in our technological society. These millions of adult learners offer a new, large, and diverse challenge to education. Given that many adult learners cannot leave their jobs or families, online education offers a medium for reaching them where they live and work. Online education also provides access to unprecedented amount of data on learners and learning. Our vision at the National AI Institute for Adult Learning and Online Education (AI-ALOE) is to develop novel AI cognitive assistants that work with this data to enhance the quality of adult online learning through personalization of learning. Successful realization of this vision requires progress on understanding the motivations, needs, and capacities of adult learners, participatory design of AI cognitive assistants, human-AI collaboration, large-scale learning analytics, and an infrastructure for deploying the AI cognitive assistants, collecting and analyzing the data on learning, and feeding the results to the cognitive assistants, teachers, and learners alike. I will describe the research program at AI-ALOE in some detail.

Biography:

Ashok K. Goel is a Professor of Computer Science and Human-Centered Computing in the School of Interactive Computing at Georgia Institute of Technology, and the Chief Scientist with Georgia Tech's Center for 21st Century Universities. For more than thirty-five years, he has conducted research into cognitive systems at the intersection of artificial intelligence and cognitive science with a focus on computational design and creativity. For the last decade or so, much of his research has focused on AI in education and education in AI. He is a Fellow of AAAI and the Cognitive Science Society, an editor emeritus of AAAI's AI Magazine, and a recipient of AAAI's Outstanding AI Educator Award. Ashok is the Executive Director of the recently established National AI Institute for Adult Learning and Online Education.

Donald Clark – Wildfire (UK)



*Keynote speech:
AI changes everything!*

Generative AI will change the way we work, therefore what, why and how we learn. Its profound impact on both work and learning will be presented showing that the consequences are both profound and unexpected. The role of the teacher and upskilling will also be explored.

Biography:

Donald Clark is a Learning Tech Entrepreneur, CEO, Researcher, Blogger and Speaker. He was CEO and one of the original founders of Epic Group plc, which established itself as the leading company in the UK online learning market, floated on the Stock Market in 1996 and sold in 2005. He has been involved at all levels of investment – angel, VC, growth, PE and IPO. As well as being the CEO of Wildfire an AI learning company, he also invests in, and advises, EdTech companies.

An investor and board member of learning companies Cogbooks (sold in 2021 to Cambridge University) and Learning Pool (sold 2021 for \$200 million), he was also on the Boards of City & Guilds, Learn Direct, University for Industry and the Brighton Dome and Festival. Wildfire delivers AI products and consultancy. He has published 3 books, the first on AI, second on Design for technology and the third, published next month on Learning Technology. His fourth book on Learning in the Metaverse has just been commissioned.

Donald has over 37 years' experience in online learning, video, games, simulations, adaptive, chatbot, social media, mobile learning, virtual reality and AI projects. He has designed, delivered and advised on online learning for many global, public and private organisations. An evangelist for the use of technology in learning, he has won many awards, including the first 'Outstanding Achievement in E-learning Award' and 'Best AIM Stock Market Company', 'Most Innovative Online Product', 'Best Online Learning Project and 'JISC EdTech Award'.

An award winning speaker at national and international conferences, he has delivered keynotes in the UK, Europe, US, Africa, Australia, Middle and Far East.

..... also a regular blogger (15 years+) on learning technology.

Conference Tracks & Sessions

The EDULEARN23 conference program is available online at <https://iated.org/edulearn23>

ORAL SESSIONS MONDAY

Technology-enhanced Learning
Computational Thinking Skills for the Digital Age
Soft Skills & Socio-Emotional Learning
Adapting Education in the Post-Pandemic Era
Programming and Computer Science Education
Experiences in Primary & Secondary Education
Experiences in Tourism Education
Technology-Enhanced Mathematics Education
Virtual Reality in Education
Creativity & Critical Thinking
Assessment and Evaluation Strategies (1)
Impact of COVID-19 on Education
Integrating Robotics and Programming in Educational Settings
STEM Education in Schools (1)
Technology-enhanced Language Learning
Teaching STEM Subjects
Generative AI for Innovative Teaching and Learning
Game-Based Learning
e-Assessment
Innovative Tools for Learning
Experiences in Engineering Education
Inclusive Education
Language Teaching and Learning
Experiences and Innovations in Mathematics Education (1)
AI in Education
Project and Problem Based Learning
Assessment and Evaluation Strategies (2)
Videos for Learning
Digital and Media Literacy
Supporting Special Education
English for Special Purposes & English as a Medium of Instruction
Experiences and Innovations in Mathematics Education (2)

POSTER SESSIONS MONDAY

Pedagogical Innovations and Trends in Education
Emerging Technologies in Education

ORAL SESSIONS TUESDAY

Social Media & Digital Skills
Plagiarism and Academic Dishonesty
e-Portfolios & Reflective Assessment
Experiences in Higher and Further Education
Professional Development of Teachers (1)
Student and Teacher Wellbeing
Experiences in Business Education
Service Learning & Community Engagement
Integrating Virtual Reality in Education
Learning Analytics (1)

International Projects & Mobility Experiences
Workplace & Lifelong Learning
Professional Development of Teachers (2)
Student Support
Experiences in Health Sciences Education
Education for Sustainability (2)
Virtual & Augmented Reality
Learning Analytics (2)
Active and Experiential Learning
Internships and Work-integrated Learning
ICT Skills among Teachers
Educational Management (1)
New Technologies in Health Sciences Education
STEM Education in Schools (2)
m-Learning
e-Learning Experiences
Gamification and Game-Inspired Learning
Personalized and Self-Regulated Learning
Teacher Training
Educational Management (2)
English as a Foreign Language
Innovations in STEM Education
Chatbots & AI in Education
From Face-to-Face to Remote Learning
Blended & Hybrid Learning
Entrepreneurship Education
Pedagogical Innovations
University-Industry Cooperation
Education for Sustainability (1)
Professional Development of STEM Teachers

POSTER SESSIONS TUESDAY

Experiences in Education
New Challenges in Education and Research

VIRTUAL SESSIONS

DIGITAL TRANSFORMATION OF EDUCATION

Data Science & AI in Education
Learning Analytics & Educational Data Mining
Digital Transformation
Digital and Media Literacy
Educational Programming & Robotics
Computer Games and Educational Software

INNOVATIVE EDUCATIONAL TECHNOLOGIES

AI, Chatbots & Robots
Virtual & Augmented Reality
Social Media in Education
Technology Enhanced Learning
Videos for Learning
Simulation & 3D Technologies

DIGITAL & DISTANCE LEARNING

Distance Education in COVID-19 Times
Challenges and Practices during the Pandemic and Beyond
Blended & Mobile Learning
Open Educational Resources
Learning Management Systems & Virtual Learning Environments

ACTIVE & STUDENT-CENTERED LEARNING

Gamification & Game-based Learning
Experiential & Cooperative Learning
Problem & Project-Based Learning
Flipped & Hybrid Learning
Pedagogical Innovations
Creativity & Critical Thinking

ASSESSMENT, MENTORING & STUDENT SUPPORT

Assessment & Evaluation
Mentoring & Tutoring
Student Support & Motivation
Developing Soft and Transversal Skills

TEACHER TRAINING & ED. MANAGEMENT

ICT & Digital Skills
Professional Development of Teachers
Educational Management

QUALITY & IMPACT OF EDUCATION

Quality in Education
Experiences and Challenges in Curriculum Design
Sustainability & Social Impact of Education
Links between Education and Research
University-Industry Collaboration
Mobility & International Projects

EDUCATIONAL STAGES & LIFE-LONG LEARNING

Early Childhood & Primary Education
Vocational Education
Transition to the Job Market & Entrepreneurship
Life-Long & Workplace Learning

MULTICULTURALITY & INCLUSION

Multicultural Education
Diversity Issues
Special Educational Needs
Inclusive Education

DISCIPLINE-ORIENTED SESSIONS

Architecture & Interior Design Education
Health Sciences Education
Computer Science Education
Business & Tourism Education

LANGUAGE LEARNING AND TEACHING

Foreign Languages
Language Learning & Translation Studies
New Technologies in Language Learning

STEM EDUCATION

Mathematics & Statistics
Engineering Education
STEM Experiences

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ACADEMIC RESEARCH IN BETWEEN USER NEEDS AND INDUSTRY DEMANDS IN THE CONTEXT OF THE SILVER ECONOMY

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Abstract

The silver economy can be considered as the system that is at the base of the production, distribution and consumption of goods and services strictly dedicated to elderlies, their living and health needs. It is a growing economic sector that, for example, in Italy generates between 300 and 500 billion per year, which is approximately 30% of the national GDP.

One of the concepts that lies at the heart of this sector is the idea of active ageing: the vision around the theme of ageing is often influenced by negative stereotypes, which lead to consider the 'elderly' user, first and foremost, as physically and cognitively impaired and, therefore, in need of assistance and targeted care. The products and services developed for this category of users consequently try to act in this direction: if, on the one hand, they are capable of facilitating their daily life and that of their caregivers, on the other, they may generate effects that are not considered and not desired, such as, for example, isolation, poor sociability, poor mobility, etc., resulting in failure in their use and diffusion.

Observing the current situation, it can be understood how this view of seniority is no longer exhaustive and truthful: the elderly person must be considered as an active user, still capable of exercising agency, moved by needs and desires that go beyond care and assistance, a bearer of experience and knowledge.

Thus, it is clear that design strategies for the development of services and products dedicated to this category of users must necessarily broaden their horizons and begin to take into consideration areas that have been little explored, such as education and entertainment, well-being, and sociality.

Therefore, in a context that is innovative because it is actually unprecedented, the role of research institutions within design universities can become crucial in directing both research and industrial application to generate new solutions that meet changing needs.

The contribution seeks to present the research experience carried out on the topic of the silver economy and active ageing in a context of collaboration between academia, public institution, and industry, and it is aimed at highlighting an unprecedented way of co-creating value: a platform capable of building continuous connections between the professional and research communities in the field of the silver economy and active ageing, based on a multi-disciplinary approach, whereby not only the main fields will be integrated, but also disciplines and competences that are not ordinary, but nevertheless capable of providing useful input to guide innovation processes in various aspects. The platform also enables the actors involved to continuously check the 'state of the art' in the areas of interest and to develop further lines of research, guaranteeing a pragmatic and creative approach, capable of directing resources in the most effective way.

The contribution is concluded presenting some potential domains of interest, identified through the first stages of exploratory research, aimed at mapping, with a macro perspective, the complexity and potential of the silver economy and active ageing sector: mobility, housing, culture, fashion, social care, healthcare, wellness, and entertainment.

Keywords: Silver economy, active ageing, design-driven innovation, research, multidisciplinary.

1 INTRODUCTION

In the Western context, thanks to a growing innovation in the field of health and wellbeing, the population is undergoing a gradual ageing process that, combined with the aforementioned improvements, leads to a necessary revision of the conception of the elderly person: a human being still active, with complex and stratified expectations and desires for their daily life, who, moreover, has a strong economic and purchasing power.

In this direction, the silver economy and the concept of active ageing become models to be pursued, stimulated, and disseminated to ensure the contribution of this group of people to the social and economic life of a country, without preconceptions and prejudices no longer consistent with the current situation.

Since this field is still under exploration, it is necessary to apply an innovative and disruptive approach to the addressed issues, thereby encouraging the development of research, products, services and solutions that are truly capable of enhancing the particular characteristics of these users and that contribute to generating social and systemic innovation.

In the field of design, different approaches to the topic of active ageing can be identified [1]: for research and development laboratories, it represents a theme to be applied to the industrial world and services; For agencies, it becomes instead a field for the realization of concepts with a strong future impact on the market; finally, in the field of academic research, design collaborates with other knowledge in order to produce research on the topic of interest.

All these approaches present critical issues, which can be overcome by integrating them into joint research platforms, capable, on the one hand of generating theoretical guidelines, stimulated by academic and pre-competitive research processes and, on the other, to produce strategies and solutions to tackle the specific needs of users and the target market.

The aim of the contribution is, therefore, to display the research experience conducted on the theme of the silver economy and active ageing in a context of collaboration between academia, public institutions and industry, highlighting innovative ways of value co-creation: a platform capable of building continuous connections between professional and research communities, based on a multidisciplinary approach, in which non-ordinary disciplines and skills will also be integrated, being able to provide useful inputs to guide innovation processes in various aspects.

Another objective of the contribution is to highlight different application areas of interest for the reference sector, identified starting from a preliminary research process.

In the first section of the paper, the concept of silver economy and the theme of active ageing are deepened, highlighting the data collected through the aforementioned preliminary research process; the second section is devoted to the presentation of the joint research platform, describing the actors involved and their role, its objectives, its structure and methodology, and, finally, the application areas of interest; the last section is dedicated to reporting the final discussion, explaining the future developments of the platform.

2 SILVER ECONOMY AND ACTIVE AGEING

In recent years the concept of the silver economy has become a demographic and economic issue of considerable importance for both the world of industry and of the academia: the World Health Organization (WHO) [2] expects that by 2030, in Europe and America, the percentage of over 65 should grow to reach 22% of the total population.

This population group has a considerable influence on local and national economies: in Italy, for example, it generates between 300 and 500 billion a year, equal to about 30% of the national GDP and, more specifically, ISTAT data [3] show a monthly expenditure of about 2100 €, especially for housing, food, transport, and health. These data show a higher spending capacity than other age groups (especially young people) and, therefore, the fundamental need to integrate the offer to make these users still participate in a country's social and economic sphere.

Further, WHO [4] describes active ageing as a system for health, participation, and safety that should improve the quality of life for people over 65, stressing that these processes should be based and driven by the rights, the needs, preferences, and capabilities of the above.

Therefore, in its Global Physical Activity Action Plan 2018-2030 [5], WHO affirms that maintaining a certain degree of activity is essential to keep and improve one's physical and mental condition. In fact, several European bodies are looking for solutions to tackle the progressive ageing process that has been taking place for decades in the continent.

However, the widespread view of ageing is often driven by negative stereotypes [6] linked to the weight these actors can exert on society [7]: fragile and not very independent [8], lacking in abilities [1] and elderly [9].

These users should be considered as people with skills and active agents in solving social problems [10]. Accordingly, project actions targeting this category should promote their social participation rather than focusing exclusively on the health and care dimension [11], accentuating erroneous de-empowerment processes [12] and the negative aspects caused by advancing age.

Several studies support the role of the elderly as a social resource [13], for example, by transferring knowledge to younger generations [14] or by keeping historical and cultural traditions alive [15]. This population group can also provide practical, emotional, intellectual, social, and cultural support [16]. Community engagement during the ageing process, maintenance of positive subjective wellbeing, continuous involvement with the family and/or peer group have been proposed as key factors describing the principles of active ageing [17].

From a socio-cultural perspective, research carried out on Italian territory [3] shows that this group of population is still involved in active relationships and participates in social and cultural activities with a certain frequency. With regard to wellbeing [18], it can be pointed out that users over 55 affirm that their condition is better than before, not having to take care of their children, being close to retirement age and having a high economic and purchasing power. In addition, both from a personal and a other people's perception of their seniority [19], it is interesting to note that most over 65s do not consider themselves to be elderly, nor do they feel themselves to be seen as by others.

It is clear therefore the need to promote a different image of these users, nurtured by research capable of generating innovative scenarios in which ideate and integrate disruptive solutions, able to include and give value to the wishes and contribution that this group of users can bring to society. The themes of the silver economy and active ageing are extreme complex, covering different social aspects, involving different actors in the reference processes and, therefore, needing multiple points of view to be addressed. In this direction, the construction of shared research platforms, including university research institutions, industrial and tertiary stakeholders, and other public institutions active in the fields of reference, can be an innovation tool for all stakeholders, capable of generating disruptive research and solutions.

3 THE JOINT RESEARCH PLATFORM

This section describes and analyzes the joint research platform, highlighting its structure, objectives, the actors involved and their corresponding roles, and the research themes highlighted through the first research activities.

The JRP Active Ageing platform aims to create a network of bodies, infrastructure, and skills, consisting of design universities, secondary and tertiary companies, and public organizations. The collaboration between these actors provides multidisciplinary approaches, aimed at defining research, strategies, and projects, guided by the analysis of users and target markets and able to respond effectively to emerging needs.

3.1 The structure and research methodology

The platform is intended as a functional tool for the implementation of multi-actor and multidisciplinary projects, exploiting the collaboration between universities, businesses, and public administrations. It is an innovative model, already tested in the context of medium-long term collaborations, aimed at the development of pre-competitive and industrial research. It can also direct academic research towards real needs dictated by markets and target audiences.

The activities carried out by the platform are structured on three parallel levels that differ in objectives, time horizon and applied methodologies: analysis of emergencies and current needs to highlight national and international best practices, current trends, exploiting quantitative and qualitative research methods; exploration of the sectors affected by the analysis and definition of short and medium-term projects, to be activated over 1-3 years; forecasting and construction of long-term scenarios, projected 10 years into the future useful to direct all the activities previously highlighted (Fig. 1).

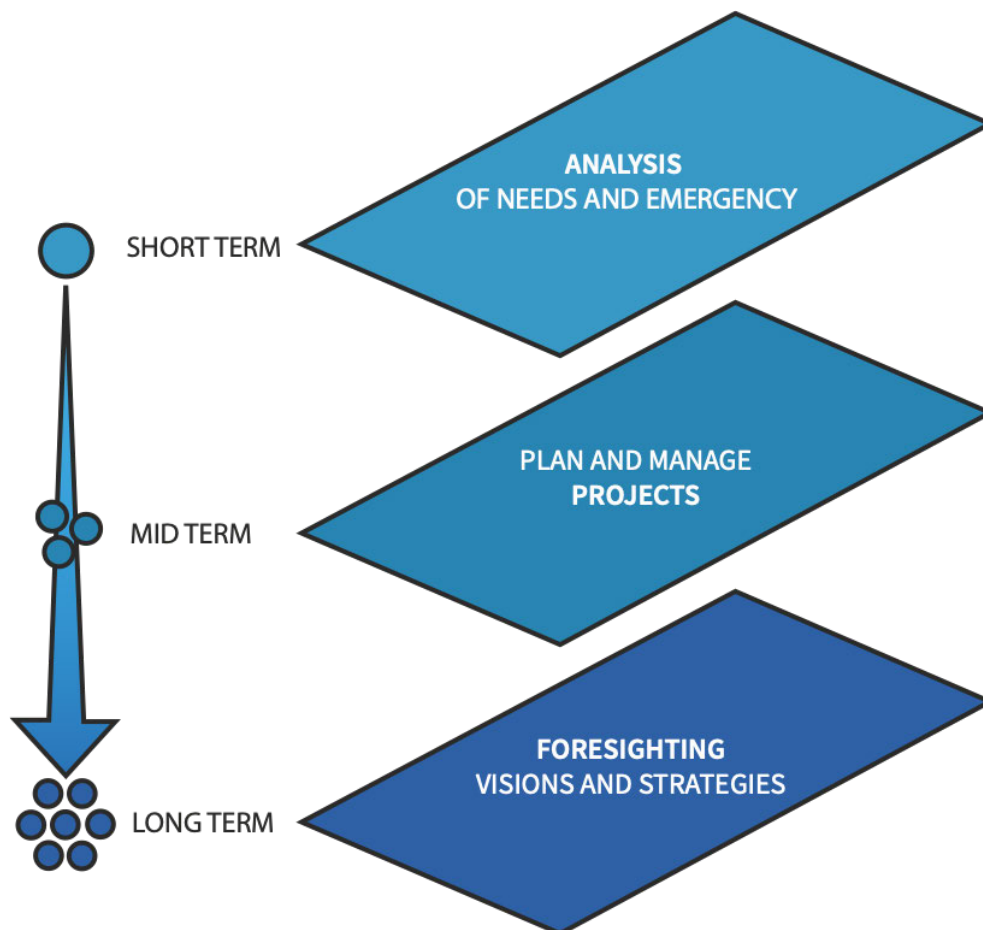


Figure 1. The research and design methodology of the platform.

3.2 The objectives

The platform therefore meets several objectives: it performs the function of a continuous observatory on the themes of the silver economy and active ageing, to map trends and signals that can direct and catalyze forms of social innovation and system; it enables different modes of research, preliminary, applied and clinical indeed; it is a co-design tool that connects different actors, knowledge and disciplines, creating an effective context for the construction of strategies with high social impact.

The platform also aims to facilitate discussion on social and technological issues, maximizing the value derived from the collaboration between the university and businesses and thus encouraging the transfer and exchange of knowledge and technology in a highly innovative context.

3.3 The involved actors and their role

The platform is composed by three main actors, which are related to the academic environment (university + foundation), the industry and tertiary sectors, and the social cooperatives. The three actors contribute to the management and activities of the research platform with their peculiar expertise: the university is the scientific guarantor and the director of research activities, exploiting their experience and their knowledge in conducting basic, applied and clinical research projects; the social cooperative, to research activities through its know-how and its applied knowledge, ensuring a high degree of truthfulness to the whole process; finally, the secondary and tertiary sectors contribute to the activities of the platform by highlighting the needs and directions of the reference market (Fig. 2).

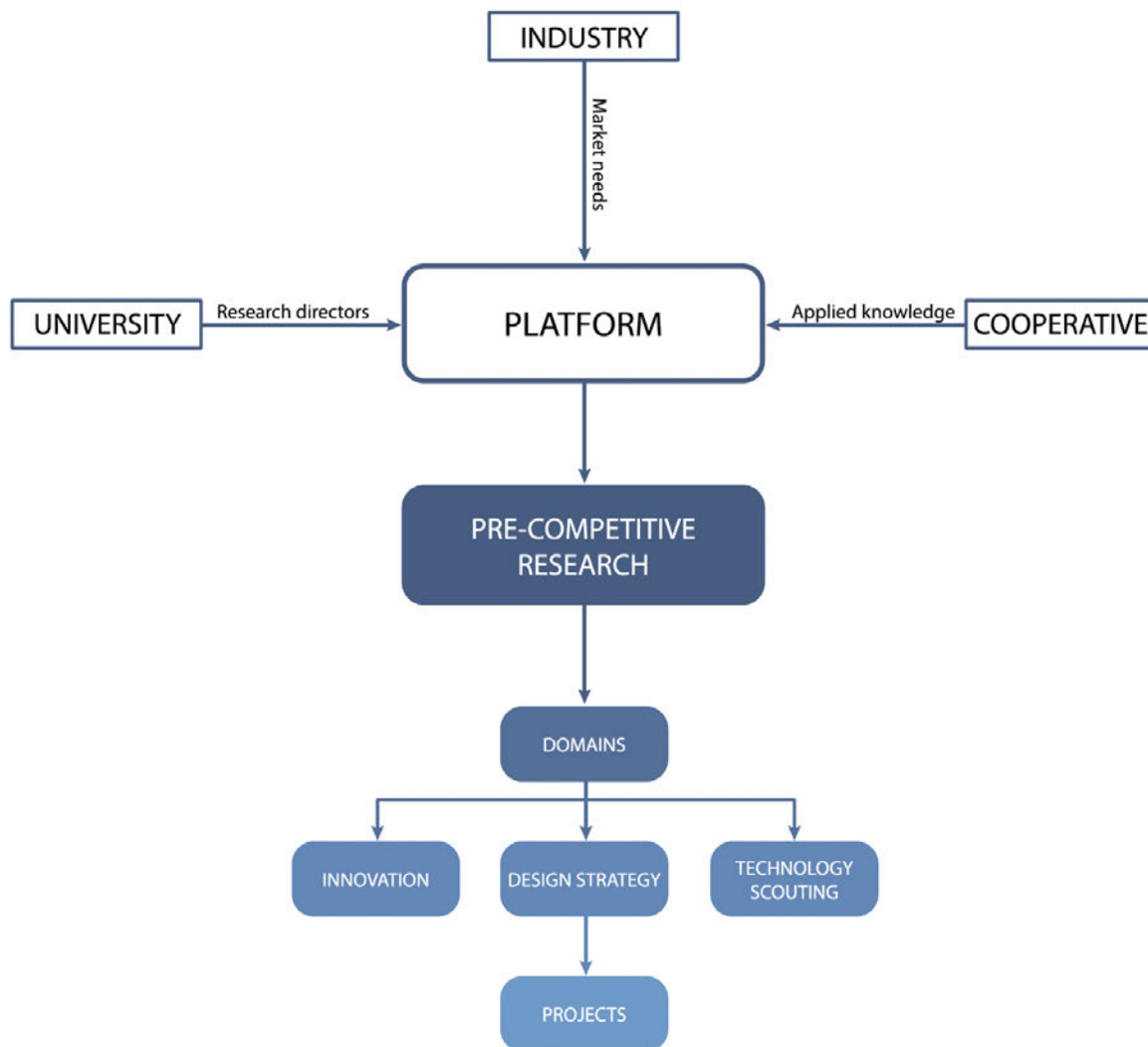


Figure 2. The actors and the outputs of the platform.

3.4 The research themes

The platform finds its natural themes through the synergy between the secondary and tertiary sectors and the academia, constantly engaging on two fronts: the continuous verification of the "state of the art" in the fields selected for research and the conduction of the research activities. This approach guarantees the initiative to be pragmatic and creative, as well as able to direct resources towards the integration of previous knowledge and experience of all the actors involved.

The research carried out through the platform focuses on the growth of the elderly population, in order to develop, as previously stated, guidelines and strategies to improve the ageing situation and the social inclusion of the target population. A cross-cutting research theme is technological innovation, which can provide valuable tools to improve the quality of life of the users concerned by the research.

Through a preliminary research process, it was possible to highlight specific themes which to focus the activities of the platform on and distribute them on a realistic and factual time horizon: mobility, housing, culture, fashion, social care, healthcare, wellness, and entertainment. These themes are not to be considered as restrictive areas, but rather as original ideas linked to the macro-trends in place and that, since today, can be assumed as potential drivers for the entire research (Fig. 3).

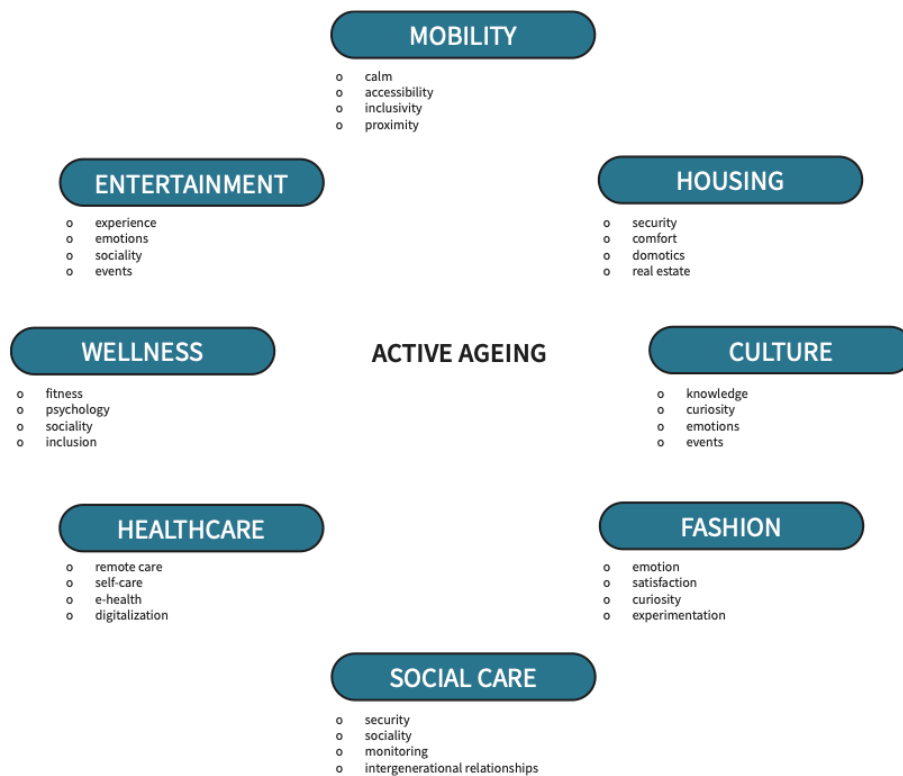


Figure 3. The specific themes the platform has highlighted through a process of preliminary research.

In the field of mobility, with particular reference to smart city and age-friendly city models, the research focuses on sharing and personalized assistance services; public transport, encouraging its use by this group of reference; and on private transport, with a particular focus on access, technology, sustainability and the user interface and user experience.

In the field of housing, specific research topics focus on home automation and monitoring, exploiting sensor and detection technologies helpful in facilitating the use of these devices even by users who are less familiar with a certain type of technology, and encouraging, as a further consequence, a greater knowledge and safety in the use of systems technologically loaded.

The theme of culture includes activities in the field of events and education, building a satisfactory offer for users over 55, which has to be, therefore, accessible, and inclusive, providing for close collaboration with public administration and public institutions.

The concept of inclusive fashion is the driver for research and activities in this specific sector, with a particular attention to cosmeceutics and nutraceuticals, sensorized tissues and specific and personalized products, currently designed with a traditional vision about ageing.

The theme of social care involves the construction of experiences that encourage intergenerational connections; the reevaluation of structures and spaces dedicated to caring for new social activities that can build meaningful relationships in the daily lives of the over 55; the creation of customized services applied to different types of accommodation structures.

In the healthcare field, research focuses on the conceptualization of medical and electromedical, pharmaceutical instruments and supplies, and on their delivery modes; furthermore, on the development of e-health platforms, online services, and smart devices.

As for wellness, projects to be explored are customizable experiences and activities to achieve physical and psychological wellbeing; and products tailored for the target audience, which should facilitate physical activity.

Finally, with regard to entertainment, potential lines to be developed concern thematic and tourism routes and the creation of spaces dedicated to specific activities, within public or private structures.

4 CONCLUSIONS

The contribution focuses on the themes of active ageing and silver economy, addressing them from a design research perspective, therefore conducted in the academic context. Highlighting different limitations in tackling these topics, mainly caused by a non-exhaustive view towards the theme of ageing, the contribution presents a joint research platform, that connects the academia with secondary and tertiary enterprises, in order to develop research, strategies and innovative projects in the fields of reference.

The activation of this type of platforms allows to assume an innovative perspective towards a group of population that is going to increase significantly in the coming years, encouraging the development of research and projects based on significant present trends, which can have a deep impact on different time horizons (short, medium, and long term).

A further innovative element of the platform is its multi-actors and multidisciplinary dimension that stimulates the creation of networks that involve small, medium, and large enterprises, and research universities, enabling the former to access pre-competitive research that can guide innovation and the development of products and services and the latter, to direct their activities towards a more pragmatic approach, guided by the real needs of users and of the reference market.

Moreover, the creation of tools such as the one described in the contribution allows to foster co-creation processes of shared value [20] among the different stakeholders involved in the activities and related to the scope of research and projects, thus generating potential innovations of meaning and sense, as well as of system and social; furthermore, it fosters technology transfer processes [21] both between the businesses and academia, and between stakeholders with the same role and function: again, through this mode, forms of radical innovation are stimulated capable of significantly changing the foresighted scenarios, giving rise to disruptive visions.

In the near future, for each thematic area identified through the preliminary research process, potential interventions to be developed in the short and medium term are going to be identified and conceptualized, building multidisciplinary project networks made up of university researchers, companies, and actors from other institutions. With a longer time horizon, the objective of the platform is to identify and build potential scenarios and long-term visions related to the different areas defined and mentioned above.

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