

# Collaborative mechanisms for a new perspective on active ageing

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**Abstract**— The collaborative networks paradigm, supported by advanced community building and collaboration ICT platforms, can provide a new approach to active ageing. This paper introduces first results of a roadmapping initiative towards the elaboration of a new vision for extending professional active life. To support this vision, a strategic research plan for the development of a new digital ecosystem, covering the social, organizational, and technological perspectives, is being designed.

**Index Terms**—Collaborative networks, virtual communities, active ageing.

## I. INTRODUCTION

With the increase in both the percentage of senior citizens and expectation of life, it is timely to reassess the understanding of ageing and retirement, and questioning elderly's work, happiness, leisure, community involvement etc. and their inter-relationships with respect to old age.

Many elderly citizens, following retirement, quickly become marginalized and considered as a **cost burden rather than a resource that is capable of "value creation"** in the society [1, 2]. This feeling of exclusion and isolation creates a vacuum in the life of the elderly citizens which in turn affects their health and well being. In fact we can consider three stages in retirement [3], the 'active stage', the 'slowing down stage' and, finally, the 'dependence stage'. During the first (active) stage, to an individual retirement is often perceived as the following:

- Loss of freedom and independence,
- Loss of identity when work ends,
- Loss of joy in weekends/vacations, since all days become the same,
- A second chance without any clear direction of how to proceed,
- Beginning of the late life crisis ("beginning of the end feeling"),
- Resulting a return back to work.

The critical challenge for the society in respect to the "**active ageing / ageing well**" process [4] is to identify new organizational structures, approaches, and mechanisms so that elderly citizens do not feel excluded, and have the chance to use their knowledge and expertise in making valued contributions to the communities where they live.

On the other hand, as the older population increases and the growth in the middle-aged population slows down, older adults are becoming an increasingly important labour source. They typically bring maturity, dependability, and years of relevant experience to the workplace. Nowadays

with more people remaining in good health at older ages and increasingly more jobs not involving physical strength, more old adults are able to continue working than ever before. Retirement will indeed no longer represent the end of the working period, but rather a career and lifestyle transition, where the retiree in principle has multiple options -- such as continuing to work (though perhaps at a different pace), returning to school for additional training or education, changing career, venturing into entrepreneurship, becoming more involved in volunteer work, or simply enjoying leisure and travel possibilities -- thus a mix of working, learning, relaxing, and trying new things can be foreseen.

In addition to the traditional initiatives focused mostly on socialization and entertainment activities for elderly, a number of other organizational forms and mechanisms are emerging, focused on providing ways to help senior professionals remaining active, in professional terms, after retirement. Although with different involvement and commitment levels from retirees, such initiatives try to make use of the valuable knowledge, wisdom, and experience of senior professionals, namely through various forms of consulting and mentoring activities. ICT and particularly collaborative technologies, can play an important facilitator role in this area. There is a need to provide support in the form of "ready-made 2nd generation affective and life-integrated communities" to which the elderly professional can join. Moreover, there is a need to provide the opportunity for senior professionals to choose a balanced proportion between their value creating and the leisure activities, as well as the opportunity to modify the balance in their portfolio of activities over time. In order to elaborate a strategic R&D plan in this direction a 2-year European initiative – ePAL (extending Professional Active Life) project – was launched in 2008.

ePAL aims at establishing a strategic **research roadmap towards a 2<sup>nd</sup> generation support system for active ageing**. ePAL aims to explore innovative ways to best facilitate the development of the active ageing process and to ensure an improved transition for the elderly citizens as they cope with the onset of age. For this purpose, a **strategic RTD roadmap**, focused on novel collaborative solutions and ensuring a balanced post-retirement life-style is pursued in ePAL. It mainly defines the needed strategy and the action plan to support both the dynamism in behaviour/emotions as well as the elderly's desire to continue professional interactions in the socio-economic system.

Most R&D efforts, both past and present, have adopted a reactive strategy while trying to mitigate the problems

"after" the elderly reach a critical phase in dependency. ePAL however adopts a proactive strategy, identifying measures of a more "preventive" nature.

## II. A COLLABORATIVE NETWORKS APPROACH

The hypothesis followed in ePAL is that collaborative networks provide an adequate framework for the implementation of effective support to active ageing.

**Collaborative Networks** represent a new scientific discipline that covers the study of networks consisting of a variety of entities (e.g. organizations and people) that are largely autonomous, geographically distributed, and heterogeneous in terms of their operating environment, culture, social capital and goals, but that collaborate to better achieve common or compatible goals, and whose interactions are supported by computer network [5].

Nowadays collaborative networks manifest in a large variety of forms. Moving from the classical supply chains format, characterized by relatively stable networks with well defined roles and requiring only minimal coordination and information exchange, more dynamic structures are emerging in industry and services. Some of these organizational forms are goal-oriented, i.e. focused on a single project or business opportunity, such as the case of virtual enterprises (VE). The same concept can be applied to other contexts, e.g. government and service sectors, leading to a more general term, the virtual organizations (VO). A VE/VO is often a temporary organization that "gathers" its potential from the possibility of (rapidly) forming consortia well suited (in terms of competencies and resources) to a given business opportunity.

Other emerging collaborative networks are formed by human professionals that may collaborate in virtual communities and form virtual teams to address specific problems, such as collaborative concurrent engineering or development of a consultancy project.

Many more examples can be found in different sectors, e.g. networks of insurance companies, networks of governmental institutions, networks of academic institutions forming virtual institutes for joint delivery of advanced courses, networks of entities involved in disaster rescuing, networks of care centres, healthcare institutions, and family relatives involved in elderly care, etc. With the development of new collaborative tools supported by Internet and a better understanding of the mechanisms of collaborative networks, new organizational forms are naturally emerging. With the consolidation of Collaborative Networks as a new scientific discipline in the last 3 or 4 years, more emphasis is being put in the elaboration of a theoretical foundation for the area and reference models that form the basis for further sustainable developments. As an example, ARCON [6,7] offers a first comprehensive reference model for collaborative networks, covering three perspectives of: the environment (endogenous elements and exogenous interactions), the life-cycle, and the modeling purpose.

In the context of the ePAL project, bearing in mind that one of the main goals is to keep the elderly engaged and socially active in society, an organized collaborative network is a fundamental instrument. After retirement, most of the social and professional bonds are rapidly broken. An organised Professional Virtual Community for seniors is then a vital instrument for keeping their involvement in society.

The following scenario illustrates a potential case of the suggested approach.

### *An example scenario*

*José is apprehensive today. In fact he has been worried lately. Everything was different two years ago when he and his friend had this idea for an innovative low consumption air conditioning device and started their FreshAir company. The two engineers soon developed the new equipment thanks to their dedication and enthusiasm. But now they are facing difficulties. They don't know much about marketing or internationalization, although they understand the need to target a global market. Unfortunately they spent all their resources in the start-up phase and now cannot afford to get assistance from one of those big consultancy companies ... Either something happens or may have to close and fire their employees soon...*

*Three weeks later ...*

*José and his colleague are having a meeting with Carlos and Ana, two members of the local branch of the Regional Development Agency (RDA). After some initial contacts, Carlos and Ana spent some time in the company making an analysis of its problems and today they are presenting their conclusions. The diagnosis seems logical to José. It is clear that FreshAir needs some coaching and specialized guidance in two crucial areas – focused marketing and internationalization.*

*But they cannot afford the high costs of such specialized assistance. RDA, an organization funded by the local government and that aims to promote local businesses, made the analysis for free. Unfortunately they do not have the expertise to help in the next phase ...*

*Guessing the worries passing through José's mind, Ana told them that there is a potential solution. Then she mentioned the ActiveSeniors association ...*

*Pedro is a retired professional, member of ActiveSeniors. Based on his specific expertise and experience in marketing, he was invited to join a team involving 2 other members of ActiveSeniors with competencies in internationalization and air conditioning. Together with Carlos and Ana from RDA, this team started a temporary collaborative network with people from FreshAir. After 3 months the first results are starting to show up. The ActiveSeniors team not only provided technical assistance and guidance, but also helped FreshAir establish some contacts with a new market in India. Now the business prospects for the young company seem brighter...*

*Pedro is quite satisfied for having this opportunity to work on a topic where his experience was a real added value. He very much appreciated the diagnosis and preparatory work done by RDA, which allowed him and his senior colleagues to focus on the core issues. Working in a team was a great experience. The small payment Pedro received is also great to complement his pension and give him some better living conditions. FreshAir and RDA could mobilize some resources to pay a small fee to the 3 members of ActiveSeniors, a value much lower than the typical consultancy prices that could never be afforded by FreshAir.*

*Carlos and Ana got a special recognition from their boss at RDA for being successful in helping a local company and thus creating better economic prospects for the region.*

*José and his friend re-gained their enthusiasm and they really appreciated the value of this collaboration endeavour with RDA and ActiveSeniors. They certainly plan to keep contact and look forward to again use the amazing pool of expertise & experience available at ActiveSeniors.*

**Challenges.** Materialization of such a scenario poses a number of socio-organizational and technical challenges including the following:

- Creation of a new collaborative culture at the level of all stakeholders in the socio-economic system.
- Clear identification and characterization of the roles and possible added-value by each participant in the tripartite network.
- Development of adequate ICT platforms to support the interactions among the various stakeholders and the work of the collaborative teams of seniors.
- Creation of new brokerage and team formation mechanisms and support tools.
- Development of new legal and tax incentives framework to facilitate this type of collaboration.
- Development of tools for distributed and multi-party project management.
- Clear rules to avoid unfair competition with the normal market actors.

Although advanced ICT platforms and tools play a vital role in the operationalization of such collaborative networks, supporting technological developments need to be effectively grounded on new socio-organizational models, the cultural change, and governance principles.

### III. TOWARDS A STRATEGIC ROADMAP

*Need for a roadmap.* The potential of ICT to support better ageing and individuals' well-being has been widely recognized, which has led to many R&D projects during the last decade. For instance, in the Framework Program 7 of the European Commission there is a research line devoted to ICT and ageing. And yet, the sensitivity of the area, the dependency on the "parallel" introduction of new organizational models and creation of a new culture, the lessons learned with the limited success of existing associations of senior professional, the risk of continuously developing technology that is not taken-up by the target users, among others, suggest the need for a careful analysis and a new approach towards what concerns new developments. It is thus clearly very important at this point in time to design a strategic R&D roadmap focused on active ageing.

In ePAL a 10-step roadmapping process [8] is adopted:

- 1 Characterize and consolidate the baseline
- 2 Perceive trends and design scenarios
- 3 Elaborate a first vision statement and instantiations
- 4 Fill the GAP: Where we are – to – Where we wish to go
- 5 Propose a plan of actions  
(a first set of unordered transition steps)
- 6 Verify the planned actions

- 7 Plan the timing and other characterization of actions
- 8 Finalize the definition of the roadmap chart
- 9 Perform consultation and refinement
- 10 Perform roadmap consolidation.

*Preliminary analysis.* As part of the baseline characterization phase of the roadmapping process, an extensive analysis of the existing associations of senior professionals was conducted. Table 1 shows the list of those that either took part in the survey or participated in our workshops.

Table 1. Studied associations of senior professions

Organization	Country
AGIRabcd	France
APCS	Portugal
ASECAT	Colombia
ASEP	Austria
BSC-I	Belgium
COGAMA	Spain
CONFEMAC	Spain
CONJUPES	Spain
ECTI	France
EGEE	France
FRAE	Spain
ISES	Italy
JUBIQUÉ	Spain
KOS	Poland
NESTOR	Finland
OTECI	France
PUM	Netherlands
REACH	UK
RSVP	UK
SECOT	Spain
SEN@ER	Spain
SENA	Belgium
SENIORES	Italy
SES	Germany
SFPA	Slovenia
SHARE	Portugal
SWB	Denmark
UDP	Spain
VIS VITALIS	Poland

These associations are mostly composed of a "professional elite" (people with a high education and that had high positions in the socio-economic system before retirement). In most cases, these people have reasonable pensions (although varying from region to region) and therefore can afford to do voluntary (unpaid) activities. However, the number of people involved in such mechanisms is not very high. On the other hand, considering the current difficulties of the social security systems all over Europe, most governments are trying to implement new formula for pension calculation which in practice means a reduction of the pension. In such context, it is foreseeable that more and more retirees will have fewer resources than needed to satisfy their standards of life and thus need to continue being involved in value creation activities.

Most participating organizations operate on a relatively passive basis, basically "expecting the client or the business opportunity to shows up". As a consequence, they do not have many projects. A frequent complaint we encountered is that they do not have enough work for all their members. And yet, many SMEs and start-ups world-wide that cannot

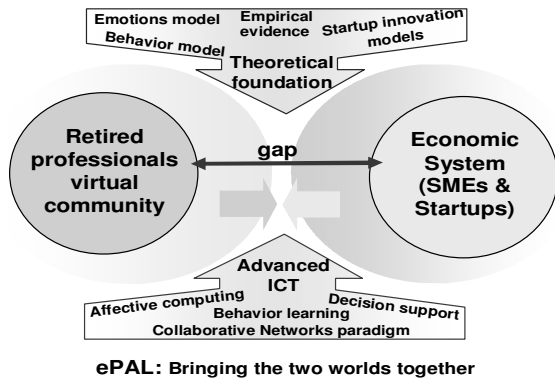


Fig.1 ePAL proposition overview

afford to pay market prices for consultancy and coaching, could greatly benefit from the accumulated knowledge and experience of senior professionals. There is a clear difficulty to reach the potential clients due to the lack of proper brokerage mechanisms or support of intermediary entities.

In addition to these associations, various other mechanisms and practices towards active ageing can be found. Examples include the maintenance of some links to the former employer (as in the case of jubilee professors), freelancing, time bank, etc.

*Multi-disciplinary area.* The design of a new digital ecosystem to support active ageing and facilitating the integration of seniors with the socio-economic system (Fig. 1) requires the development of advanced ICT platforms and tools, and a sound theoretical foundation which requires the contribution of multiple disciplines (e.g. Collaborative networks, Behaviour modelling, Causal reasoning and soft computing, Affective computing / emotion-oriented systems, Machine learning).

Another way of rephrasing the ePAL hypothesis is that an effective approach to prolonging the active life of elderly and their involvement in the economic and societal system involves the following key elements:

- Organizational architecture element that includes the organization and support for operation of an affection-based virtual community of senior professionals as well as the organization of “business liaison” units that allow keeping them involved in the economic system.
- Theoretical foundation to cope with deeper understanding of the principles and laws regarding the evolution of people’s behavioural pattern after retirement and their corresponding needs.
- Advanced ICT support (infrastructure and services), providing a platform to support active balanced ageing.

Given the current state of the art, and the fact that different necessary scientific areas do not have a sound tradition of working together, it is quite risky to make big investments in focused R&D activities before a more strategic planning is made towards a **roadmap** for a research agenda.

#### IV. A NEW VISION / GAP ANALYSIS FOR ACTIVE AGEING

A fundamental prerequisite for developing a vision for the desired future of this area is to identify both: the key **drivers** (i.e. the main driving forces in the market and

society) and their related **trends** (i.e. the main happenings in the market and society) regarding the ePAL environment. In our research, to comprehensively cover the most important aspects related to a desired vision for ePAL, we have identified three main perspectives that are required to be addressed. Namely, the vision of a desired future for ePAL shall cover its **technological** perspective, its **social** perspective, and its **organizational** perspective (Fig. 2).

Furthermore, building **scenarios** is a tool to provide actors with essential understanding, orientation, context, direction, and some degree of consensus in planning research developments and implementations. In relation to ePAL’s vision for future, scenarios are used to support understanding of different future possibilities regarding the enhancing of active life of senior professionals, as well as possible actions to take and which events are probable to occur in future.

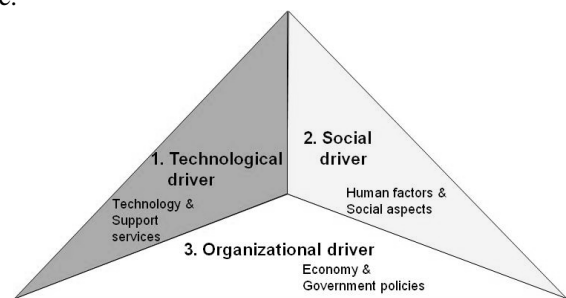


Fig. 2. Key drivers for ePAL environment

Based on extensive analysis and elaboration, a first vision statement for ePAL is proposed, as shown in Fig. 3.

Core ideology:

**Building a strong and cohesive social fabric to embody active senior professionals, as an important part of the European silver economy**

Envisioned future:

In the coming decade, a comprehensive paradigm will emerge in response to Europe’s ageing population and its inevitable skill shortage, that extends the balanced active life of senior professionals, facilitating the use of their talents and expertise, and thus facilitating value creation from these mature assets, for the benefit of both Europe’s economy as well as the European society as a whole.

Main desired facets:

- Well founded reference model of the environment, specifying its:
  - endogenous (*structural, componential, functional, and behavioural*) and exogenous (*market, support, societal, constituency*) elements, and their interlinks
- Well established technological infrastructure, support tools/services
- Support for social responsibility and adaptation of suitable ethical code
- Established organizational infrastructure, supporting economic and societal involvement through government policies and actions
- Established national/international regulations for involvement of senior professionals in market/society and related legal frameworks

Fig. 3. 1<sup>st</sup> desired ePAL vision

In order to facilitate the analysis of needs, it is effective to instantiate the vision statement according to the social, organizational, and technological perspectives (example in Fig. 4 for the technological perspective).

**In the coming decade, the ICT collaboration platforms and tools will be developed as an easy to use enabler of new approaches for continuation of the active involvement of elderly people in the socio-economic system. As such novel infrastructures and intelligent functionalities will act as a catalyst of new organizational forms, supporting effective management of geographically disperse communities of retired professionals, and facilitating the active participation in the socio-economic activities, as an extension of the human capabilities towards fitted participation.**

**Main desired facets:**

- V1. Advanced collaboration support services, including (virtual) teams' formation and management
- V2. Development of collaboration ontology supporting variety of stakeholders
- V3. Support for user-generated knowledge content
- V4. "Configure yourself" based philosophy infrastructure
- V5. Easily adaptable and customizable user interfaces
- V6. Affective computing and context aware enriched environments
- V7. Support for establishment of trust among stakeholders
- V8. Tools supporting the process of value creation
- V9. Novel contractual & cooperation agreements, including negotiation support
- V10. Advanced marketing and brokerage services
- V11. New networking models for elderly communities' involvement with the socio-economic system
- V12. Security and ethical / privacy support

Fig. 4. 1st ePAL Vision instantiation – Technological perspective

Taking into account both the desired vision and the current baseline, a detailed gap analysis is performed, comparing the state of today's market and society against the state planned by the vision for creating a balanced active life for senior professionals. This analysis focuses on Strengths and Limitations, the most relevant elements facilitating or constraining the elaboration of a plan of actions. Table 2 shows the identified elements for the technological perspective.

Table 2. Example of gap analysis for the technological perspective

<u>Technological Perspective</u>	
<b>Strengths</b>	
<b>S1</b>	Good progress in conceptual models for collaborative networks (although mostly focused on industry cases)
<b>S2</b>	There is already an understanding of the needed management functionalities for VO breeding environments and professional virtual communities
<b>S3</b>	Various partial models and advanced prototypes (e.g. negotiation, trust promotion, value systems) have been developed to support collaborative environments
<b>S4</b>	ICT infrastructures exist across Europe to provide the basic communication building blocks that will be needed to implement the ePAL vision.
<b>Limitations</b>	
<b>L1</b>	Lack of consolidated theoretical base in areas such as reference modelling for active ageing support systems
<b>L2</b>	Lack of effective and integrated ICT support for collaboration (till large fragmentation of functionalities).
<b>L3</b>	ICT research in this area too much focused on the "last phases of life", reducing the needed attention to active ageing support.
<b>L4</b>	Fast proliferation of new tools and functionalities without a holistic approach, an obstacle for adoption by seniors.
<b>L5</b>	Increasing trend to focus on techno-centric approach for ICT R&D, which hinders proper understanding of the critical issues of the socio-technical systems needed to support active ageing.

The identified gaps can be expressed through the generation of an "Influence map" to represent both the positive and negative influences of the baseline's Strengths/Limitations on the achievement of the vision (example in Fig. 5). A qualitative scale (e.g. as High and Moderate) is adopted to express the influences.

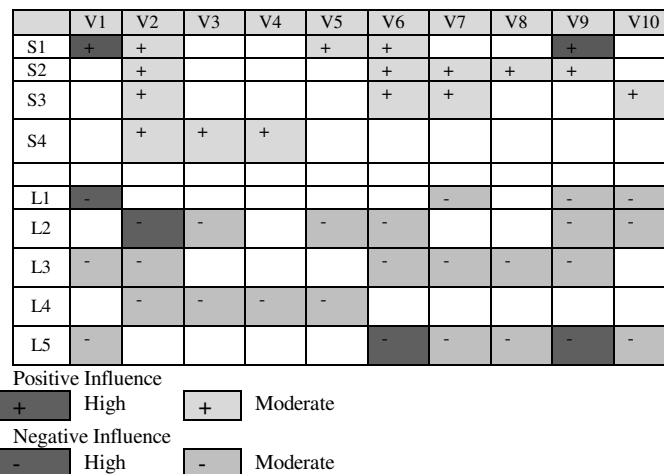


Fig. 5. Gap analysis - Influence map

Next challenge is to elaborate a plan of research actions and their suggested timing to lead us from current baseline to the desired vision, taking into account gap analysis results. An example of a proposed action in the technological area is: "Design and develop business support tools to facilitate collaborative value creation".

The last step will be the consolidation and consensus building phase. The steps performed so far have been conducted in close interaction with dozens of stakeholders and experts in different domains, but a final consolidation / refinement is needed when all pieces of the roadmap will be assembled.

## V. SOME ORGANIZATIONAL FORMS

One important aspect when designing a roadmap to extend professional life of individuals is to consider the organizational forms that can best support the main objective of keeping seniors involved in the socio-economic system.

An association of retired professionals can represent a special form of a professional virtual community. The establishment and management of such associations can benefit from well researched and developed concepts and tools for professional virtual communities. These communities are business oriented entities, mostly focusing on supporting their members to jointly optimize individual financial gains. The focus of traditional associations of retired professionals is not necessarily the enhancing of financial gains of members as they might have a pension. The main aim of retired people that join such associations is to remain professionally active and thus involved in the society. They are mostly willing to share and exchange their knowledge and experience to those individuals or organizations that need them.

There are two challenges which are facing retired people when they do want to provide their knowledge and experience to beneficiaries, namely:

- Finding opportunities to apply their knowledge and experience – beneficiaries, willing to accept their offers – is quite challenging. As mentioned by many associations, it is difficult for retirees to individually acquire opportunities in the society that are also being targeted by other formal service providers, such as consultancy and other organizations. Even when such opportunities are brokered, the

process of building trust for each individual retiree to beneficiaries might be very challenging.

Some acquired opportunities cannot be responded by one retiree alone, the normal practice in traditional associations. For example, SMEs which need consultancy on a subject often require more than one kind of expertise. Thus for such opportunities a number of retirees might need to collaborate in order to provide the required knowledge.

To address these challenges ePAL project envisions a new kind of networked environment constituting senior professionals – **Community of Active Senior Professional (CASP)**. We define CASP as follows:

*CASP constitutes a long term association of senior professional individuals that are largely autonomous, geographically distributed, and potentially heterogeneous in terms of their: capabilities, offered capacities, culture, system of values, etc., but sharing their main compatible and/or common goals of increasing their active professional life in the society and/or market, through co-working with others in Teams of Senior Professionals (TSPs) supported by computer networks.*

*TSP is a dynamically configured collaborative network of individuals which is established within the CASP in response to opportunities in the society and market that are in need of their wisdom and/or knowledge assets that they can offer, which as a consequence supports the retired professionals remaining professionally active.*

Fig. 6 illustrates these concepts.

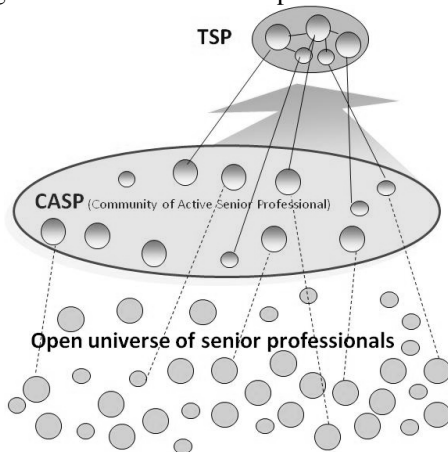


Fig. 6. A visualization of the concepts of CASP and TSP

As mentioned in section III and motivated by the scenario in section II, the effective involvement of seniors in the socio-economic system needs to consider other entities (Fig. 7). Thus ePAL proposes a tri-partite network, involving, besides seniors, the intermediary entities and the recipients of the services provided by seniors.

**Intermediaries:** Organizations or people which act as mediators or agents between CASP (or individual TSPs) and recipients.

**Recipients:** These can range from individual persons, groups of people, entrepreneurs and start-ups, SMEs, or large organizations. Recipients include the categories of clients and beneficiaries.

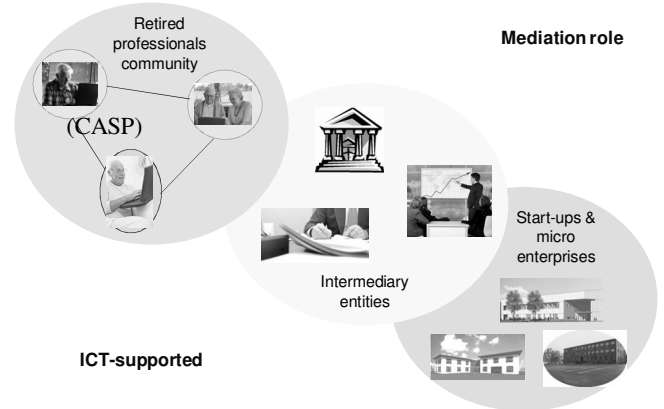


Fig. 7. A tri-partite ecosystem

There are further two categories of intermediaries depending on their objectives, i.e. the brokers and supporters:

▪ **Brokers** are organizations or people whose principal objective is that of making it possible for senior professionals to be able to supply their services (experience and knowledge) to the market and society. This type of entities plays a very important role in extending professional active life of seniors. Brokers can include, among others, the associations of senior professionals, government organizations such as regional development agencies, or large companies.

▪ **Supporters** are organizations that have as their principal objective the maintenance of an active life for the elderly and improvements in their quality of life, providing a range of services that allow the elderly to provide a service in a more structured manner. These types of organizations basically offer three types of support, and thus constitute three sub categories of supporters, as addressed below:

- **Financial supporters**, namely banks, investment firms and government.
- **Service supporters**, organizations that provide things like education, facilities, methodologies, advice or assessment, etc. Examples are 3rd Age Universities, Non-Governmental Organizations, Societal Organs, Consulting companies, Regulatory Bodies, etc.
- **Service providers**, those organizations that provide the technology and ICT tools that ease and improve the quality of life for elderly. Included in this group are the service and production industry and ICT companies.

## VI. CONCLUSIONS

Extending active professional life became an important need as the expectancy of a longer healthy life increases. Such extension is likely to:

Facilitate active ageing, keeping elderly involved in and contributing to society;

Generate additional income to help them keep their standard of living.

ICT can be an important enabler in facilitating the creation of collaborative networks involving not only (virtual) communities of seniors, but also potential recipients of their services and intermediary entities.

Given the sensitivity of the area, sustainable R&D needs to be supported by carefully designed roadmaps. First

results from ePAL give important insights in developing such roadmap. Ongoing activities are now addressing the finalization of the roadmap and consensus building process.

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