

# EMORY PROJECT – MODULE 602 - EXERCISE

## Project

### Acquired Brain Injuries: “The silent epidemic”

Curative and rehabilitative care have become a real challenge for developed countries, as they already account for more than 50% of the total healthcare expenditure and are increasing rapidly. Acquired Brain Injury (ABI), the leading cause of death and permanent disability worldwide, represent the main component of these costs, and their prevalence is also growing at great rates. The WHO is warning about the dramatic increase expected in the following decades due to the close relationship between brain injuries and population ageing and developed life habits, which will therefore have a **great impact on healthcare sustainability**. As an example, stroke (one of the leading causes of ABI) today accounts for €22billion/year sanitary cost in curative and rehabilitative care, the 4% of the annual healthcare expenditure in the EU.

### “A life saved is a life worth living”: Rehabilitation is the clue

The most impacting aspect around ABI is the **chronic condition** of those patients that survive to it. Unfortunately, ABI cannot be cured, and it turns Activities of Daily Living (ADLs) into enormous challenges, resulting in long-term impacts on the patients’ quality of life. The only way to improve this situation is following strict rehabilitation therapies for the rest of their lives, aimed at lessening effects or slowing down their disorder.

However, the current model for providing rehabilitation to ABIs’ patients presents a major shortcoming: **Lack of impact on patient’s wellbeing at great healthcare cost**. As an indicator of the need of reducing rehabilitation cost is that, in countries where post-discharge rehabilitation receive State subsidies (the leading cause of drop out of therapies is the high financial burden), the adherence rates account for more than 90%.

### Telerehabilitation: The promising but hindered opportunity

The use of telemedicine could help overcoming this situation, allowing the patient to be treated at home for increased intensity of treatment at less sanitary cost and, at the same time, making exercises related to ADL and, therefore, much more incentive and with greater impact on the patients’ quality of life. In fact, in the last years several telerehabilitation systems have been developed, such as [RehabNet](#) and [VirtualRehab](#). However, **the potential is being hindered by the reduced participation of the clinical community in the development and uptake of such systems**, as shown by the fact that only 10% of rehabilitation hospitals and clinics are implementing them.

Furthermore, ABI rehabilitation presents particular difficulties for implementing ICT-based remote models: Rehabilitation needs to be done by imitation and in a comprehensive way, meaning that **it is necessary to combine motor ability, cognition and sensory capacity**. These are highly interdependent skills, required to activate the Mirror Neuron System ([MNS](#)), basic for the efficacy of treatment. This is: the inversion of the visual image of a body part (i.e. a right hand is moving (motor ability), but perceived as the affected left hand (cognition sensory capacity), will lead to an additional activation of the right hemisphere (mirror neurons) and *vice versa*.

**Existing telemedicine systems do not** combine the rehabilitation of these three functions simultaneously and inter-related, so they are not able to sufficiently activate the MNS, losing effectiveness. On the other hand, until now they have not been capable to exercise sensory capacity at home, and require the use of multisensory rooms available only in the most advanced clinics.

After 5 years of research carried out at The Institute of Functional Rehabilitation ([IRF](#)) of [La Salle University](#) in Madrid, we have developed **integral exercises for the telerehabilitation of ABI**, directly addressing at least 2 of the 3 core functions (motor, cognitive, sensory). They are to be practiced at home, **to train ADL as well as Activities at Work** (which we are calling A@W).

Our exercises make use of Virtual Reality (VR) and sensing for creating the training environments, sending stimulus to the patients, and monitoring their condition, performance and evolution. Imitation is achieved by using avatars, and when possible, by requiring the **interaction amongst users** (i.e. patient with patient or with caregivers). This unique feature helps also reinforcing the social inclusion and psychological condition of ABI patients.

We have compiled them into a modular platform that allows managing therapists, patients and exercises, somehow similar to the way Learning Management Systems (LMS) manage eLearning contents, teachers and students. We are transferring LMS paradigms into a **Telerehabilitation Management System**, allowing for a similar explosion eLearning went through in the 90s thanks to [LMS](#).

## Call 1: Instrument for SMEs

### Who should apply to the SME Instrument?

***Are you an innovative, high-flying small or medium-sized business with European and global ambitions?***

Have you got an idea for an innovation that targets new markets and could boost the growth of your company?

Are you looking for substantial funding to develop and scale up your idea?

And could you make use of business development resources and coaching to take your company forward? Then the SME Instrument is for you.

The SME Instrument supports high-risk, high-potential small and medium-sized enterprises to develop and bring to market new products, services and business models that could drive economic growth.

The SME Instrument is for innovators with ground-breaking concepts that could shape new markets or disrupt existing ones in Europe and worldwide.

***Competition for SME Instrument support is tough.***

The SME Instrument is very selective.

Only the most convincing and excellent proposals can be funded after a thorough evaluation by multinational panels of technology, business and finance experts.

Selected companies receive funding and are offered business coaching to scale up their innovation idea, and can also receive mentoring. They are helped in networking with other SME Instrument clients, with other companies of all sizes, and with potential co-investors and follow-up investors across Europe. As an SME Instrument client, you will gain visibility and boost your chances of success in European and international markets.

***Europe needs more radical, market-creating innovations to improve productivity and international competitiveness and generate new jobs and higher standards of living.***

These innovations must meet user and customer needs and tackle societal, technological and business challenges in a sustainable way.

***Have you got what it takes? Then apply now!***

## Call 2: SC1-DTH-03-2018: Adaptive smart working and living environments supporting active and healthy ageing

**Specific Challenge:** Demographic change and the ageing of the population create new heterogeneous challenges for age-friendly living, recreational and working environments such as a shrinking workforce and increasing numbers of workers with functional impairments, chronic conditions, care duties or re-integration in and later retirement from the labour market.

Digital solutions can support older individuals in being and staying actively involved in professional life for longer by designing fit for purpose working environments and by enabling flexible management of job-, leisure- and health-related activities considering their needs at the workplace, at home and on the move, with a particular focus on social inclusion, health needs and job retention.

**Scope:** Proposals should develop and validate digitally enabled adaptive services and solutions leading to smart work environments for older adults, supporting them to remain actively involved in professional life, helping them to sustain and renew their work and personal life related skills and support independent active and healthy lifestyles while taking into account reduced capabilities due to age-related health risks and conditions.

Proposals should be based on trans-disciplinary research, involving behavioural, sociological, psychological, medical and other relevant disciplines, including gender and cultural aspects.

Proposals should convincingly describe the planned progress beyond state of the art in development and integration of unobtrusive, adaptive solutions for age-friendly living and working environments, addressing the needs of employees in specific and various sectors and workplaces<sup>121</sup>.

Proposals should build on active user engagement (e.g. employee participation at the workplace) in order to ensure the understanding of user needs, safeguarding ethics, privacy, security and regulatory aspects (e.g. labor law). Attention theft and impeding physical activity by ICT should be avoided.

Concepts should aim at realistic and verifiable benefits for flexible and sustainable job longevity measures and the consortium should include the necessary stakeholders to validate all relevant issues. The validation should take place in real settings (at workplaces and at home as required). The approach should demonstrate improvements in quality of life and/or improved health and safety for older adults, better management of aging workforce leading to a win-win for employers and employees, health and social system efficiency gains, business and financing models and organisational changes required for service delivery.

The Commission considers that proposals requesting a contribution from the EU between EUR 3 and 4 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Participation of SMEs is encouraged.

**Expected Impact:** Proposals should present methodologies and metrics as appropriate for measuring progress with significance towards the expected impact in:

- Independent living, and quality of life of older persons compared to current state of the art, enabling older persons to stay actively involved in work life for longer or return to work after severe disease;
- Enhanced health and safety working conditions and quality of life of older persons at work compared to the current situation, enabling older persons to be able to contribute at an appropriate level for a longer period of time;
- Evidence of user-centred design and innovation, new intuitive ways of human-computer interaction, and user acceptance;
- Potential cost-effectiveness due to enhanced self-care, life-style, age-friendly and skills conducive work environments and socio-economic benefits;
- Competitive advantage for European industry through flexible and sustainable work arrangements for an ageing workforce;
- Global leadership in ICT based innovation for active and healthy ageing including the occupational environment.

**Type of Action:** Research and Innovation action

**Budget available:** 25 millones de euros

**Deadline:** April 2018

## Call 3: SC1-BHC-22-2019: Mental health in the workplace

**Specific Challenge:** In most European countries, absences from work and early retirement due to mental illness have increased in recent years<sup>86</sup>. Mental health conditions such as depression, anxiety and stress represent substantial financial costs for employers and employees, as well as a significant loss for society at large. An EU-level estimate of the overall costs, direct health costs and lost productivity is more than 450 billion EUR per year.

Mental illness is an important cause of absence from work but it is also linked to high levels of presenteeism, where an employee remains at work despite experiencing symptoms resulting in lower productivity. It is important to create mentally healthy workplaces, i.e., promoting and protecting employees' good mental health and supporting them when they experience mental health problems, and their return to work. A healthy workplace involves creating an environment that is supportive of the psychosocial aspects of work, recognising the potential of the workplace to promote workers' mental health and wellbeing, and reduce the negative impacts of work-related stress. Many of the factors that influence the positive mental health and wellbeing of workers relate to the social environment at work such as the working conditions, style of management, working culture and levels of supports, as well as job security.

More knowledge is needed about effective interventions by employers to promote good mental health, and about the barriers to effective implementation of such interventions, in particular for smaller enterprises and public agencies with less resources and knowledge to manage these health issues.

**Scope:** Proposals should develop and implement intervention(s) that an employer/organization can take to promote good mental health and prevent mental illness in the workplace. These interventions can be newly developed or improvements on existing ones. They should address challenges in mental health in the workplace<sup>90</sup> in the EU. The interventions should be assessed in terms of direct and indirect individual and collective health outcomes and cost-effectiveness, implementation facilitators and barriers.

Proposals should build on existing knowledge but may well go beyond. Co-morbidities in mental and/or physical health should be addressed. Research should be multidisciplinary, including social sciences and the humanities. The stigma attached to mental ill health is important to consider as well as other social and cultural factors which may be relevant to improving the working environment. Mixed-methods research<sup>91</sup> is encouraged. Proposals should involve key partners such as employers and employees in the private and public sector, policy makers, insurers, social partners and civil society in developing initiatives. Proposals should address relevant gender issues (e.g. gender equality at the workplace). Ethics and data protection aspects should be addressed where they are relevant.

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 to 4 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

### Expected Impact:

- Improved mental health and reduced sickness absence in the EU working population.
- Positive impact on productivity and economic results of workplaces by improved policies and action to promote mental health.
- Improved policies on mental health in the workplace based on the broader evidence base of effective interventions.

**Type of Action:** Research and Innovation action

**Budget available:** 30 millones de euros

**Deadline:** April 2019