



# REPORT ON THE SOHEALTHY SEMINAR HELD IN SPAIN

## Publishable Version

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## Acronyms and abbreviations

Acronym/Abbreviation	Description
EC	European Commission
SRA	Strategic Research Agenda
SoA	State of the Art
R&D	Research and Development

## Executive summary

This document describes the objectives, organisation and results of the SOHEALTHY seminar held in INESCOP for the validation of the technology areas resulting from the state-of-the-art analysis.

One of the main objectives of the SOHEALTHY project is the creation of a scientific and technological cooperation network of a high level centred on the footcare sector, specifically in the areas of obesity, diabetes and the older generation. Such network will define future technological and specific research collaboration work lines, defining R&D priorities and thus working for a lesser fragmentation of R&D activities.

To this end, first it is important to define main research lines and trends and next to prioritise them. The main research trends were defined in the SoA analysis, where specific technology areas were identified; the prioritisation of such technology areas is intended to be carried out by the cooperation network, which includes experts of different types such as industrialists, health or public health professionals, universities, research centres, patients associations...etc and from different countries, in such a way that a more realistic vision of the main current and future research lines of the footcare sector is obtained, taking into consideration the voice of all agents within the value chain of the footcare sector in the Euro Mediterranean area.

The seminar was organised as a way to gather relevant footcare sector experts and ask them to prioritise the technology areas. The results of this seminar will be compiled with other results that will be obtained from future seminars, workshops, etc. throughout the project.

## 1. Introduction

In the framework of the SOHEALTHY project, a seminar was held on January 31<sup>st</sup> at INESCOP's premises in Elda –Alicante, concerning the validation of the technology areas identified in the document "State of the art of the most relevant technology areas within the footcare sector".

This seminar is part of the "validation phase", where experts from different countries and profiles will be asked to validate the technology areas identified in the SoA document. These experts will be contacted through different channels, as follows:

- ~ Sohealthy experts community
- ~ Workshops and seminars
- ~ Project dissemination events

The seminar results have provided a rich input to the follow-up work of task 2.1 "development of a joint Strategic Research Programme".

This seminar has also helped disseminate information about the SOHEALTHY project among relevant experts who themselves can now serve as multipliers spreading information about the project even further. After the seminar, all participants expressed their interest in joining the SOHEALTHY expert community.

## 2. Methodology

The seminar was divided into two phases: identification of technology areas and evaluation and ranking of technology areas.

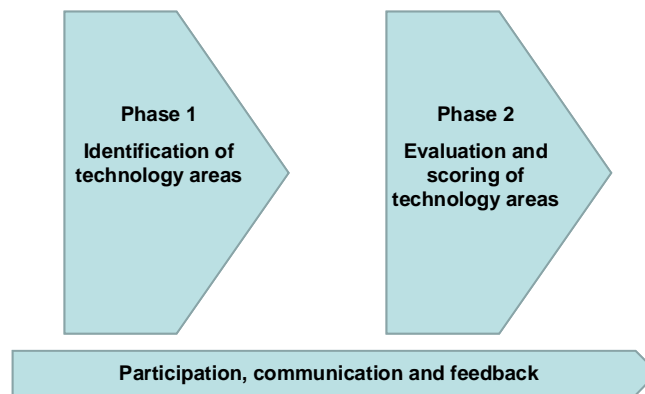
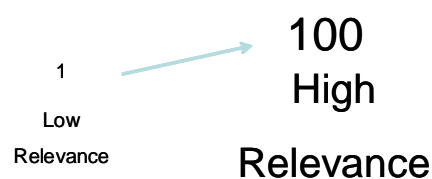


Figure 1. Phases involved in the seminar

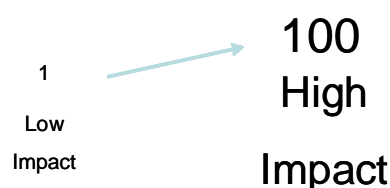
1. **Identification of technology areas:** participants had to read carefully the list of technology areas and identify new ones. The discussion was carried out per each research area, instead of each specific technology area, which would have taken too long.

2. **Evaluation and scoring of technology areas:** for each technology area, participants had to rank three main parameters on a scale from 1 to 100, such three parameters being:

- ~ **Technology relevance:** this measures the degree of advancement of the technology area analysed with regard to the research field to which it belongs. A score of 1 means low relevance and 100, high relevance.



- ~ **Impact on other research fields:** this measures the progress or impact of the technology area analysed on the progress in other technology areas.
- ~ **Impact on patients needs:** this measures the impact of the technology area analysed on covering patients' needs and wellbeing.



Regarding the last two parameters, a score of 1 means low impact and a score of 100 means very high impact.

Participants were also asked to decide when they think the technology area would be available and establish the timeframe for each one according to these three options:



**1. Short term**  
(  $\leq 2$  years)



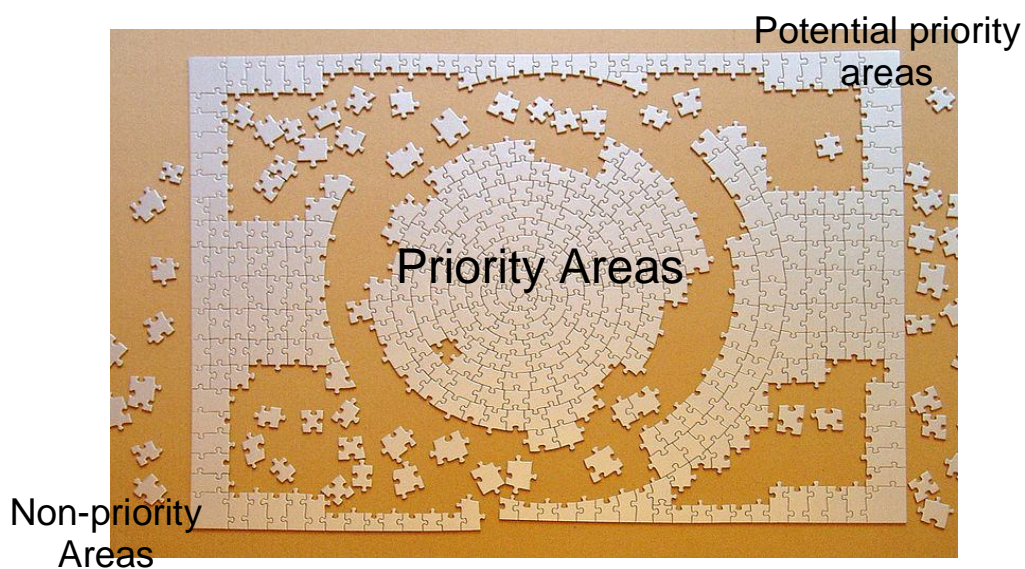
**2. Medium term**  
(  $2 < \text{years} \leq 5$  )



**3. Long term**  
( years  $> 5$  )

To make the scoring process easier, a template was prepared (in Spanish) with all technology areas (including the new ones identified during phase 1 of the seminar) and four columns that corresponded with the three parameters to be ranked by the participants and the temporal framework of the technology areas.

Once all scores were obtained, data were processed (after the seminar was finished) in order to obtain the potential, priority and non-priority areas.



Finally, each technology area was arranged in terms of short, medium or long term according to the results obtained from the average of the sum of figures in the timeframe column. Thus, we obtained the following matrix of results:

### **Priority Matrix**

	Short term	Medium term	Long term
Priority areas			
Potential priority areas			
Non-priority areas			



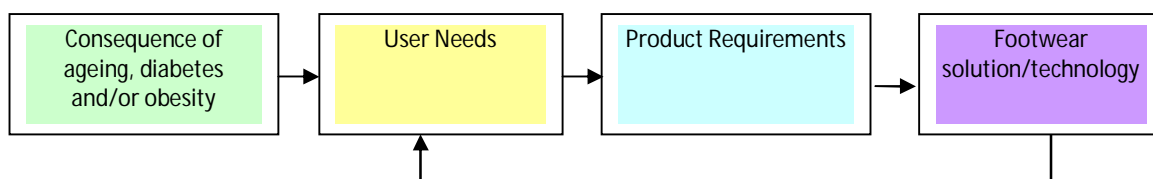
### 3. Objective and organisation of the seminar

The main objective of the SOHEALTHY seminar was to gather experts' opinion about the technology areas described in the SoA document, identifying new technology areas that are difficult to detect in the scientific literature and publications (mainly because they refer to current research trends), and know their views about such technologies. To this end, they were asked to analyse the technology areas identified in the SoA document, to prioritise them and finally, to identify new ones.

Participants were chosen for two main reasons:

- ~ Due to their wide professional experience, they know very well the footcare sector and the different tools that are available on the market, as they have to use them in their day-to-day with patients. This means that they are the final users of a wide range of technologies, so knowing their opinion is very relevant.
- ~ Due to their professional profile, they know very well patients' needs since they deal with them everyday. Thus they were able to provide us with a valuable vision from a clinical point of view.

In the end, participants' opinions and views helped us get more information about some of the steps of the following process:



After welcoming the participants to the seminar, a brief presentation of the SOHEALTHY project was given to all participants in order to inform them about the main project objectives, and next they were informed about the methodology to be followed. Previously, a document containing the list of specific technology areas-77 in total (at that time)- derived from the document "*State of the art of the most relevant technology areas within the footcare sector*" had been sent to all participants.

As explained in section 2 of this report, the seminar was divided into two phases, the first one was the identification of new technology areas, which was aimed at discussing if there were new technology areas to be added to the list. All participants were asked to read carefully the list of technology areas and after 30 minutes approx. the moderator asked all participants their opinion about each research field in a brainstorming exercise. The results can be consulted in the following section.

Phase 2 of the seminar focused on scoring the three main parameters mentioned in the methodology section: Technology relevance, impact on other research fields and impact on patients' needs and wellbeing, and to establish the timeframe for each technology area (short, medium and long term).



**Image 1.** Some pictures of the participants during the SOHEALTHY seminar

## 4. Results of the Seminar

As mentioned before, during the first phase of the seminar all participants were asked to analyse each research field and its related technology areas in order to identify new ones. There were in total 15 new technology areas, as shown in the picture below:

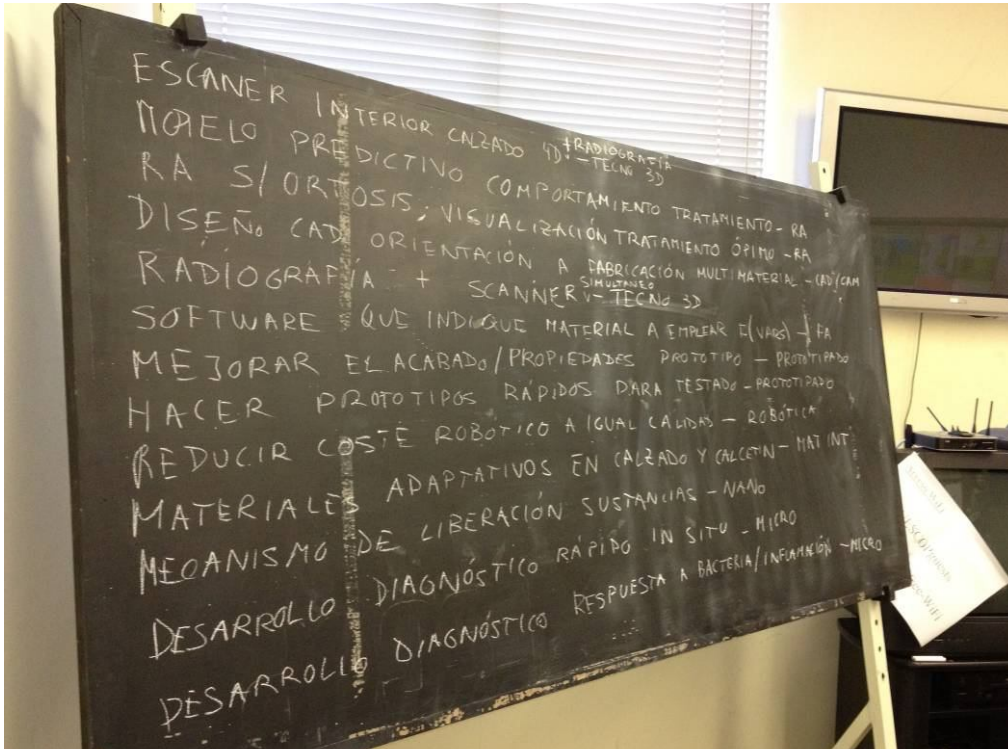


Image 2. Blackboard with the new technology areas that arose in the SOHEALTHY seminar

The new technology areas identified were:

### CAD/CAM

1. To provide a 3D scanner able to take x-ray images
2. To develop SW that provides an indication on the materials to use according to the patient's needs

### FLEXIBLE MANUFACTURING

#### Additive Manufacturing

3. To improve the finish and properties of the final prototype, thus avoiding corrections
4. Faster production of prototypes for testing before final production

#### Robotics

5. To reduce costs in the development of robots without reducing quality

### MATERIALS

#### Smart materials

6. To develop adaptive materials that better suit the external conditions of shoes and socks

### MICROBIOLOGY

7. On-site diagnostic methods: quick and non-expensive
8. Diagnostic methods to local inflammatory response

**SENSOR TECHNOLOGY RELATED TO MEASUREMENTS**

- 9. To develop sensors which are more suited to the foot

**MICRO/NANOENCAPSULATION**

- 10. To improve drug/substance release mechanisms
- 11. To develop methods that allow assessing the effectiveness of microcapsules on the foot

**ADHESIVES**

- 12. To develop new permeable waterborne adhesives

**BIOMECHANICS**

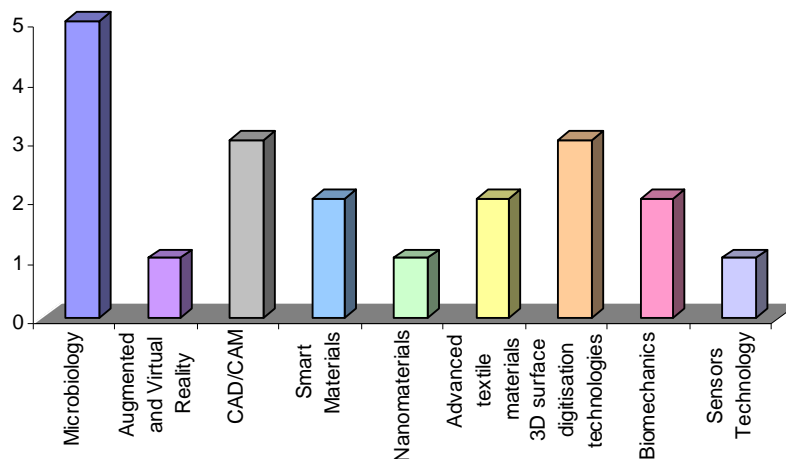
- 13. To develop innovative footwear that allows measuring force and pressure of the foot surface on the shoe.
- 14. To develop a single comprehensive software able to integrate data from different sources, allowing for easier medical prognosis and more effective treatment.
- 15. To develop shoes with built-in accelerometers

During the second phase of the seminar, participants were asked to rank the 3 parameters from 0 to 100 for all technology areas and establish the timeframe for each one (short, medium, and long term). As there was no time for processing all data that day, the results had to be processed after the seminar. As a result, we developed the priority matrix mentioned on page 8 of this document.

Taking into consideration that almost all participants were podiatrists and most probably they do not know in depth all technology areas (as robotics, augmented reality...etc), we considered very useful to carry out other type of analysis that could be interesting for this study, for example, to analyse which technologies had obtained a higher impact on patients' needs.

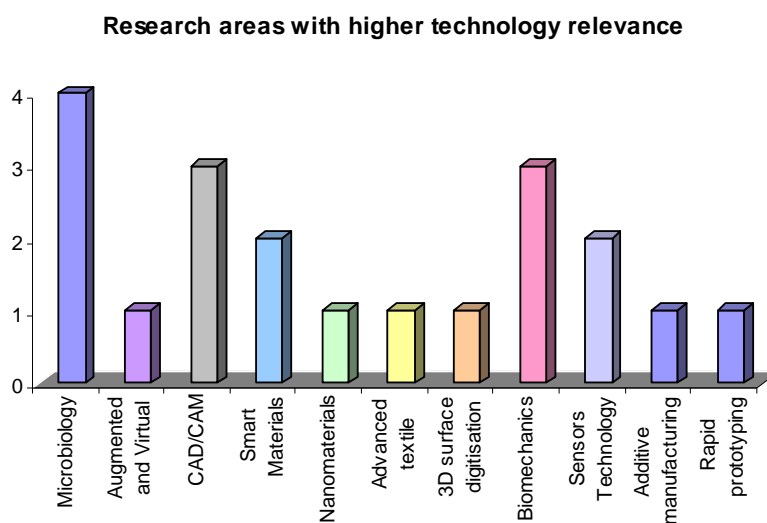
Among the first 20 technologies that obtained a higher impact on patients' needs, 5 belonged to Microbiology, 5 to materials (2 Smart materials, 1 nanomaterials, 2 advanced textiles), 3 to CAD/CAM, 3 to 3D surface digitisation technologies, 2 to Biomechanics, 1 to Augmented and Virtual reality technologies and 1 to Sensors technology.

**Research Areas with a higher impact on patients needs**



It is important to highlight that the correlated coefficient between the impact on patients' needs and the technology relevance is positive and quite high ( $r= 0,72$ ), which can be interpreted in different ways, one can be that experts have given high technology relevance to those technology areas that are also considered to have a high impact on patients. This can be explained because there is a strong bias in favour of health professionals (all participants were podiatrists), who gave more importance to clinics-related technology areas. Actually, if we compare the list of the 20 most relevant technology areas with the list of the first 20 technology areas with a higher impact on patients' needs, we realise that these lists differ in only 6 technology areas, the rest of the technology areas are the same on both lists.

The same analysis was performed with the technology areas that had obtained higher technology relevance, with the following results:



At the end of the seminar, all participants gave their opinion about the situation of the footcare sector and the state of the technology. Some of the most interesting views were:

- ~ Patients' education: patients are not aware of the importance of wearing suitable footwear and insoles.
- ~ Orthopaedic shoes/ orthotics are perceived as very expensive by patients. One of the causes is that patients must receive more information and education.
- ~ Other healthcare professionals should provide more information to patients about the importance of wearing healthy shoes/ insoles.

## 5. Conclusions

This seminar proved to be a very useful tool to gather important podiatrists within the footcare sector in Spain and helped us prioritise the technology areas. In addition, it was useful to promote the project and involve experts in the SOHEALTHY community.

As the group was very homogeneous (all participants were podiatrists), there was a strong bias toward clinical issues and consequently the results had to be analysed taking this fact into consideration.

It is expected to organise similar events throughout the project (workshops, etc) with other types of experts (research centres, industrialists...etc), who will most probably give more relevance to other technology areas or research fields they usually work with. Once we compile all results, an analysis of the results obtained per type of expert will be carried out.