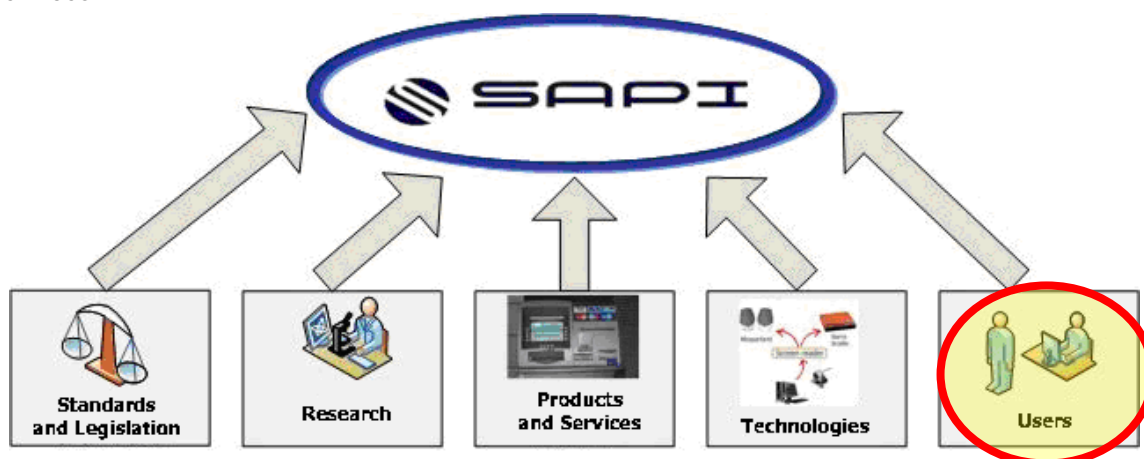


The study of visual pathologies and target identification Survey

This document summarises the content of the deliverable “**D1.2_1 The study of visual pathologies and target identification**” in relation to *RI 1.2 The study and analysis of visual pathologies and target identification*, within the scope of the first Development Objective (DO 1) “Study and analysis of the state of the art”.

The key role and importance of the user within the SAPI project is the reason behind the critical, in-depth study of visual pathologies and the difficulties they bring with regard to interaction with information technology instruments to provide services. Indeed, from a user viewpoint, creation of the SAPI platform must take into account the problems regarding vision and access (environmental conditions, devices, available support instruments) which to date are invalidating or make interaction with hardware devices (ATMs, palmtops, etc.) difficult as regards the use of content and services.



Therefore, RI 1.2 is dedicated to in-depth study and classification of visual pathologies. Said study represents research related to the main sight-related disabilities, instrumental for the purposes of the subsequent phases of the SAPI project. Specifically, the study of visual pathologies sets itself the aim of identifying the target pathology which the SAPI platform will be centred on.

The possible access problems which highlight the “digital divide” phenomenon may be encountered by users with permanent disabilities, but may also be an obstacle for able-bodied users making use of PCs in unfavourable environmental conditions or through devices with limited software and hardware features.

The study carried out offers a statistical analysis of disabilities, with specific reference to the category of the visually-impaired. On the basis of parameters defined by Law No. 138 of 2001 regarding the valuation of visual disabilities, the figures related to the visually-impaired and blind populations worldwide are listed, with the concentration in various continents, in the USA; Europe and Italy highlighted. Data obtained from sector studies are added to with results obtained from

an ad-hoc questionnaire distributed to a sample of visually-impaired/blind individuals from the "Paolo Colosimo" State Institute for Industry and Handicrafts for the Blind in Naples. The purpose of said questionnaire is to highlight more effectively the impact said pathologies have on the use of computer services.

The statistical analysis is completed with results obtained from epidemiological surveys conducted by national and international research centres which serve to highlight the main visual pathologies which can lead to the condition of being "visually impaired". Said pathologies are differentiated according to the countries of interest: developing countries (Fig. 1) and industrialised countries (fig. 2).

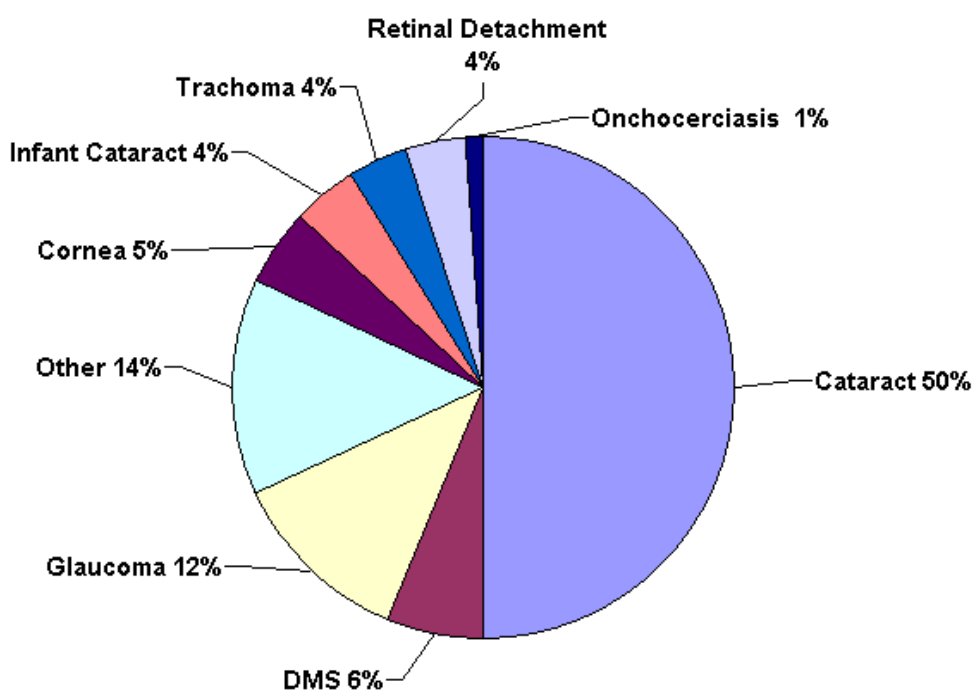


Fig. 1: Classification of pathologies and diffusion in developing countries

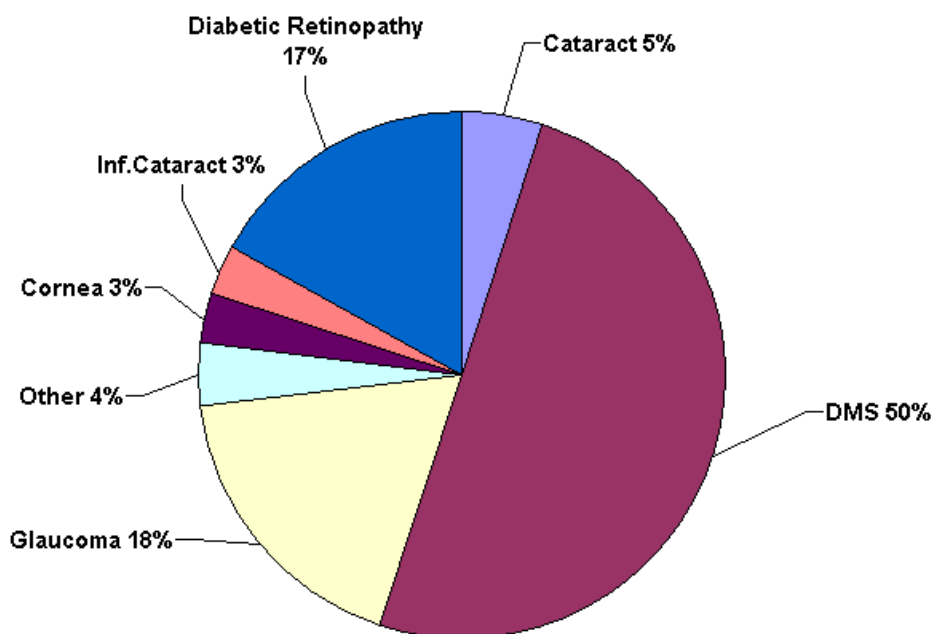


Fig. 2: Classification of pathologies and diffusion in industrialised countries

The research continues with an overview of the main visual aids currently available on the market and of the diagnostic tests used to recognise sight deficits. Said deficits are illustrated by simulating website navigation by users suffering from the main visual pathologies. The instrument used to simulate use of websites by selected visually impaired individuals is the accessibility bar developed by the AIS (Accessible Information Solutions) team working at the NILS (National Information and Library Service).

An analysis of the data obtained from research carried out made it possible to draw up a table, matching the visual technologies looked at with a set of possible solutions compiled following study of supports

PATHOLOGY	PROBLEM	APPLICABLE PRINCIPLES
Macular degeneration, Diabetic retinopathy, Stargadt's macular dystrophy Paracentral sight deficit	Reduced central vision	Video enlarger software which allows enlarging of parts of the screen only thus not detracting attention from the screen
Myopia	Blurred vision of distant objects	Video enlarger software which allows enlarging of part of the screen only thus not detracting attention from the screen
Glaucoma, Pigmented retinopathy	Reduced peripheral vision	Video enlarger software which allows enlarging of part of the screen only thus not detracting attention from the screen
Scotoma, Retinal detachment	Reduced visual field	Video enlarger software which allows enlarging of part of the screen only thus not detracting attention from the screen

hemianopsias		
Amblyopia, anisometropia	Reduction of visual sharpness	Video enlarger software which allows enlarging of part of the screen only thus not detracting attention from the screen
Cataract	Image opacification, faded colours and poor contrast	The use of text presentation style sheets with large light characters on a dark background
Daltonism	Chromatic vision defect	The use of content and style sheets for black and white presentation
Astigmatism	Blurred vision of near and far objects	The use of text presentation style sheets with large light characters on a dark background
Hypermetropia, presbyopia	Blurred vision of near objects	The use of text presentation style sheets with large light characters on a dark background
Achromatopsia	Colour blindness	The use of content and style sheets for black and white presentation
Hypermetropia, presbyopia	Blurred vision of near objects	The use of text presentation style sheets with large light characters on a dark background
Nystagmus	Eye motion difficulties	Video enlarger software which allows enlarging of part of the screen only thus not detracting attention from the screen
All visual impairment and blindness	Complete or almost complete loss of vision	Screen reader and voice interaction

Table 1: Relations between visual pathology and support solution

Said table represents the first step in both the identification of clusters of users with the greatest access difficulties, and a census of the adaptation rules to be implemented in the service delivery platform.

The *Study of visual pathologies* concludes with the identification of target pathology(ies) for the SAPI platform. A compromise between two requirements was taken into account when making said choice, that of the maximum diffusion of the pathology and that of the greater level of digital divide among the population (fig. 3).

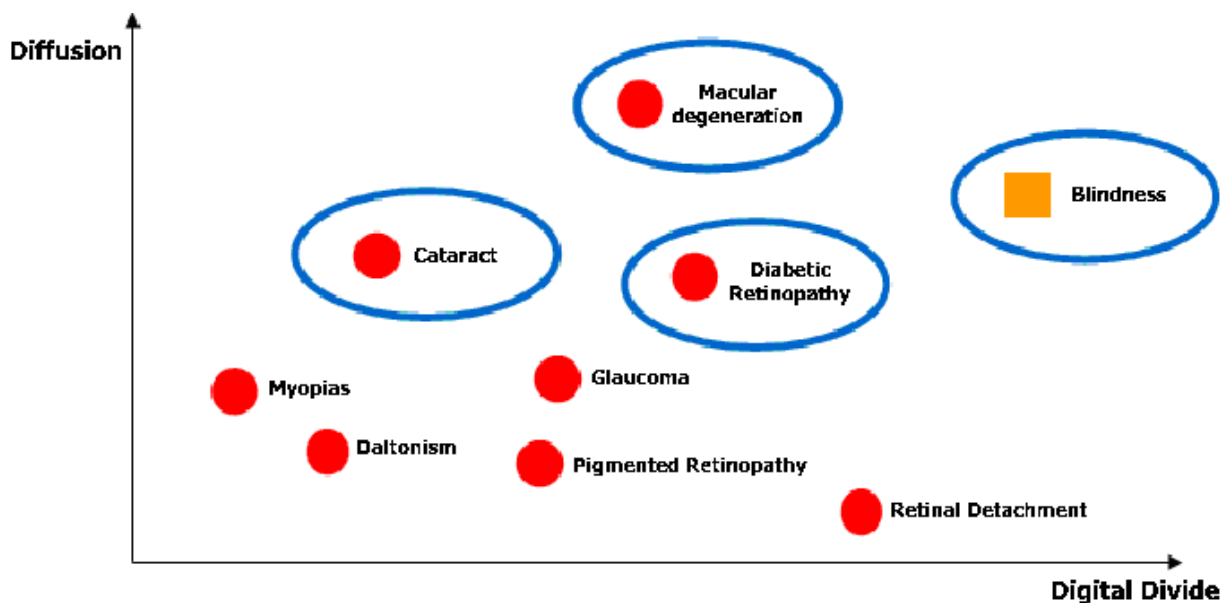


Fig. Diffusion of visual pathologies vs digital divide

According to the above diagram, albeit qualitative, macular degeneration proves to be the visual pathology which satisfies the criteria of greater diffusion and lack of effective aids to deal with the digital divide. The diagram also includes the category of the blind (shown with a box given that it is separate from pathologies linked to the visually impaired) for whom the level of digital divide to be dealt with is undoubtedly the highest, and diffusion is comparable with the most common visual pathology (macular degeneration).

Moreover, special attention must be given to other pathologies which are diabetic retinopathy for which the level of digital divide is greater than for macular degeneration, and cataracts which, according to the research carried out is significant due to its level of diffusion.

On the basis of these considerations, it can be concluded that macular degeneration, blindness, diabetic retinopathy and cataracts are the four target categories for the SAPI platform and shall represent one of the starting points on which to base the modelling activities provided for in the project and subsequent platform testing activities.