MEMORIA DEL TRABAJO FIN DE GRADO

SANTA CRUZ A SMARTER CITY FOR THE VISUALLY IMPAIRED

Technology and Knowledge to Be an Accessible City

SANTA CRUZ UNA CIUDAD MÁS INTELIGENTE PARA LOS DISCAPACITADOS VISUALES

Tecnología y conocimiento para ser una ciudad accesible

Autora: Dª Sirley Johanna Avendaño Galvis

Tutor: D. Isaías Leopoldo Naranjo Acosta

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ABSTRACT

In this work we reflect about the use of technology to achieve a satisfactory state of accessibility for blind and visually disabled in the city of Santa Cruz de Tenerife. Considered as the final objective of this document is the conversion of this city into a "Smarter City" for the disabled community

We begin analysing the concept of Smart City and knowing some of the best smart cities internationally and on a national scale, and then focus the attention on the state of accessibility of Santa Cruz dividing it in two sections: strengths and weaknesses.

Consequently, in base of the collected data we create a proposal for actions and its respective justifications. Finally, we conclude the present work standing out the benefits and positive contributions of the technology in the access and free movement of the visually disabled in public spaces of Santa Cruz.

Key Words: accessibility, visually impaired, blind people, technology, Smart City.

RESUMEN

En este trabajo reflejamos el uso de la tecnología para conseguir un estado de accesibilidad satisfactorio para las personas con discapacidad visual y las personas ciegas de la ciudad de Santa Cruz de Tenerife. Considerado como objetivo final, la reconversión de Santa Cruz en una ciudad más inteligente para la comunidad discapacitada.

Comenzamos analizando el concepto de Smart City y conociendo algunas de las mejores ciudades inteligentes a nivel internacional y nacional, y enfocando la atención en el estado de la accesibilidad de Santa Cruz, dividiendo este en dos apartados: fortalezas y debilidades.

Consecuentemente, en base a los datos recopilados, se crea una propuesta de actuación y sus respectivas justificaciones. Finalmente, concluimos el presente trabajo destacando los beneficios y contribuciones positivas de la tecnología en el acceso y libre desplazamiento de las personas con discapacidad visual en espacios públicos de Santa Cruz.

Palabras clave: Accesibilidad, discapacidad visual, personas ciegas, tecnología, ciudades inteligentes.

1. INTRODUCTION

Technology is present in virtually all the areas of our lives. As a result, the use of this world-changing tool has allowed industrial sectors to achieve higher efficiency in all their respective procedures, as well as making it possible for companies to communicate globally in real time, managing vast amounts of information in a way the world has never seen before. Technology has changed our lives and has come here to stay.

In addition, Government bodies have experienced some significant changes in the development of their function where technology has been implemented. In the management of cities, most administrative procedures are carried out through Information and Communication Technologies (ICTs). Furthermore, the analysis of urban plans requires specific technological programs, and the creation of applications for public transport has been made possible thanks to the digitalization of processes.

The city of Santa Cruz de Tenerife has already developed the above mentioned measures, and more, related with the innovation and, furthermore, thanks to the innovation and the efficient management of other areas, it was officially declared in 2015 a "Smart City." With regard to the social cohesion of this city, advances in the telecommunication sector have provided many people with access to a wide range of services and products, and today thanks to internet access, a significant percentage of the population is more able to decide freely what to buy and where to go. A walk in the city or a visit to a site of interest can be researched and planned through the web easily. Yet, what would happen if our health condition worsened and we found ourselves without the use of our sight or if it was seriously damaged? Would we be able to maintain our independence and have the same access to public places and to information as fully sighted people?

Currently, people with visual impairment find many barriers in the city of Santa Cruz, and these barriers impede their access to basic aspects of social life. There is a significant lack of adaptations in place to facilitate mobility for blind people, especially when it comes to inner city movement, specifically visits to public infrastructures within sectors such as culture and leisure. In order to solve these issues, awareness must be raised concerning the day to day barriers faced by the visually impaired, and as a matter of basic human rights a solution must be found.

The main idea of this project is to highlight ways in which technological processes can be integrated into the management plans and services of the city of Santa Cruz in order to facilitate mobility for citizens with visual disability, including provisions for blind tourists that visit our beautiful city. Why not implement innovative systems to provide disabled people with the same opportunities as the rest of society?

The implementation of this idea would enhance Santa Cruz as a destination equipped to welcome visitors with visual disability, thus creating a competitive advantage within the tourist sector worldwide.

The final objective, would be to have Santa Cruz officially accepted and declared as a better "Smart City," with a specialization in infrastructures and services for the blind through the use of technology.

The present document shows the skills and competences I have acquired during my degree, from which I have selected the subjects and themes that have had the greatest impact on my learning process and are related to new city projects that can improve accessibility for a sector of the population.

1.1. Methodology and Organizational Structure

In this work, I have applied the descriptive method and the following organizational structure: the present state of the issue; Smart Cities internationally, then, on a national scale, finally focusing the situation on the area of study, Santa Cruz de Tenerife as Smart City. Furthermore,, the analysis of strengths, ordinances, the present state of the affairs and weaknesses of this city concerning accessibility for the visually impaired; proposals for action; the discussion, in which I argue why what I propose is necessary and can give positive results. Finally, the conclusions, together with references, webliography, and the annexes.

Some of the information for this project has been gathered through careful research of official web pages, but most of the information has been obtained by fieldwork, carrying out interviews with blind people, listening to their personal experiences regarding disability, as well as interviews with workers of public companies such as SINPROMI, an island entity that since 1993 has been fighting for equality of opportunities for disabled people, and La ONCE, a non for profit Spanish organization created in 1938 for blind people. The aforementioned interviews are included in the annex of this document.

2. THE STATE OF THE ISSUE

The innate desire to satisfy people's needs has given rise to significant changes for humankind throughout history. Perhaps the best examples of significant change are the Industrial Revolution and the globalisation of communications and economies between continents. Of course, we must also mention a third example, the digital age in which we are immersed.

The 21st century is characterised by continuous technological advances, it is the setting for digital advancement in industry and the intelligent management of cities around the world. Those cities that have proven to be using advanced technological processes have been awarded the title of "Smart Cities." As this is an important concept of the present work, it is therefore necessary to define clearly what is meant by 'Smart City.'

A Smart City is one whose services and infrastructures are more efficient and accessible thanks to technology. For instance, in planning the resources of a city, the implementation of systems that regulate the exact amount of water and energy required, or intelligent traffic systems, in which, through sensors situated on the asphalt at crossings, the driver will be advised of the approximation of another vehicle to the crossing. Also, the use of LED technology for public illumination, as well as intelligent management systems for the irrigation of green spaces.

In the environmental sector, "Smart" means to be able to reduce pollution levels, as for instance, through the increasing usage of hybrid cars, the use of recovery machines for plastic bottles, and referring to the use of technology processes, the digitalisation of services such as garbage collection.

The State administration implements the use of ICTs (Information and Communication Technologies) to create big data bases and offer transparency and open access for everyone to government legislation.

The beginning of Smart Cities dates back to the year 1985, with the "Brundtland Report," a document that contrasted economic development- over time with environmental sustainability, in order to create a network of management solutions and to reduce contamination caused by the concentration of population in the cities and the exhausted availability of resources, among other things.

According to the United Nations Organisation, the population of cities keeps growing, and this, in turn, presents city planners with a growing challenge because they have to balance the needs of a community with government directives to design an infrastructure that consumes the lowest amount of resources possible. Currently 54% of the world's population lives in urban areas and it is expected it will have reached 66% by the year 2050.

Taking up the Brundtland Report and its results, the countries belonging to the United Nations were summoned in 2012 to a conference known as Río+20, celebrated in response to the problem of environmental pollution and accelerated climate change. Meanwhile, companies such

as IBM, Cisco, Siemens and Microsoft began to create intelligent solutions against polluting activities. As a direct result of these projects and their incorporations, other cities worldwide began to set in motion similar projects so that more and more cities developed their projects and applied them in city management. And so began an era of developments that would eventually lead to the birth of Smart Cities.

2.1. Smart Cities internationally

In order to be able to reference the best Smart cities world-wide, IESE the international business school, introduced a global ranking known as Cities in Motion (ICIM 2016) on a sliding scale in which 181 cities were assessed on 10 crucial dimensions, all of which are closely interrelated:

- ✓ Governance is mainly related with the participation of citizens in matters of management of a city and the capacity of a government body to involve business leaders and local agents in that management, as well as to apply electronic systems to government management.
- ✓ Public management can improve its efficiency through the creation of new models of organisation, and management together with private collaboration can add improvements in different sectors.
- ✓ Urban planning with the purpose of creating a compact city, in the sense that services and infrastructures are connected and accessible to promote community life. It refers, also, to the creation of intelligent plans for the public spaces of a city.
- ✓ Technology and specifically the information and communication technologies (ICTs) can improve the access of a community to public infrastructures, services and products and achieve efficiency in diverse processes for the benefit of society.
- ✓ Environment, in the way that a city improves environmental sustainability and looks for alternative energies, efficient managing of water and policies that help to counter the effects of climate change.
- ✓ International outreach is the image of a city abroad and is closely related to the brand of a city. It is the international recognition through strategic tourism plans and foreign investment in the city.
- ✓ Social cohesion includes aspects related to the development of the community, solidarity relationships, care for the elderly, and the most disadvantaged groups. Also, efficiency in the systems of health, security and citizen inclusion.
- ✓ Mobility and transport in order to facilitate the movement in the city and to facilitate the access of people to public transport services.
- ✓ Human capital, related to attracting and retaining talent, creation of plans for the educational sector and to boost creativity and research.
- ✓ Economy, with regard to local economic development, as well as promotional marketing plans, industrial strategic plans, and innovative and entrepreneurial actions.

In the first three places of the IESE ranking, International Cities in Motions (ICIM 2016), we find New York, London and Paris, each of them highlighted in one or more dimensions of the ranking. New York, for example, stands out for its powerful economy linked to its high Gross Domestic Product (GDP) and existent public trading companies. London achieved a commendable position in the human capital dimension because it has one of the best business schools and a great number of universities and art galleries. Paris in its part has the top position relating to international outreach, since it is a very important international tourist destination, thus hosting a great number of congresses and meetings. Despite these positive results amongst some of the smartest cities in the world, there is still a huge amount of work to do regarding one of the dimensions in the list: social cohesion.
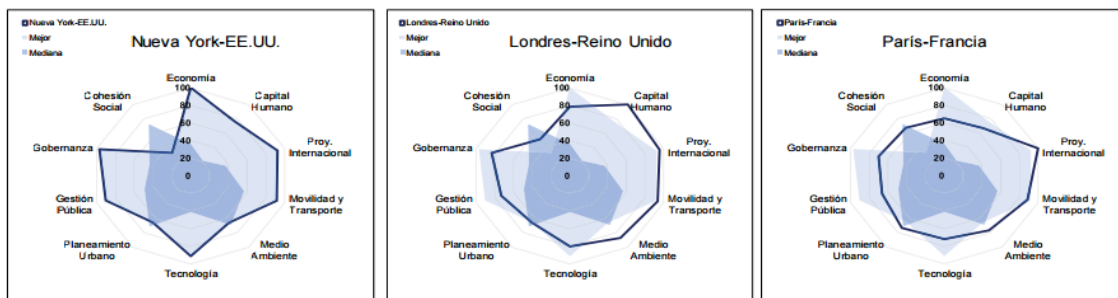
Graph 1. Taken from the platform of IESE Business School

As we can see from the examples in New York, London and Paris, there are various models and areas of concentration in order to qualify as a Smart City, and whilst no city could achieve excellence in all the given dimensions, it is important to achieve an acceptable minimum by identifying the needs of a specific city.
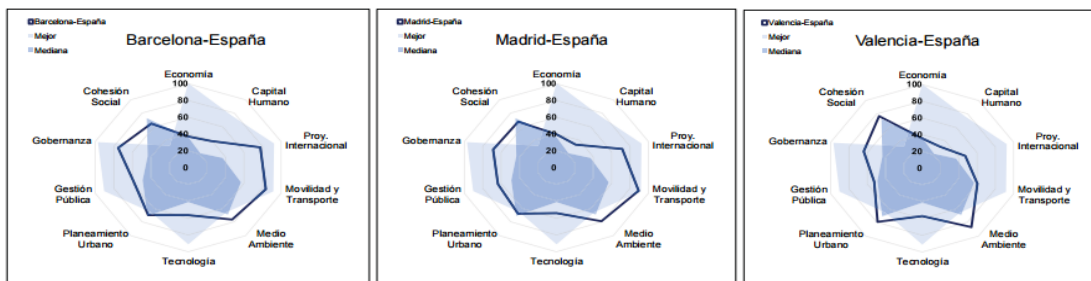
2.2. Spanish Smart Cities

In the case of Spain and using the same ranking of IESE Business School as a benchmark, there are three Spanish cities among the first fifty best Smart Cities of the world: Barcelona, Madrid, and Valencia, in positions 33, 34, and 49, respectively.

Barcelona stands out in the following dimensions: 1. Mobility and transport: it performs good management of its network of public transport and of its urban network of cycle paths. 2. International outreach: due to the international tourism that visits the city throughout the year and the important international expositions and events that are celebrated there, such as Smart City Expo World Congresses, the Smart City Campus or Mobile World Congresses. At the same time, this big city participates in the World Association of the Major Metropolises (UCLG in its English initials) which stands for "United Cities and Local Governments," and whose purpose is the exchange of experiences and the defence of Metropolises' interests. Also, Barcelona participates in an International Association of Educating Cities (AICE, in its Spanish initials) which bets on learning, promotion and progress for citizens and to defend citizens' rights. 3. Referring to the environmental dimension, Barcelona has created sensors that detect the capacity of rubbish containers, as well as the remote control system of rainwater and deposits and, a plan of energy self-sufficiency including the initiative of electric cars.

Madrid is highlighted in the dimension of mobility and transport, as it has developed some online platforms on the home page of its town council; in the section of "Plan your Trip" it provides information about bus routes and adaptations for specific needs. In addition, on the same homepage there is information about the public transport network, for example the times of the long distance train, as well as the long distance buses. Furthermore, this city has created a network of bicycle stations near to metro stations and intercity bus stations.

Valencia was the first Spanish intelligent city to create a technology platform known as VLCi, Valencia Intelligent City to enable citizens easier access to documents and procedures, as well as improving urban planning and so achieving important cost-savings in the public budget. This city scored highest in the environmental dimension, because it has an integral water cycle system, which consists of collecting water from nearby rivers, converting it to usable water for consumers, after which it is returned to the plant to be recycled.

Graph 2. Taken from the platform of IESE Business School

2.3. Santa Cruz as a Smart City

Currently in Spain there is a network of Smart Cities, created in June 2011 and known as Spanish Network of Smart cities (RECI in its Spanish initials). This encompasses 65 Spanish cities that apply technologies in their cities and that, as a result of the existence of this association, are able to exchange experiences and work together to develop sustainable environment systems. This network emphasises energy saving and the development of sustainable mobility, improving open access to government actions and the social care of people, to improve their quality of life. In addition, it has as a proposal to increase the economic progress of the city and to attract human creativity. Since February 2015 Santa Cruz has been one of Spain's 65 Smart Cities' network.

2.3.1. Strengths

Santa Cruz has created some initiatives that we will analyse according to the criteria of the IESE Business School. In reference to the mobility and transport dimension, the capital of Tenerife has implemented some projects, such as the use of electric cars and the installation of their recharging stations. Furthermore, this city provides several bike paths distributed in different points of the city, specifically on the avenues of La Marítima, Anaga, Los Majuelos, La Constitución, San Francisco, La Roche, as well as the San Andrés motorway. Among the companies that develop accessible business models is Metrotenerife. It was distinguished with the Telefonica Ability Awards of 2015 for developing a project that integrates disability.

Regarding the environmental dimension, Santa Cruz has developed a sustainable energy action plan in which it will accumulate an inventory of greenhouse gas emissions and a quantification of other gas emissions, with the objective of reducing polluting emissions up to 20% by 2020. In the same way, Santa Cruz town council in cooperation with the bank Caja Canarias/ La Caixa has established a Sustainable Foundation with the slogan "to impulse and develop a healthier lifestyle," which works to educate people with the goal to become internationally recognised for its sustainability and responsibility.

Another initiative comes from Santa Cruz's town council, which in the attempt to conserve the environment, has created an ecological urban garden in the municipality of El Sobradillo, focusing on self-sufficiency and encouraging the exchange of cultivated vegetables between users of the plots in the garden. This Project will foster interaction within the community, encouraging healthy leisure time and positive cohabitation.

The town council of Santa Cruz announced in its home page that El Sobradillo is the beginning of a network of ecological urban gardens in this city and more will follow in the near future.

In relation to the international outreach of Santa Cruz and this being the capital of the Island of Tenerife, it is important to consider an international meeting point for the celebration of events related to technological advancements and economic activity that benefits both the industry and the community. One example is Tecnológica Santa Cruz, in which national and international startups share their entrepreneurial experiences and knowledge with the public, as well as discussing social change, creativity and product innovation, management of social networks and rebranding with the aim of trying to empower citizens to start projects.

In the same way the IV International Forum of Tourism known as Futurismo took place in June this year, presenting issues related to tourist innovation and sustainability. According to an article in *"La Opinión"* published in March this year, during specific periods such as Christmas time and Carnival, hotels in Santa Cruz in recent years have experienced full occupancy, visits by cruise ships have increased, as well as excursions to the capital from other points of the island.

The technology that has been incorporated into the city's public services is another example. There are free Wi-Fi zones in parts of Las Teresitas beach, as well as in Parque Marítimo, Parque García Sanabria, and Plaza España. In the same way, Titsa bus station offers free Wi-Fi connection so that people can check the timetable of buses and can be quickly informed about issues or last minute changes. In addition, some buses are equipped with USB connections to recharge the battery of the mobile phone or the battery of a wheelchair, free of charge.

Technology is also incorporated into the cultural area of this city, which comprises 45 places declared of cultural interest and posted in a platform known as "Cultural Heritage Manager," a downloadable application. There are also applications available through smartphones for the open data portal on the homepage of the town council of Santa Cruz regarding government information related to public services and its geolocation.

The governing body of Santa Cruz offers transparency in the management of services related to legislation and urban projects, and encourages people to participate, adding their suggestions about cultural heritage that could be included into a strategic plan, as well as offering the option to make suggestions as to what kind of information should be published and which apps people consider need to be created by the public administration. On the same website, the section "Relationship with citizens, society and social participation" shows the different areas in which the community can participate.

Another dimension is public management. Through the use of virtualisation technology on the town council's web, it is now possible to do certain administrative procedures from any computer without the need to visit the town council. Also, public administrators will reward initiatives by public workers who improve the quality of the service offered to the citizens. Diverse services for citizens are present in the different corporate social networks like Facebook and Twitter, but also in YouTube channel and in Google Plus. In urban procedures, like opening licences or implementation of projects, the city fostered administrative simplification and reduction of documentation for activities classified as "harmless," which do not alter people's health condition or cause environmental damage.

In the dimension of urban planning, the city of Santa Cruz has a planning management office in which it is possible to present documentation on line, but users also have the option to make an appointment for this office on Tres de Mayo Avenue and therefore be assisted by the appropriate civil servant. The town council web site provides information related with building ordinances, document verification, approval for urban operations, agreements and projects related to edification in the city, as well as the latest news about urban planning.

In relation to the human capital the Chamber of Commerce of this city offers a great variety of attendance and semi-attendance courses for employed people, and the office of employment offers free-of-charge courses for the unemployed. Since 2016 Santa Cruz has belonged to the Canarian Network of Innovation and Business Development (RECI in its Spanish initials), which helps with consultancy and supports the development of entrepreneurial ideas, in order to promote innovative changes and to receive better economic returns and offer support by external funding. In addition, it has the function to act as an intermediary between enterprises and offer vocational training in high schools to improve training in the work place.

These are just some of the actions that Santa Cruz has incorporated into the public management of this city in order to be a better Smart City. However, there is still one last dimension of this Smart City that needs to be addressed and on which we will now focus our attention. This is social cohesion. Within this dimension, blind and visually disabled people of Santa Cruz are the main object of study.

2.3.2. The present state of affairs

The area of study

Santa Cruz is divided into five districts, namely Anaga, Centro-Ifara, Salud-La Salle, Ofra south coast, and Southwest. In a survey carried out by the town council of Santa Cruz in 2014, it was calculated that out of a total population of 214,154 citizens of the five districts, 2,581 are blind. Some of them were born blind and others have lost the ability to see because of illnesses, by accident or simply as a result of pathologies associated with old age. Only 1,197 have an official certification of their visual disability. Firstly, we will know the articles of the constitutional and legislative framework that gather some of their rights in matter of accessibility and social inclusion.

Ordinances

The Spanish Constitution in its articles 9.2, 14 and 49 specifically mentions the rights of a disabled person to feel integrated in social life with a right to enjoy life like any other citizen of this nation. Furthermore, the various public administrations must work to eliminate obstacles that prevent equality and foster the participation of disabled people in matters related to politics, the economy and culture of their city, as well as to establish policies that assist people with specific needs in aspects related to education, leisure, sports, and work.

Now, the current municipal ordinances, that provide disabled people with the right of accessibility to public buildings: Law 8/1995 of the 06th April for accessibility and elimination of physical and communication barriers, and the regulation by decree 227/1997of the18th September, both approved and published on the 22nd of February of 2017, in the Official Bulletin of the Province of Santa Cruz of Tenerife, included the right to an accessible environment in equality of conditions and to the removal of barriers which prevent the natural development of disabled people, as well as to encourage the adaptation of facilities and buildings so as to guarantee access.

In the same way, Royal Decrees 505/2007 of the 20th April, 314/2006 of the17th March, 173/2010 of the 19th of February, define the basic conditions of accessibility and the use of public areas and buildings and all that was specified in a document named "The Safety in Use and Accessibility" (SUA, in its Spanish initials). This document proposed that in case building adaptations were not feasible or compatible, other alternative solutions can be implemented. This was added to another Law (2/2011) on the 04th of March, whose article 11 stated that public administration can authorize improvement works, as long as these are included in a plan of rehabilitation, without the authorisation of buildings' owners. Likewise, it is possible to adapt free spaces within the public domain. Finally, it was abolished by law 8/2013 of the 26th of June, for urban rehabilitation, regeneration and renovation, which together with the law of land 07/2015 of the 30th of October, constitute the law of Land and Urban rehabilitation. This ordinance provides the regulatory tool that permits the order of any necessary actions in the city of Santa Cruz, including a section to improve access with elements such as ramps, lift platforms, and lifts.

In reference to the legislation of accessibility of maritime transport, law PRE/3028/2011 of the 4th November regulates the basic conditions of accessibility on passenger ships and for the shipping companies that provide services in port terminals. As well as this regulation there is an

established protocol of action and training required by the crew members to guarantee dignity and appropriate safety conditions for handicapped passengers. This training covers issues of attention to passengers during the check-in procedures, on board during the sea trip and, also, on the arrival in port. There are also systems of assistance by the professionals for this collective in emergency situations.

Furthermore, there is a link from the administrative offices on land immediately after the purchase of the boarding pass to the crew of the ship passing on information about passengers with disabilities.

La ONCE

Apart from the ordinances, there are significant companies that work with the purpose of normalising the life of people with vision impairment and the equality of opportunities for all, such as the National Organisation of Spanish Blind, La ONCE, a public law corporation of social nature. This organisation, situated in the capital of Tenerife, improves the social cohesion of people with visual disabilities in different social areas and fosters the cooperation between public and private organisations that are interested in the promotion of activities or services with access for all. Furthermore, La ONCE offers personal attention in matters of visual rehabilitation for people with low vision, and in the case of blind people, it helps the movement skills for using the stick and abilities for daily life. In addition, this organisation is responsible for the promotion of physical accessibility, as well as for the access of information and communication technologies.

One of the technological incorporations of this national organisation is the control of acoustic traffic-lights, which emit an acoustic signal when traffic light turns green so that the blind person can cross the road. According to the information obtained by, Mr. Benito Codina, the technician of rehabilitation of La ONCE, Santa Cruz is one of the cities with a greater number of acoustic traffic lights, there are approximately 200 in this city.

Also, providing users with a stick or a guide dog are other elements provided by this organisation, which considers the self-sufficiency and the development of blind people together with these elements essential requirements for their social inclusion.

The technician of rehabilitation of La ONCE considers that taking into account that 85% of people with visual disability have low-vision but are not blind, it is not necessary to implement total technological innovation. Instead, conditions could be considerably improved just with good illumination, using contrast on some surfaces, and placing signs in buildings, and also in tourist establishments like hotels. All that will contribute to facilitate the exchange of information and the self-sufficiency of this collective. However, blind people have other needs and they require other guiding elements, such as tactile paths that are recognised with one's feet or the stick and help to identify a pedestrian crossing or an irregular itinerary. Also, he explains that the problem is not only to include the adaptations in the planning and design of products or services, but also to explain how to reach them.

Taking into account his experience in the corporation of La ONCE, he thinks that it is not an inclusive tactic to offer activities created only for disabled people, since the activities should be designed for all, and in them disabled people should assume functions in accordance with their capacities and abilities. He remembers the case of Lucía Hernández, who in 2016 participated as a candidate in the Carnival of this city, as a way to include people with disability in social life, illustrating that this candidate, though being blind, her situation has not been an impediment to be able to participate in this event. These initiatives have a great social component because they not only provide better life quality for the disabled but also create links between them and the general population

Concerning the tourist sector, La ONCE's Mr. Benito Codina highlights the fact that approximately 65% of people with disability are older than 65-70 years and look for destinations with warm weather, security, and services adapted to their characteristics. This creates great opportunities for a city as a tourist destination. Also, approx. 60% of those older than 70 years have vision problems, and 80% of people older than 80 have serious vision problems. Yet, even so, they participate in tourism and travel and are potential consumers. All changes to improve accessibility will be good for the tourist sector.

As a pioneer of good practices, the interviewer talks about the municipality of Arona, whose town council has a tourist office exclusively for accessibility and has been recognized as the most accessible town hall in Europe. People look for this type of facilities when considering a tourist destination.

Mr. Codina comments that Las Palmas de Gran Canaria is another example of a socially responsible city, given that its town council is one of the few that has an accessibility department, which aims to guarantee the access of the handicapped to public infrastructures. This department takes an active part in conversations with the city regarding accessible destinations and has participated in the creation of an app for mobile phones called LPA (In its Spanish initials) allowing people to find the accessible points of the island, and also, to report those which are not.

By 2019, according to an article by Hosteltur published in February this year, all destinations will have an international norm, ISO 21902, organized by the ONCE and the Spanish Association for Standardization (UNE) and the World Tourism Organisation (WTO) in order to meet specific international standards for accessible tourism, taking into account that disabled people have also a right to enjoy culture and leisure, as well as a right to travel around the world.

SINPROMI

Another public corporation was created in 1993 by the Island Council of Tenerife, called the Insular Society for Promotion of People with Disability, abbreviated SINPROMI, and it is also situated in Santa Cruz. It manages services for disabled people, among others, including people with visual difficulties or blind. This corporation creates and directs projects of training and integration for the handicapped, in which they teach the accessibility function of information and communication in technological devices. In the same way, it develops specific software and programs to facilitate the access of the disabled to training, working, and leisure resources.

In terms of accessibility, SINPROMI fosters accessibility to buildings and supports projects that provide resources to improve the development of daily life for the handicapped. This organisation is responsible for the areas of tourism, leisure, and sport in the city, offering culture and art activities for all. Also related to accessibility, SINPROMI promotes the suppression of physical barriers and accessible environments, providing information and technical support for private and public entities that request advice, they also provide advice to job seekers and companies looking for employees, as well as their selection and personal support.

This corporation has identified the advantages of using technology in order to access information and communication and has increased its usage to develop projects for tele training and teleworking. One of SINPROMI's objectives is to encourage the participation of the disabled in society, boosting the approach to cultural resources and the enjoyment of sport activities, tourism and leisure, as well as facilitating access to information.

In an interview held with the person responsible for the area for accessibility at SINPROMI, Mrs. Dulce Torres, stated that there are more accessibility measures for people with physical disability than for blind people because they represent a higher percentage and a more visible social group. She claims that there are buildings built many years ago without the requirements of the municipality ordinances, as for example routing bands in the interior of public buildings for the orientation of blind people, or urban areas with an irregular pavement that needs to be changed to a podotactil pavement. However, there are other places that have already incorporated elements such as podotactil paths as in the case of the tramway exchangers, located on the edges of platforms for blind people to know there is a decline right in front of them, as well as at the beginning and the end of flights of stairs. She comments that, in general, in the city of Santa Cruz there is a lack of lowering on pedestrians' crossings, as well as a lack of podotactil paths.

Another important aspect noted by Mrs. Dulce Torres, is the need for an integral perspective. This would see a more inclusive approach designing and creating products and services for all, thus leading to a greater all round benefit. This, in turn, makes the system more sustainable, since it would not be necessary to add adaptations in the near future. If we take into account that 40% of people face situations like health problems with their extremities or vision, or a situation carrying a baby stroller or travel baggage, or simply because we get older and there increases the need for elements that facilitate our movement in the city, that means that all the improvements in accessibility can help many of us if we are in these situations.

The town council of Santa Cruz in collaboration with SINPROMI created in March 2012 a Municipal Committee of Accessibility, composed by representatives of associations and collectives of disabled people, as for instance the association "QUEREMOS MOVERNOS," as well as municipal technicians to generate debates that enrich the decisions of the town council and the specific measures to improve accessibility. Its objectives are to consider accessibility as a transversal axis of the municipal policies, to globally add accessibility principles in all areas of society: urbanisation, buildings, communication, transport, education, culture, sports, and new technologies involving civil society in the design of a city for all. All that in collaboration and coordination with other institutions in order to adopt actions for a more accessible city using

technologies as modernisation and inclusion tool. The final objective is that Santa Cruz de Tenerife becomes an example city for its citizens and for other municipalities, as well as an accessible tourist destination.

Another interview held with the person responsible for technological innovation at SINPROMI, Mrs. Virginia González, saw the provision of useful information about how technology creates access opportunities for people with disabilities in different social areas. She also mentioned the advantage of self-sufficiency for the blind who thanks to the function of accessibility on their Smart phones can translate information from written text to spoken language in order to receive information.

With this possibility available we can see how the intelligent use of technology could be considered a significant tool in a blind person's life, since this transmits decision making information is transmitted without this technology for the visually impaired a Smart City would be able to consider itself quite so intelligent.

SINPROMI's Virginia González clarified that it is not always necessary to implement advanced technologies in order to achieve positive results for blind people. Sometimes it is enough to create applications that can replace the main function of eyesight, that is to say recognition. She also mentioned support elements as in the example of intelligent labels that can store information regarding a variety of different buildings. Technology makes possible information and communication through devices which are programmed with functions that allow the interaction between the environment and people with low vision. When approaching an urban infrastructure, the person uses the technology to know if it is accessible. This could be an important step to guarantee easy access and improve the inclusion of blind people in society and at the same time to attract a new tourist niche to our city.

In the transport sector, specifically with regards to bus companies like Titsa, the interviewee commented that during the waiting time at a bus stop it would be interesting to obtain real-time information on the location of the bus. Also, during the bus journey it would be useful to obtain acoustic information through a voice system incorporated in the bus referring to the next bus stop. Many of these elements could be very useful not only for people with visual disability or blind people, but also for elderly people and people that visit our city and do not know the daily route of buses.

One important aspect obtained from the talks with the professionals of La ONCE and SIMPROMI is the lack of knowledge on the characteristic of disabilities and the fact that just this is a motive that generates exclusion against this collective with special needs. It is necessary to inform people what are the real difficulties that handicapped people have and how our actions in urban spaces can cause a negative impact on the people that depend on our civic awareness and engagement. Such is the case of parking in parking spaces reserved for the disabled or on pedestrian crossings, which have to be surrounded to be able to cross the road: these behaviours invalidate in practical terms an action that was created to improve the accessibility of people. Also, similar effects can be observed with urban furniture that is badly placed, vegetation situated

on very narrow streets, and pedestrian crossings whose pavement does not have the marks to recognize that the crossing is there.

Also, devices should have some minimum requirements of accessibility for meeting the needs of the users and specifically for handicapped people. In the case of vending machines, these do not have a voice system in order to understand which functions buttons to select, and the same goes for some automated teller machines.

The culture and leisure services also have to change considerably. This is especially relevant in the case of sport activities, as well as their infrastructures because they are inaccessible for people with disabilities. As a critical point, Virginia González of SINPROMI, denounced the health sector for its lack of signs and acoustic elements to enable the use of the services and infrastructures, a very basic need. In the same sense, it is important to ensure the access to e-commerce pages for all kinds of users with a voice description of the product or service.

Finally, with regard to the question if improving its public access and infrastructures within public urban planning could transform Santa Cruz into an accessible destination in the tourist sector, her answer was affirmative. She added that many handicapped people already come here because of the climate: if Santa Cruz implemented the necessary measures to improve access to public places and if we offer services specialized for this market niche, more will come.

Both La ONCE and SINPROMI were willing to answer me some of my questions about disability-related issues and the current situation of accessibility in Santa Cruz. Their contributions appear in the Annex to this document, and were crucial in the research of this subject because of their first-hand knowledge of the special needs of this collective. Their statements confirm the lack of inclusion of the disabled in many social areas, activities and services for citizens.

<u>Future projects of La ONCE and SINPROMI</u>

With regard to the involvement of these organisations for the future, both are involved in future projects. In the case of La ONCE, the technician talked about collaborative work with the Astrophysics Institute of Canaries to be present in a congress in Dublin concerning technological devices that help to identify obstacles on the line of movement (also called perceptive anticipation of obstacles) and that is programmed to make decisions before the person reaches the obstacle. At the same time, he talks about other mechanisms like geopositioning to know where you are and what surrounds you, and geolocalization to know where you are going.

SINPROMI on its part is working together with the department of Information of Technology of the Island Council of Tenerife in a project to evaluate the pedestrian routes. This concerns the accessibility of zones proven to be of tourist interest through google maps on mobile phone in order to facilitate the best way to arrive at a tourist point and, also, to recognize the accessible routes and provide accessible information for residents, users, tourists, etc. It is also a way to see what areas are lacking in improvements and which ones should take priority.

2.3.3. Weaknesses

Once we have established the most important matters regarding accessibility and gathered relevant information of those companies trying to foster the inclusion of disabled people in this city, we will see realistic data concerning the critical points of access to different public infrastructures of this city. SINPROMI and the town council of Santa Cruz in collaboration with public and private organisations drafted an official Integral Plan of Accessibility and Social Inclusion for Disabled People in November 2015, in which different public areas of our capital, such as urban walkways and pedestrian crossings, among other areas, were looked at:

Graph 3. In the case of the 7285 analysed walkways in the five districts of this city, only half of them are accessible. The others only partially meet the standards of security and accessibility as required by municipal ordinances, given that their pavement has an inclination of between 8% and 12%. Likewise, they have a non-sliding pavement and/or a regular surface and the width of the pavement is between 0,90cm and 1.20m.The worst case of inaccessibility is for the walkways that have an inclination of more than 12% and have neither a non-sliding pavement nor a regular surface, and the width is smaller than 0.90cm.
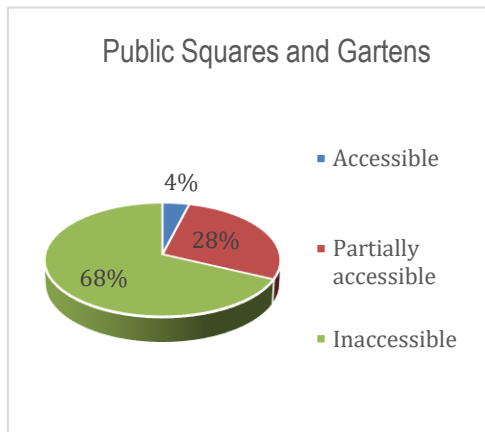
Walkways

- Accessible 45%
- Partially accessible 26%
- Inaccessible 29%
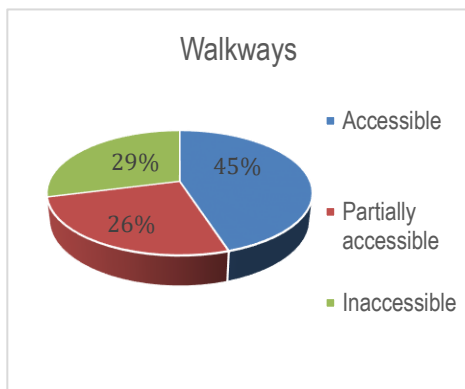
Source: Own elaboration

Graph 4. In relation to the pedestrian crossings, 7088 were analysed in the five districts of Santa Cruz of them, and specifically the lowering of the level to the ground. Again, only half are accessible. A very small percentage partially have the requirements, as the inclination is between 14% and 16%, a different surface pavement-road between 0.02m and 0.04m, the crossings width between 0.90cm and 1.20m, and the fact that it doesn't have obstacles. On the other hand, an important percentage of 42% are directly inaccessible due to an inclination higher than 16%, width is smaller than 0.90 cm, having obstacles, or even worse, there is no lowering to the road level.

Pedestrian Crossing

- Accessible 46%
- Partially accessible 12%
- Inaccessible 42%
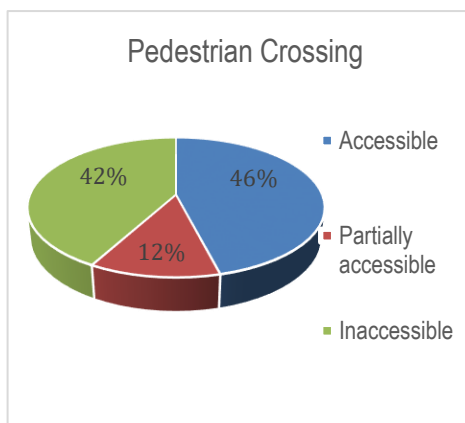
Source: Own elaboration.

Graph 5. The situation of Santa Cruz's public squares and gardens is worrying. As we can see in the graph, almost 70% of these public spaces are inaccessible because at their main access there is a step higher than 2 cm, followed by a transit area of less than 1.20m., and if there is a ramp, its inclination is higher than 12%. In the interior of these places, the width of the main route is greater or equal to 0.90cm, the inclination of the main route is greater than 12%, the pavement is deteriorated or sliding, and there are no benches to sit on. It is very worrying that only 4% of public squares and gardens are accessible for the handica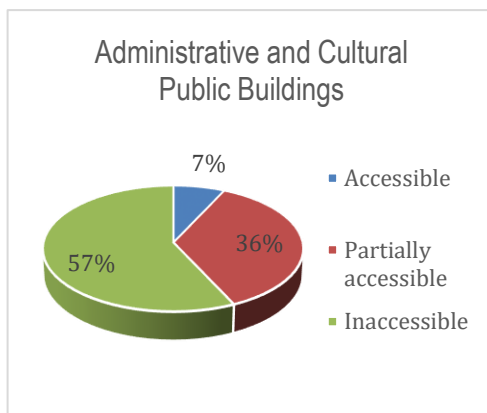pped, taking into account that we consider these places of social interaction, for the use of the community and spaces of development of public activities for society that are not accessible for the visually disabled.

Public Squares and Gartens

- Accessible
- Partially accessible
- Inaccessible

4%
28%
68%

Source: Own elaboration.

Graph 6. There are still many urban elements that to a greater extent are inaccessible, as is the case of bus stops, with a negative result of 71%, since the inclination of the streets towards them is more than 12%. Also, there is no lowering to the level of the ground next to the bus stop, nor benches to sit on. In the same way, if the bus stop had a bus canopy, the space ahead does not meet the legal regulation or directly there is none.

Transport facilities are one of the basic elements that a society needs to be able to go from one place to another and they should be accessible for all, especially since for many reasons the car is not the best option and the growing trend is to use public transport.
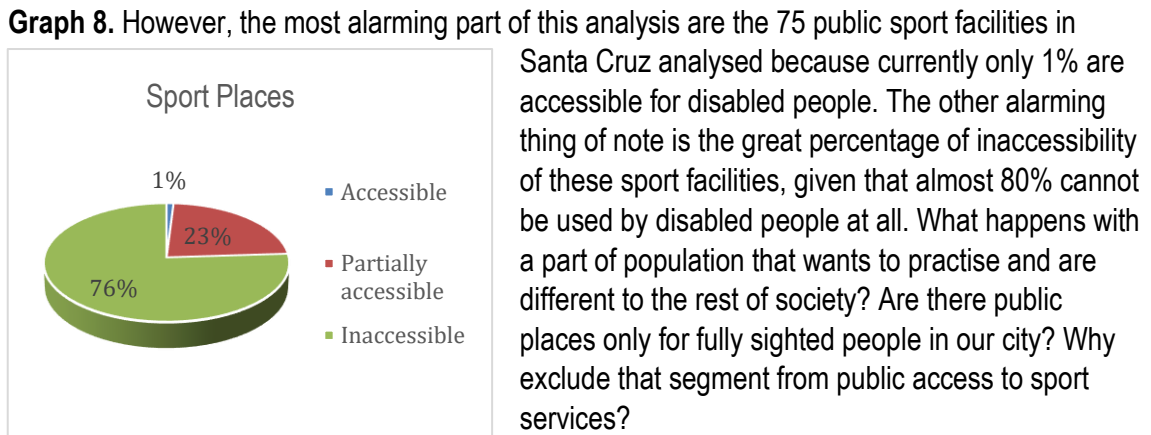
Bus Stop

- Accessible
- Partially accessible
- Inaccessible

19%
10%
71%
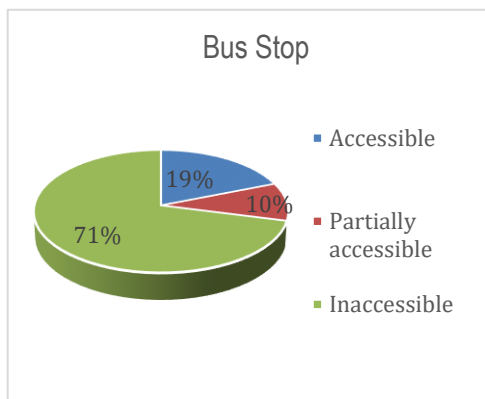
Source: Own elaboration

Graph 7. Referring to the 52 analysed administrative and cultural public buildings, whose installation are visited by all citizens and visitors in some moment for another, either for administrative procedures or simply to enjoy cultural activities during their leisure time. We can observe in this graph very negative results in matters of accessibility. Only 7% are completely accessible and more than half are inaccessible, an aspect that draws our attention, since the municipal ordinances try to foster culture and leisure activities in the community, as well as to bring the public administration closer to users so they can participate in meetings on city planning and projects, or in cases they have any procedures pending.
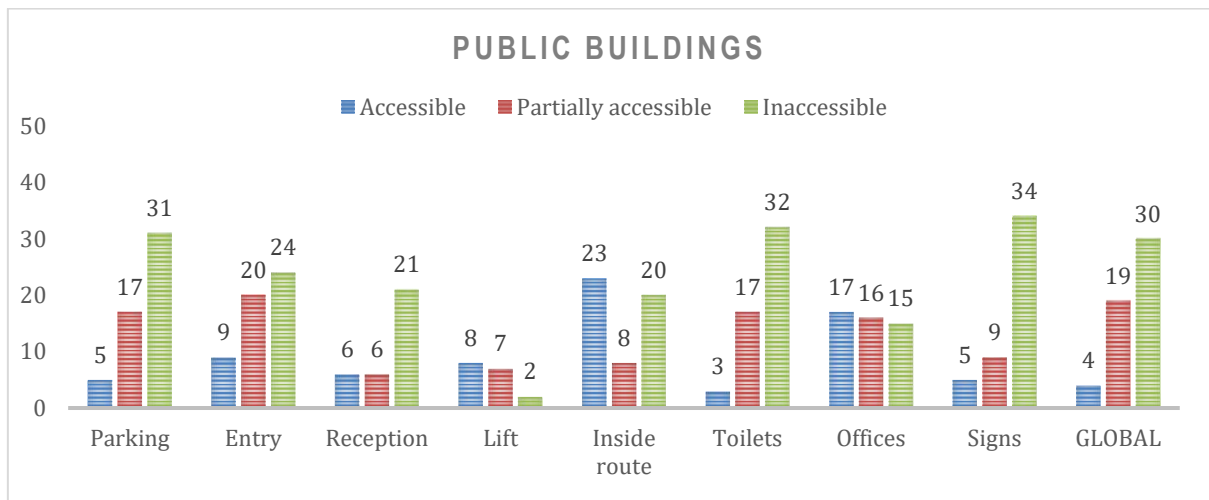
Administrative and Cultural Public Buildings

- Accessible
- Partially accessible
- Inaccessible

7%
36%
57%

Source: Own elaboration.

Graph 8. However, the most alarming part of this analysis are the 75 public sport facilities in Santa Cruz analysed because currently only 1% are accessible for disabled people. The other alarming thing of note is the great percentage of inaccessibility of these sport facilities, given that almost 80% cannot be used by disabled people at all. What happens with a part of population that wants to practise and are different to the rest of society? Are there public places only for fully sighted people in our city? Why exclude that segment from public access to sport services?

Sport Places
- 1% Accessible
- 23% Partially accessible
- 76% Inaccessible

Source: Own elaboration.

We continue with a more detailed analysis of accessibility looking inside 53 public buildings, and also the nearby parking facilities. More than half, specifically 30 buildings, are inaccessible for different reasons. There are no parking facilities for disabled people next to the building and there are no toilets for people with disabilities or the existing ones do not meet the legal requirements. Furthermore, the signs do not facilitate movement inside the building, they have been not adapted and are insufficient for finding some facilities. As we can see in the graph, the real situation in terms of accessibility to public buildings is unfavourable and still some municipal ordinances have not been put in place.
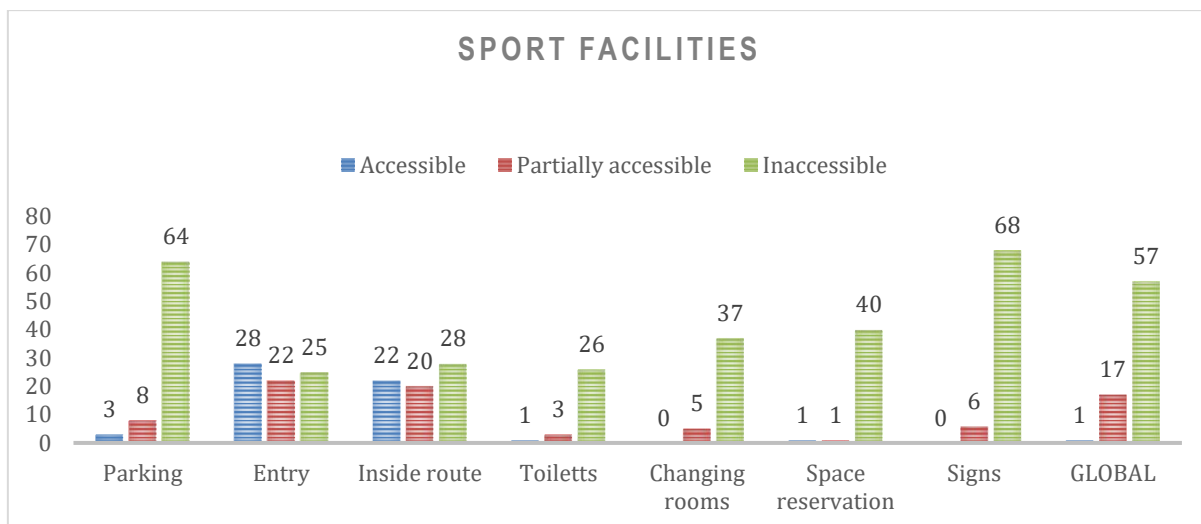
Graph 9. Facilities of Public Buildings

PUBLIC BUILDINGS

Accessible — Partially accessible — Inaccessible

Category	Accessible	Partially accessible	Inaccessible
Parking	5	17	31
Entry	9	20	24
Reception	6	6	21
Lift	8	7	2
Inside route	23	8	20
Toilets	3	17	32
Offices	17	16	15
Signs	5	9	34
GLOBAL	4	19	30

Source: Own elaboration.

In relation to the 75 analysed sport facilities, 57 of them are clearly inaccessible. There is a grave difficulty finding adjacent parking places to these facilities and distinct lack of signage to guide visitors or users through the facilities of the sport place. In addition, some facilities or furniture such as changing rooms or signs are incredibly non-existent, also a significant lack of accessible toilets and lockers which are the main components of any sport facility.

Graph 10. Sport facilities

SPORT FACILITIES

■ Accessible ■ Partially accessible ■ Inaccessible

	Parking	Entry	Inside route	Toiletts	Changing rooms	Space reservation	Signs	GLOBAL
Accessible	3	28	22	1	0	1	0	1
Partially accessible	8	22	20	3	5	1	6	17
Inaccessible	64	25	28	26	37	40	68	57

Source: Own elaboration.

In addition, the Integral Plan for Accessibility includes some public buildings that are critical points which need to be upgraded and must incorporate measures to achieve a good state of accessibility and be an example to other public administrations in access for everyone.
With reference to the town council of the city of Santa Cruz de Tenerife, on Viera y Clavijo Street, the result in matters of accessibility were only partially successful. In aspects relating to the walkways leading to the town hall, nearby parking facilities, different ramps for the secondary entrances, the lift, as well as the interior itinerary and the plenary room. The results were poor. The main point of this building is found directly at the main entrance, it has a staircase without a ramp, and this is a repeated issue at the central and side entrances of Mendez Nuñez Street. Likewise the toilets, the furniture, and signs are all currently in a poor state when it comes to matters of accessibility.

Another example of partial accessibility in public buildings is the public swimming pool on Reyes Católicos Avenue: its facilities in general are partially accessible, whilst the reception and the tribune are inaccessible. According to SINPROMI, the above mentioned examples, the town hall and the public swimming pool, should have accessibility as a high priority because these buildings offer services that are for all the community and should foster the interaction between citizens and the adequate development of social life. Therefore, they must be open for everyone. Consequently, SINPROMI has calculated an estimated budget for the actions that would improve the access to these infrastructures. In the case of the town hall, an investment of approximately €110,000 and for the facilities of the public swimming pools, approximately €41,000.
Also, other public places like libraries, buildings with classrooms, and buildings with public service points, as well as buildings with point access through tablet are in acute need of improvement regarding accessibility. Most of them do not have adapted computer areas, or supporting products with writing and reading access for people with special needs; and in some cases, the visual content is inaccessible.

Despite having several municipal decrees that outline the access' rights of blind people to public infrastructures, many visually disabled and elderly people prefer to stay home, their best scenario meaning that they count on their families to do the daily tasks and accompany them in their movements around the city because neither the urban planning nor the public infrastructure meet the standards of accessibility so they can autonomously move freely around Santa Cruz's streets. The data of the official Integral Plan of Accessibility and Social Inclusion show us the real situation of some buildings that do not meet regulations and other buildings that have been built with physical barriers, many of them only partially accessible.

Analysing the situation from an academic standpoint and based on the statements of professionals, it is important to consider not only the accessibility in situ but also the long walk to some of these buildings, with various barriers along the way that require adaptation or complete removal for safer movement of the disabled. Notwithstanding, despite the fact that this collective of our community lives in the Smart City of Santa Cruz surrounded by technology, it can be argued that they do not enjoy the same quality of life as the able-bodied person and that the daily problems they face ergonomically, administratively, mentally, and socially could be resolved mostly with technological solutions in today's digital world.

Although, it is also necessary to create a transversal accessibility plan trying to see urban areas and public buildings as a whole or as system that should connect both points, in order to provide efficient solutions based on the knowledge of the public administration and the needs of any citizen, the socialisation and administrative procedures. Firstly it necessary to create a complete inventory of public infrastructures, including public schools, university buildings, libraries, museums, sport places, playgrounds, and also maritime and land transport. Secondly we must gather information form the first-hand experiences of disabled people and an inventory of those places they find impossible to access. With this information we can then measure the current accessibility for blind people with the aim of collecting up to date information for future improvements.

In this way it would be possible to know the strengths and weaknesses of infrastructures and public services in order to act and remove the isolation that is felt by a disabled person in an inaccessible environment and to boost their autonomy.

3. PROPOSAL FOR ACTION

The fact that blind people have to adapt to a sighted world creates a sensation of uncertainty as to how to arrive at a specific place. Therefore, it is imperative that we begin a process of transformation in Santa Cruz, creating a Smarter City that puts technology at the service of the community to achieve equality of opportunities for disabled people and specifically for blind people.

In order to obtain the expected results, it would be necessary to recruit the assistance and backing of governmental bodies at various levels in order to tap into all the skills and knowledge required to manage a capital city, from adaptations to budget, through planning and law, as well

as take into consideration the participation of disabled people from the beginning with the planning projects in order to receive a positive result through the engagement of all the citizens. Because those who can-not see the physical world are the best intermediaries to transmit back to us their difficulties, informing us of the solutions they need to be able to overcome these barriers we unconsciously allow and that generate discrimination against the wellbeing of the disabled community.

As we can imagine, they, better than anybody else, know the difficulties they face every day, from the moment they leave their homes, during the walk through the city directing their way to public administration in order to resolve any procedure and, though we understand that it is an unconscious act of discrimination, they are the ones that have visible marks of our indifference on their bodies, as stated the association of disabled people called "Queremos Movernos" in March this year in the newspaper "*EL DÍA.*"

As a consequence of the issue raised in this documentation, we must take measures to clarify what actions should be carried out to improve social inclusion for those citizens and travellers with visual impairment in the city of Santa Cruz with the purpose of reinforcing the social cohesion of our Smart City. This is only possible if we count on the engagement of the community, the support of the government and the involvement of the private sector.

These are some actions proposed related to the social field, but also to the tourist sector:

- ➢ Investment in the research and development of specific assistive technologies for blind people that guide their movements in the city, that can be incorporated into mobile phones, as for example the installation of intelligent sensors in a city that send signs to these devices to facilitate walking through the streets of Santa Cruz, as well as the implementation of geolocalization techniques.
- ➢ Seek advice from specialists in the sector of the smart management of a city, Schneider Electric or IBM, corporations specialising in technology and consulting.
- ➢ The financing of programs and projects with European funds, as the European Regional Development Funds (ERDF) in its Spanish initials (FEDER,) and the calls for the financing of projects like Horizon 2020, a program for innovation and research. Also, State aids included in the National Plan for "Smart Cities" that benefit local entities and the industry.
- ➢ The creation of smart labels, similar to bar codes that can be scanned by devices to provide all the necessary information about a product or service, incorporated gradually, first in large businesses and then in small businesses of all categories.
- ➢ In cases where there is no economic and technology media, businesses must supply the information of the product in Braille in the businesses mentioned above, according to the standards of the Spanish Braille Commission of La ONCE.
- ➢ Add intelligence systems to maritime transport in order to emit information about the location of ship's facilities to the devices of blind people, as well as information on estimated times of arrival, and who to report to in the case of ill health.

- In reference to public transport, such as buses, the addition of the acoustic technology to the existing visual screens that inform passengers about routes and schedules in order to facilitate the geographical orientation of the visually disabled.

- The identification of public places with physical barriers and the introduction of technical measures (minor works) necessary to adapt them.

- A reminder to all buildings for public administration that they have a duty of fulfilment of the municipal ordinances regarding the access of the handicapped to their facilities and the application of sanctions to public buildings of general interest that do not comply with the legislation on accessibility within a given period of time.

- The constitution of an independent department of accessibility in the premises of the town council of Santa Cruz, which should represent exclusively the community of handicapped people live in our city, and also act, as intermediary to transmit the basic requirements of this collective to the government directives.

- The upgrade of cultural, sporting and social meeting places through adaptations for the handicapped. Including ramps, signs, adapted toilets, as well as other necessary requirements for sport installations. Also, contribute to the participation of the general public offering sport activities inside these places that can be carried out by all, promoting different sport modalities for this collective.

- In relation to the sports, cultural and leisure sector, the reservation of quotas for people with visual impairment and the programming of an automatic messaging system to inform them about future activities and other relevant data about it.

- The design and the planning of a complementary leisure sector for the visually impaired community, and for the blind tourists that visit our city, that uses audio technology as the main communication tool.

- To foster the recruitment and the training of service staff of the tourist sector in assisting disabled people in a professional way, and to ensure relevant and up-to-date qualifications for those staff involved in guided tours.

On the one hand, some current needs could be satisfied by adapting infrastructures and eliminating obstacles, whilst on the other hand some needs require the implementation of both new and currently available technology. Having set out the possible actions that would lead to a more inclusive life for the visually impaired and a better Smart City, I will now outline how it can offer significant benefits to our city.

4. DISCUSSION

The proposals for action mentioned above are essential to achieve the balance between the rights of the community with disabilities and the rights already enjoyed by fully sighted people. This balance would encourage social integration, encourage respect between able and disabled bodied individuals, raise the profit of disabled people in society, and as a direct result of greater social integration, and create a mutual sense of belonging between all members of the municipality.

From a social point of view, through the investment and the interest that shows Santa Cruz in technological projects for the handicapped we draw the attention of sectors like education, industry and health sector for them to cooperate and promote initiatives that improve the conditions in which they offer their services and products, thus creating so a chain effect or, better still, showing they are interested in creating strategic alliances.

In order to understand the day to day difficulties for a visually impaired person, we must first imagine ourselves in the same position. In this way we would quickly see how personal autonomy is almost impossible when we cannot see the information needed for our daily life. As able-bodied members of a community, we take for granted reading restaurant menus, the products in stores and their prices. When a person cannot see in the bank or the pharmacy or at the train station and needs to continually ask for help, their sense of self-worth is much reduced.

If Santa Cruz makes the decision to implement these changes for our visually impaired citizens and tourists, it will be participating in a huge movement towards autonomy and 'normality' for this sector of people and the city will rise quickly in the international ranking of Smart cities.

With regard to tourism, this is an ideal opportunity to increase Santa Cruz´s competitive edge, promoting this city to the world as a disabled-friendly destination for blind people, offering a totally different product in comparison with other places on the Island. Also, it could attract new investors to foster entrepreneurial activity in this city.

This research offers an opportunity for Santa Cruz to become a smart destination, attract a specific niche of tourists to our city, a new cross section of people and their able bodied families who want to enjoy a vacation in a place whose services and infrastructures are accessible and adapted for them and their needs. In addition, these proposals offer a challenge for managers and entrepreneurs to create products and vacation packages for blind people, as well as interesting activities designed to focus on their other senses in order to explore nature and culture. Furthermore, it offers a challenge for tourist stakeholders to create specific products and services for this segment based on their needs, not to mention the employment opportunities that this initiative can create.

According to the statement of Antonio Prado, president of The Economic Commission for Latin America CEPAL, organisation belonging to the ONU. "*Accessibility brings values that are not only social, but also economic: seasonality, attract people like older people and families with a positive prescribing of the destination by its users, improved reputation and overall increase in the quality of products and services, since the benefits of accessibility are an improvement for any tourist profile*," These statement by Mr. Prado indicate the significant advantages of having a good management in matters of accessibility of a city, and the possibility to obtain huge profits in different sectors as the industry of services, being the social benefits one of the most important.

The proposal for actions that I suggest are necessary for the wellbeing and fulfilment of equal human rights for the more disadvantaged members of our society. Any of these community members could be a relative, a friend or even we. At any time ocular illness could take all or a

part of our eyesight and if this was to happen, we would certainly want to continue life in the same way as we had when we were fully sighted.

5. CONCLUSIONS

The main contributions of this academic project based in Santa Cruz's accessibility for the visually impaired and blind people through technology and knowledge are the diverse ways to supply devices with the necessary functions to be able to provide this collective with real time information.

Another contribution provided by this academic research are the social advantages, resulting from the technological implementations that contribute to build an equal basis in society in matters of accessibility, providing blind people with the necessary tools to be self-sufficient and take decisions.

We are all aware of the advantages that technological advances bring to our lives. However, the proposal for action explained in the document could be carried out in order to improve also the quality of life of the community with disabilities and to boost their inclusion in society as an act of respect in the strict sense of the word, in accordance with the current legislation and also as an act of solidarity and admiration for overcoming the situation to losing the ability to see.

Regarding the final objective of this work, for Santa Cruz to be accepted and declared as a better "Smart City," It is feasible once the technical and technological improvements that allow the access of the disabled community to the social public places are established by the public administration and also the stakeholders.

The use of technology could not only make of Santa Cruz a smarter city but also a landmark worldwide. In this sense, the professional development of the main idea of this project, technological processes in urban planning of a city to reach a satisfactory state of accessibility will boost the international outreach of this capital as an disabled-friendly city, as well as the loyalty of those visitors who have experienced the advantages of a city adapted for the visually impaired.

As future developments, we should develop the same project for other disabilities in order to transform Santa Cruz into a completely accessible destination.

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6.2. Graphs table of contents

7. ANNEXXES

- ➢ Interview to technician Mr. Benito Codina in La ONCE

Benito Codina.m4a

> Interview to the person responsible of accessibility in SINPROMI, Mrs. Dulce Torres

Dulce Torres.m4a

> Interview to the person responsible of technologies in SINPROMI, Mrs. Virgina González

Virginia González.m4a

> Interview to a blind person, student of the University of La Laguna, Mr. Maha

Student of the University of La Laguna (1).amr

Studen of the University of La Laguna (2).amr

> Interview to a blind person, affiliated of La Once

Afilliated of La Once.m4a