**ESITIP APPLICATION FORM**

**Egyptian-Spanish Joint Co-operation Programme in**

**Information and Communication Technologies**

1. General Information

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| 1.1 Acronym | HT |
| 1.2 Title | Hyper Technology |
| 1.3 Summary | Medical devices company |
| 1.4. Proposal Area | [**Strategic Areas**](https://correo.cdti.es/owa/redir.aspx?SURL=my4ptSWUksTmq-ZfPoG2jXrT01MnGzMSErOZqmFTycu-d8NypfzTCGgAdAB0AHAAOgAvAC8AdwB3AHcALgBpAHQAaQBkAGEALgBnAG8AdgAuAGUAZwAvAEUAbgAvAE8AdQByAFAAcgBvAGcAcgBhAG0AcwAvAFIAZQBzAGUAYQByAGMAaABJAG4AbgBvAHYAYQB0AGkAbwBuAC8ASQBUAEEAYwBhAGQAZQBtAGkAYQBDAG8AbABsAGEAYgBvAHIAYQB0AGkAbwBuAC8ARABvAGMAdQBtAGUAbgB0AHMALwBTAHQAcgBhAHQAZQBnAGkAYwAlADIAMABBAHIAZQBhAHMAJQAyADAAMgAwADEANQAuAHAAZABmAA..&URL=http%3a%2f%2fwww.itida.gov.eg%2fEn%2fOurPrograms%2fResearchInnovation%2fITAcademiaCollaboration%2fDocuments%2fStrategic%2520Areas%25202015.pdf):  Wireless and Cyber Security □  Electronics and Embedded Systems for ICT Applications □  ICT for Homeland Security □  ICT for Transportation □  ICT for Health □  ICT for Agriculture □  ICT for the Disabled □  ICT for Education □  ICT for Energy □  [**Technology-Trend Areas**](https://correo.cdti.es/owa/redir.aspx?SURL=8I41oArAhqhcJd3aNer4hl2J-VPPYR-KnIsIiC1AbaO-d8NypfzTCGgAdAB0AHAAOgAvAC8AdwB3AHcALgBpAHQAaQBkAGEALgBnAG8AdgAuAGUAZwAvAEUAbgAvAE8AdQByAFAAcgBvAGcAcgBhAG0AcwAvAFIAZQBzAGUAYQByAGMAaABJAG4AbgBvAHYAYQB0AGkAbwBuAC8ASQBUAEEAYwBhAGQAZQBtAGkAYQBDAG8AbABsAGEAYgBvAHIAYQB0AGkAbwBuAC8ARABvAGMAdQBtAGUAbgB0AHMALwBUAGUAYwBoAG4AbwBsAG8AZwB5ACUAMgAwAFQAcgBlAG4AZAAlADIAMABBAHIAZQBhAHMAJQAyADAAMgAwADEANQAuAHAAZABmAA..&URL=http%3a%2f%2fwww.itida.gov.eg%2fEn%2fOurPrograms%2fResearchInnovation%2fITAcademiaCollaboration%2fDocuments%2fTechnology%2520Trend%2520Areas%25202015.pdf):  Mobile Applications and Computing □  Cloud Computing □  Data Analytics and Big Data □  Internet of Things □  Gamification □  Cognitive Computing □  Smart Machines □  Blockchain □  Virtual and Augmented Reality □ |

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| 1.5 Budget and Duration |  | | 1st  Year | | 2nd Year | | 3rd Year  (if applicable) | | | | **TOTAL** | |
| Duration (nº months):  Start Date: | |  | |  | |  | | | |  | |
| 6-2018 | | **Spain** | **Egypt** | **Spain** | **Egypt** | **Spain** | | **Egypt** | | **Spain** | **Egypt** |
| Budget  (€/EGP) | Government  Contribution |  | 40 |  | 20 |  | | 20 | |  | 80 |
| Private  Contribution |  | 5 |  | 5 |  | | 5 | |  | 15 |
| Others,  if any |  |  |  |  |  | |  | |  |  |
| Subtotal | |  | 45 |  | 25 |  | | 25 | |  | 95 |
| Subtotal (%) | |  |  |  |  |  | |  | |  |  |
| Total | |  | |  | |  |  | |  |  | |

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| --- | --- | --- | --- | --- |
| Budget head | 1st Year (€) | 2nd Year (€) | 3rd Year (€)  (if applicable) | TOTAL (€) |
| Amortization of capital assets (tangible and intangible) |  |  |  |  |
| Material cost |  |  |  |  |
| Manpower |  |  |  |  |
| Outsourced technical collaborations |  |  |  |  |
| Overheads (indirect costs) |  |  |  |  |
| Audit cost |  |  |  |  |

**1.5ª** **Budgetary details in respect of Spanish company (€)-** *minimum CDTI fundable budget per Spanish company will be* ***175,000 €*.**

**1.5ª Budgetary details in respect of Egyptian company (EGP)**

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| Budget head | 1st Year (EGP) | 2nd Year (EGP) | 3rd Year (EGP)  (if applicable) | TOTAL (EGP) |
| Non-recurring | | | | |
| Equipment | 20,000 | 60,000 | 1000,000 | 180,000 |
| Recurring | | | | |
| a. Manpower | 20,000 | 35,000 | 50,000 | 105,000 |
| b. Consumables |  |  |  |  |
| c. Travel |  |  |  |  |
| d. Contingency | 10000 | 10,000 | 20,000 | 40,000 |
| e. Overheads (indirect costs) | 50,000 | 75,000 | 70,000 | 195,000 |

**1.5ª Budgetary details in respect of Egyptian researcher (EGP)**

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| Budget head | 1st Year (EGP) | 2nd Year (EGP) | 3rd Year (EGP)  (if applicable) | TOTAL (EGP) |
| Non-recurring | | | | |
| Equipment |  |  |  |  |
| Recurring | | | | |
| a. Manpower |  |  |  |  |
| b. Consumables |  |  |  |  |
| c. Travel |  |  |  |  |
| d. Contingency |  |  |  |  |
| e. Overheads (indirect costs) |  |  |  |  |

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| 1.6 Members contribution | Name of the entity/company | K€ | KEGP |
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| **Total contribution (%)**  *(Limit* ***70%-30%*** *participation per country)* |  |  |  |

*Note: Add charts if necessary*

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| 1.7 Project Starting Point (Select Proof-of-Concept/Prototype according to ITIDA classification) | |
| **Proof-of-Concept:** Solid work published by the applicants in a journal, a patent owned by the applicants, or promising preliminary results of the proposed research or methodology. | We already have done our proof of concept as a Digital Hearing aid  https://goo.gl/16J9Ba |
| **Prototype:** A working but not necessarily complete product. It may still need additional research for improving its output, miss some features, or need customization for specific applications. | Yes we have a prototype of our own , we need to improve some feature in it , but it works |

2. Project Outline

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| 2.1 Description (no more than 2 pages) |
| **Joint abstract:** *it should describe the proposed research, objectives, methodology, expected outcomes and economic potentials impact*  *Proposed research*:  The most basic function of a hearing aid is to amplify sound. Digital hearing aids do this in a rather sophisticated way.  As sound enters the device, it is broken into multiple frequency bands. Each band is then amplified by the amount necessary to return the wearer's hearing to normal levels at that band.  With digital technology, devices can now break sound into as many as 24 different bands. Given that every person has a unique pattern of hearing loss, the sound quality provided by a modern hearing aid is far better the previous analogue technologies that were restricted to two bands - base (low frequencies) and treble (high frequencies).  **Our objective is 2 separate products:**  Firstly : is mainly a mobile app that helps hearing impaired persons to amplify the frequencies they don’t hear well by the help of a smart phone and a neat Bluetooth headset  Secondly: is a complete standalone headset that works as a Digital Hearing Aid and controllable by a mobile app via Bluetooth  *Methodology:*  Digital_Hearing_Aids_small  *The idea in its simplest form , we take an analog signal by a small condenser electret (or high capture) microphone then pass this signal to our ADC (analog to digital converter ) then to our micro-processor in which the DSP (digital signal processing will take place ) in this stage we configure our signal to match the desired output , so we do that by amplifying some frequencies which are barely heard by the person and suppress some frequencies , after that the signal goes to be digitalize again through DAC (Digital to analog converter) then finally the output audio signal will be hopefully on the Bluetooth headset device like an ordinary any Bluetooth headset , except that we’ll have our Bluetooth headset will be optimized for our specific purpose*  **Economic Potential Impact:**   1. We provide a long term device which does not need continuous calibration or doctor visits, because the patient can adjust it anytime anywhere. 2. We offer the product at a much lower price. At 15 USD per piece the price is unmatched given that it does not need to be replaced to adjust for change in patient’s status. 3. We have no competitors within the Egyptian market, which would make us pioneers in this field in Egypt.   **Statement of the degree of collaboration and the role of each PI:** *Describe the nature of cooperation and the actual role of each PI in the implementation of the projects. It is worth to highlight why such cooperation is important for both countries and responsibilities of both partners*  **Problem Definition:** *Describe the problem you are going to tackle in the project, and explain how the proposed concept meets the up-to-ate requirements to improve performing e functions of your institution*  Hearing impairment is one of the commonest birth defects. It is the third leading chronic disability affecting nearly 250 million people in the world, and 75% of sufferers live in developing countries.  The impact of hearing impairment on the individual and society is significant. Development of hearing loss leads to severe handicap that affects the sufferer’s job, home and life with subsequent social and economic burden on the society. In children the problem is compounded since normal hearing is the primary source for acquisition of language, speech and cognitive skills.  In a national household survey conducted to estimate the prevalence of hearing impairment in Egypt, it was found to be high in those aged 0-4 years (22.4%).  ***Proposed solution and impact:***  An adaptable digital hearing aid that allows the dynamic change of its amplification by the user. Moreover, it will be less costly than an analogue prefixed hearing aid that requires constant changing to adapt with the patient’s changing state. |

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| 2.2 Innovation highlights (State of the Art / Progress beyond state of the art) |
| **State-of-the-Art:** *Describe the state-of-the-art in the project subject matter. Also, describe any previous achievements or pilot studies which have been conducted by you (your team) within the project subject matter. It is worth mentioning your relevant international publications, patents and former research grants in the project subject matter in this section of the proposal*  Latest Digital hearing aids are programmed to re-balance a wearers hearing.  As sound enters the hearing aid, it is broken into multiple frequency bands. Each band is then amplified by the amount necessary to return the wearer’s hearing to normal levels at that band.  **Connectivity to mobile devices and entertainment systems**  Wearers are increasingly looking for solutions to improve their ability to use their hearing aids more effectively in partnership with their mobile phones, digital radio, plasma televisions, and personal stereos (i.e. iPods and MP3 players).  In response, manufacturers have developed streamers that connect wireless devices to the user's hearing aid.  The benefit is that this delivers improved performance in terms of speech intelligibility and sound quality as signals from the external devices are streamed directly into the hearing aid, without background noise and the need for the hearing aid to first process a sound signal.  **Multiple and automatic programming**  Different listening environments often call for different settings within hearing aids in order to maximize their effectiveness.  For example, when listening to music, the user would prefer to turn off features that may misinterpret elements of the music as noise.  When in a quiet room, a wearer will not need the benefit directional microphones and noise reduction to the same extent they would in a crowd at the football.  Advanced hearing aids allow the user to change the settings by pressing a small button on the device. The most advanced hearing aids will even listen to the environment and change the hearing aids settings automatically, without the wearer needing to touch or think about their hearing aids.  **Objectives:** *Briefly and succinctly state your project’s main and specific objectives*  *Our main objective is to make Digital Hearing Aids available in Egypt and let Our people use this technology*  **Our objective is 2 separate products:**  Firstly : is mainly a mobile app that helps hearing impaired persons to amplify the frequencies they don’t hear well by the help of a smart phone and a neat Bluetooth headset  Secondly: is a complete standalone headset that works as a Digital Hearing Aid and controllable by a mobile app via Bluetooth |

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| 2.3 Technological Development Envisaged |
| **Approach and Methodology:** *Describes how your project will be implemented, including your general scientific approach (Plan of work), activities, methods, and project inputs. Specify the methods only to the extent needed to give a general idea of the tasks to be conducted and the findings it will yield.*  First Product :   * Android Studio (Java and C++ libraries dependancies) * Tested or resulted app on Injoo and Samsung core   Second Product:   * Used dsPic33FJ64GP802 as a Processor Unit for the DSP * Used Electret Microphone for Capturing the Voice Signal * Sound Signal Enter the dsPic through ADC Peripheral * The signal then Sampled and Digitalized and here comes the role of DSP * After DSP Takes place the Signal is then output on DAC Peripheral of the dsPic * This Process is controlled over a standalone mobile app that control the dsPic through Bluetooth   Production Phase :  All we need is to combine all the components including:   1. High quality amplifiers 2. Microphones 3. Capacitors and resistors 4. Long-life Battery   Once we collect them all in a well-organized block diagram, we will send it to our contributors in China to start manufacturing our product with a user friendly design.  We will have another contributor to help us delivering our product in Egypt or any place in Africa.  Your fund will decide our start-up quantity from the product. |

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| 2.4 Market Applications and Exploitation |
| **Project Outcomes and Impact:** *Expected outcomes in accordance with added value of this collaboration, its relevance for the industry and society, significance to researcher training and to the development of the research environment, and strengthening research cooperation between Egypt and Spain over the long term.*  The outcomes will be unlimited as it will include:   1. Help people with hearing disabilities to have a cheap, high quality and save hearing aid 2. Enrich the Egyptian market with our unique product 3. As an impact in our society, our company will help in employing lots of young people and training them to gain more experience in that field 4. For researchers, we will be the pioneers in hearing aid in Egypt and that will open the space for more researchers to look for a better scientific solutions   Marketing plan:  We plan to reach our target market in two ways:  A – Using social networks, as many people use it these days it can reach anyone either directly or indirectly, i.e. people can recommend us to a customer or vice versa.  B – Via partnerships with charity organizations such as Resala, Misr El-Khair, … etc. Because they already have the manpower to scan many areas to reach potential customers  .  Quality matrix:  • Acceptable look and comfortable wear.  • Signal to noise ratio.  • Real time processing. |

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| 2.5 SWOT Analysis and Mitigation Plan |
| *The project team should be aware of the strengths, weaknesses, opportunities and threats of the project. This should be illustrated in this section. A mitigation plan should follow the SWOT analysis.* Business Canvas: *Strengths:*   1. *Our product is cheap, user friendly and save* 2. *Our market has a huge need for such a product*   *Weaknesses:*   1. *The market may not be familiar to our new product* 2. *Our employees may need specific training about this product*   *Opponents:*   1. *The market has a huge need to our cheap and save product* 2. *Great opportunity for huge revenue*   *Threats:*   1. *The market may not be aware of hearing aids* 2. *The competition in the future will be difficult* |

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| 2.6 Resources |
| *Detailed description of features of the equipment that will be used in the project and justification for needing them may be given in this section. Distribution of these resources over the milestones may also be given.*  *The equipment will be:*   1. *Microphone: to get the voice from the surrounding environment* 2. *Amplifiers: to increase the strength of sound signals* 3. *Capacitors and resistors* 4. *Digital filters: to filter the sound signals and remove the noise* 5. *Long life battery*   *The features will be:*   1. *Ability to filter any surrounding noise* 2. *Maximize the sound signals* 3. *User friendly hearing aid in small shape* 4. *Ability to control the hearing aid from our mobile app and select from many modules* |

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| 2.8 Milestones / Timeline and Gantt Chart / Diagram - project schedule and work breakdown structure of the project into working packages |
| **Pipeline:**   1. **Proof of concept phase (Nov. 2017 to Jan.2018) :**   After researching the idea and similar products, this phase has been done with satisfying results.   1. **Prototype phase (Dec. 2017 to Feb. 2018) :**   We have a working prototype using a raspberry pi microcontroller with good accuracy.   1. **Product manufacturing (May 2018 to June. 2018) :**   This phase will involve prototype enhancement, and finding a way for mass production.   1. **Product distribution (Starting Oct. 2018) :**   In this phase we are expecting to have a product ready for the market. And we start delivering to customers.  Capture2 |