II. STRATEGY AND METHODOLOGY

Linkage Strategy: Integration of capacities between the customers of health services, the government and relevant stakeholders. Health Technopole CENGETS is an organized institutional system of the Peruvian Health Sector. The project introduces the concepts of Health Technology Management and Clinical Engineering CE in Peruvian Health sector. A key component of the model is the sustained multidisciplinary approach. Some results of the sustainable innovative interaction developed are: creating HTM & CE Units in hospitals, PeruMinistry of Health and Social Security System are gradually including HTM & CE criteria in the normative and national regulation. The Peruvian Health Ministry and the National Health Service Hospital started to plan pilot projects in HTM&CE, National Maternal & Perinatal Institute INMP incorporates HTM&CE in its policies, organization and management. The Peruvian HTM & CE model is effective and a relevant reference for developing countries.


III. RESULTS

Some topics related to Health Technopole CENGETS’ intervention are: Clinical Engineering, Healthcare Technology Management, Health Technology Assesment, Management of medical devices, Framework of Medical Devices Regulation, Qualification or training in Healthcare Technology Management, Quality, development of appropriate technology, promotion of use of medical devices and promotion of companies in technological basic services for health sector. Following a brief description of results:

1. International experience on the clinical engineering: an integrated organizational system to Peruvian hospitals, aimed to improving their ability to manage technology based in HTM & CE. With the support of PUCP, the first Unit of Clinical Engineering created in the country was in 2000 in the Children’s Health National Institute INSN, which in a few months was dismounted from the original purpose. In 2004 and 2007, PUCP supported the creation of a HTM Unit in the National Hospital Cayetano Heredia in Lima, the experience was positive but it was disbanded for lack of a corporate policy decision. The project showed the unnecessary waste of economic resources in hospitals and therefore the economic viability of projects. CE, in 2008 with the support of PUCP, the National Hospital Dos de Mayo established a Medical Equipment Technology Unit (MUTECH), the resource was needed as a model for the same reasons above. Following the creation of the National Maternal Perinatal Maternal Institute INMP built the appropriate conditions and required by Health Technopole CENGETS to develop a HTMACE Unit becoming one of the most relevant changes in the evolution of health organizations in Peru.

2. National and Regional recognition, according to Ministry of Health PAHO/WHO, HTM and other international expert organizations: Health Technopole CENGETS received the American College of Clinical Engineering ACEC & ORS recognition Award 2020, giving the organization demonstrating significant improvements in National Health Technology Management (HTM) structure/outcomes...[44].

3. HTM & CE On-Line Courses: On 2007, University of Vermont, USA and PUCP received Pan American Health and Education Foundation PAHO/WHO’s support to implement the first Medical Equipment Technology On-Line and Advance Level Education Project. Before, in 2004 Global Development Learning Network GD LN World Bank - Content Development Fund supported the On-Line version of the Health Technology & Clinical Engineering International Management Course, 246 students were trained in total.

4. International Internships in Clinical Engineering: Technopole CENGETS coordinates with University of Vermont USA a collaborative program of internship for PUCP’s students, they receive an HTMACE training program and work at American hospitals, next to the stage they return to work in Peruvian hospitals, 05 engineers were involved in this program.

5. Consulting to Health Sector: Health Technopole CENGETS is: a) a global liaison for collaboration with a and a collaborator of Ministry of Health, Social Security hospitals, Andean Commission of Health, Chamber of Commerce of Lima and others; b) a member of Technical Committee of Clinical Engineering Standards for Health sector; it collaborates by reviewing the Peruvian version of ISO 0600.1; c) a member of the National Committee of the creation of the Peruvian Agency of Healthcare Technology Assessment; d) as a requirement from Ministry of Health, Health Technopole CENGETS will develop a Best Practices HTM & CE Pilot Project at National Hospital Dr. Dios de Mayolo, c) called by the Minister of Social Development will collaborate in 2 National Programs; g) responding to an invitation from the Presidency of the Health Commission of the Peruvian Congress, Health Technopole CENGETS will be on charge of inclusion and develop the Technology issue in the contents of the National Health Law of Peru.

6. Maternal Perinatal Tele-Esquiziopatia Project: It is a multi-institutional project, involves the University of Orleans and the Universities of State, Lima and the University of Vermont and ORS international, USA it is also supported by the Embassy of France, Health Regional Direction of Cusco and the Ministry of Health.

7. Creation of Undergraduate Biomedical Engineering Program: with the collaboration of the University of Vermont USA and the Latin American Council of Biomedical Engineering CORAL.


CONCLUSION

Technology model usually applied to enhance industrial capacities is being efficient and appropriate to resolve complex social and technological problems in a developing country. CENGETS is doing distinctive initiatives to improve the Quality in Health Sector of Peru by implementing a sustained strategy mix: Linkage and Leapfrogging Strategy applied to the Educational and Training Programs, supported by a Projects & Problems Based Learning Methodology. The model have resulted in distinctive results as: i) Development of Best Practices through Pilot Projects to create Integral Change (structure, planning, systems, equipments and others) at Peruvian health sector and ii) Promotion of the profession of Biomedical Engineering in Peru. Key components of the strategy are: Innovation, Technology, Management, Education, Interaction, Leadership, Multidisciplinary and international exchanges. The model have led to remarkable results and provide enough evidence for dissemination of a model focused on improving the quality of Healthcare services and Development of Health Competitiveness in other similar countries.

References

2. Llewellyn, T. J. and Shalaby, R. (2000). “Technology acquisition strategies for engineering education“.[7] considering the educational and training perspective, the intervention is in the macro and micro levels [3], fig 2.a. B a key component is the multidisciplinary approach developed through Pilot Projects: Social and Technical aspects are both strongly considered due to the complexity of Peruvian Health Sector.

Fig.1 Health Technopole CENGETS – PUCP’s Mind Map

Fig.2a. CENGET’s Leapfrogging Strategy: Developing Skills in Technology & Innovation through a Collaborative Framework. Fig.2b. CENGET’s Leapfrogging Strategy: Application.