



Cases of Open-Innovative Type Infrastructure and
Technology Transfer for Medical Device Development

dongguk
UNIVERSITY



Medical Device
Innovation Center

DMIC Director, Kim Sung Min

DMIC Director

» Representative career

Work Place (Department)	Title
Department of Medical Device Industry, Dongguk University	Head of Department
The Korea Society of Food, Drug, Cosmetics Regulatory Science	Vice-President
'Dongguk University Medical Devices Innovation Center' Designated by Ministry of Health & Welfare	Center Director
Korean Society of Medical & Biological Engineering	Director
Department of Medical Biotechnology, College of Life Science & Biotechnology	Professor
Ministry of Strategy & Finance (Financial Project Assessment Advisory Committee)	Civil Committee Member
Journal of the Korean Society of Precision Engineering	Edition Staff
Ministry of Knowledge Economy (Next Generation Technology Development Project Technology Committee_Medical Devices Branch)	Committee Member

» Major Career

Work Place (Department)	Title
National IT Industry Promotion Agency (IT R&D Promotion Business Planning Committee)	Committee Member
Ministry of Health & Welfare (Medical Devices Committee)	Committee Member
Ministry of Food & Drug Safety (Internal Regulation Evaluation Committee)	Advisory Committee Member
National Institute of Food & Drug Safety Evaluation (Professional Committee)	Advisory Committee Member Energy

Ways for Medical Devices Industry to Have Competitive Power



▶ While medical devices industry is a new growth engine industry, global corporate emerges and unsatisfactory in creating premium jobs.

- Total number of manufacturing companies is 2,277; average production per company is KRW ₩1.7 billion; average employees are 15.5
- Rate of operating profit ('12): 16.8% for global top 15 companies; domestic 11.6% for top 15 companies

▶ In the advanced countries the electronic companies entered into medical devices sector showing high growth rate, whereas in Korea, it is centered on venture company, which is limited in its scale expansion

- Sales of number 1 company in Korea, Samsung Medison, is KRW ₩ 290 billion. Samsung Medison began as the first venture company and has grown as it is.
- Among global top 10 companies, electronic companies (3 companies), pharmaceuticals (3 companies) and distributors (1 companies) are parent companies.

▶ Need to advance industrial structure through supporting excellent companies in other industries such as IT, electronics and machine in their entrance into medical devices industry

- If Korea with advanced IT and machinery industry enters into medical devices industry with high value added and combines the strengths of other industries, advancement of industrial structure
- may be possible (proportion of IT industry in domestic GDP in 2nd quarter, '13 is 13.2%)

Problems in Medical Devices Industry Infrastructure & Their Solutions



As convergence between technology and industry expands, a variety of technology knowledge required for technology development shall be efficiently ensured

Global Cooperation among Corporate

Technology: obtaining overseas advanced technology; technology solution domestically; occupation in commercialization technology; international standardization

Economy: technology development cost saving; technology development period reduction; market entrance; increase in export

Strategy: keep domestic competitors in check; product occupation in market; training technology manpower

Reduce technology level gap

Technology cooperation

Economic cooperation

Strategic cooperation

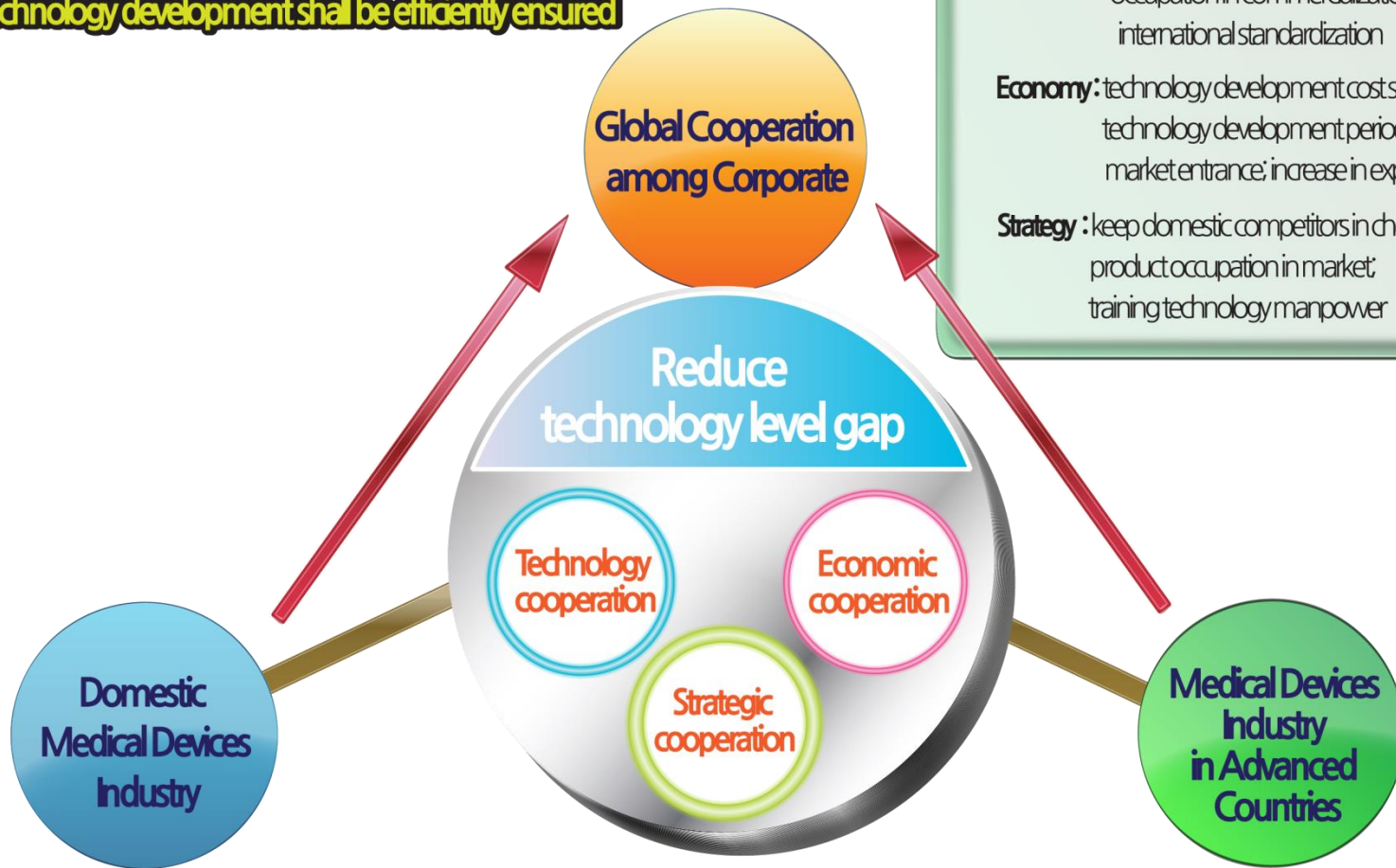
Domestic Medical Devices Industry

Medical Devices Industry in Advanced Countries

Lack of effort for international cooperation (technology cooperation & research)

Technology gap ↑

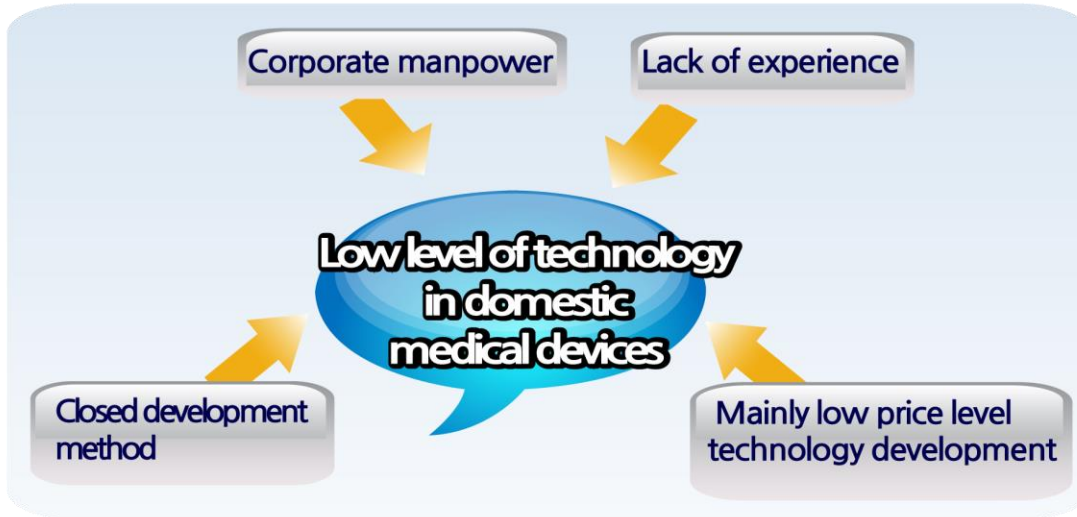
Level of R&D technology and global cooperation is very high



Future of Localization of Medical Devices



▶ Accelerated Localization of Medical Devices



Localization of medical devices

- ▶ Advanced technology power
- ▶ Enter into overseas medical devices market



'Open Innovation' Support Center

- Provide market-focused idea
- Provide production infrastructure (technology, equipment, manpower)
- Technology service support (clinical, permission/license, insurance, marketing, etc)

What is Open Innovation?



A strategy that saves necessary resources and time for innovation and maximizes the performance of innovation **by extending R&D activity limited inside organization to the outside of organization so as to utilize external idea and R&D resources together**





Developing Leading Technology to Create New Market

- Pushing leading technology-oriented R&D that can create a market
- Securing new growth engine through active technical investment in the medical device sector
- Securing R&D Portfolio to cope with uncertainty

Uplifting development speed to advance into the market right on time (Time-to-Market)

- Securing capability to develop any products following rapidly-changing customer's needs right on time
- Securing partnership and networking with external technology for quick market release

Securing R&D Efficiency to Maximize Profit Creation

- Fallen Return On Investment of R&D due to shortened product lifecycle

Major Needs in Failure of Idea Development



● Failure in Identifying Customer Needs

- customer, patients, doctor, hospital, general consumers
 - What product will be sold well?
- Begin depending on technology characteristics of developers
 - To whom will the product be sold?



● Strategic absence of customer needs solution

- absence of strategy itself or absence of choice of strategy

● User Demands

- if technology is excellent but does not meet user requirements, commercialization will fail

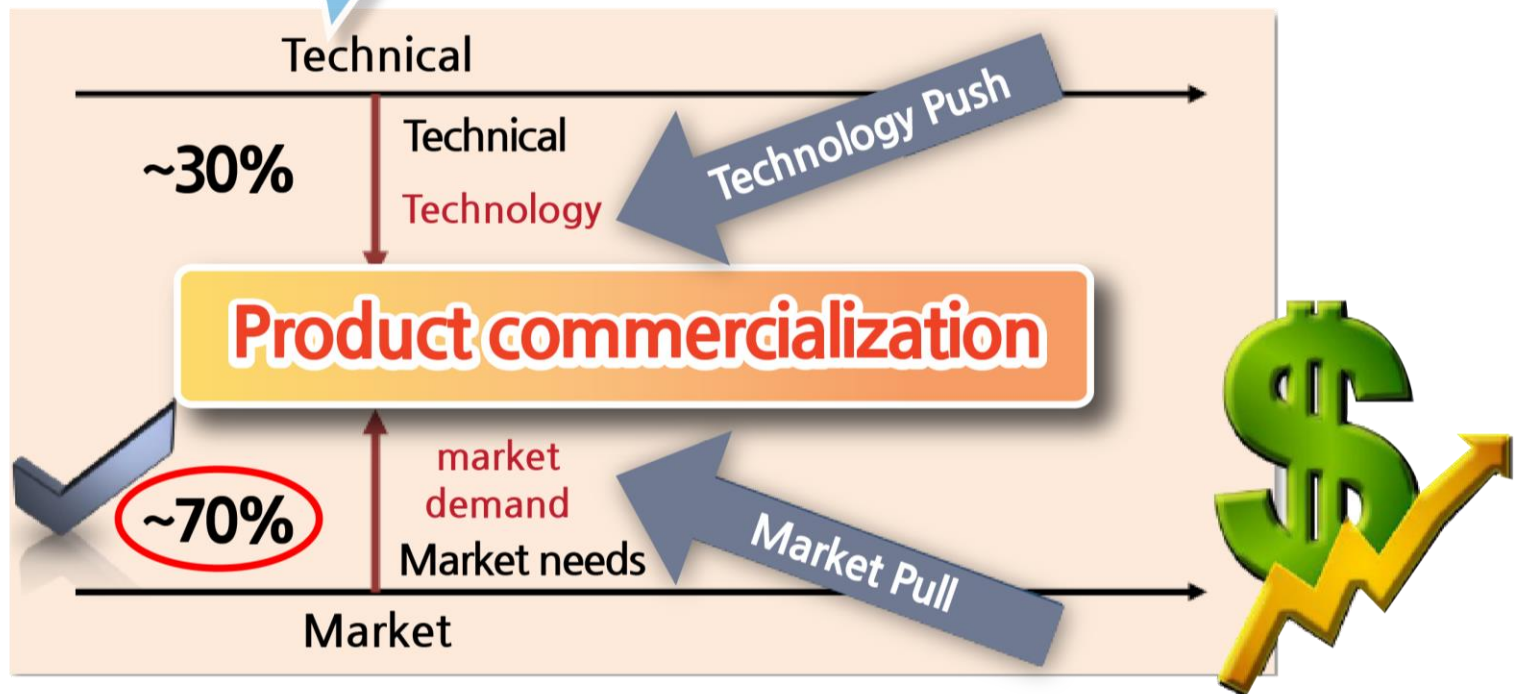
● Market Demands

- if the number of users is small, commercialization fails

What is the starting point in idea development?



The company which succeeds in idea commercialization transforms the market demand into product rather than focusing on technology



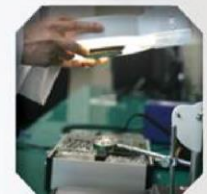


Transform ideas in medical field into reality!!

DMIC adds values to
your medical device idea



Development of and support
to trial product



The background features a light blue gradient with various medical and scientific icons in white and blue, including syringes, pills, a stethoscope, a globe, and question marks. A hand is visible in the bottom left corner, holding a white card with text and a logo.

Dongguk University Medical Devices Innovation Center

1. R&D Process

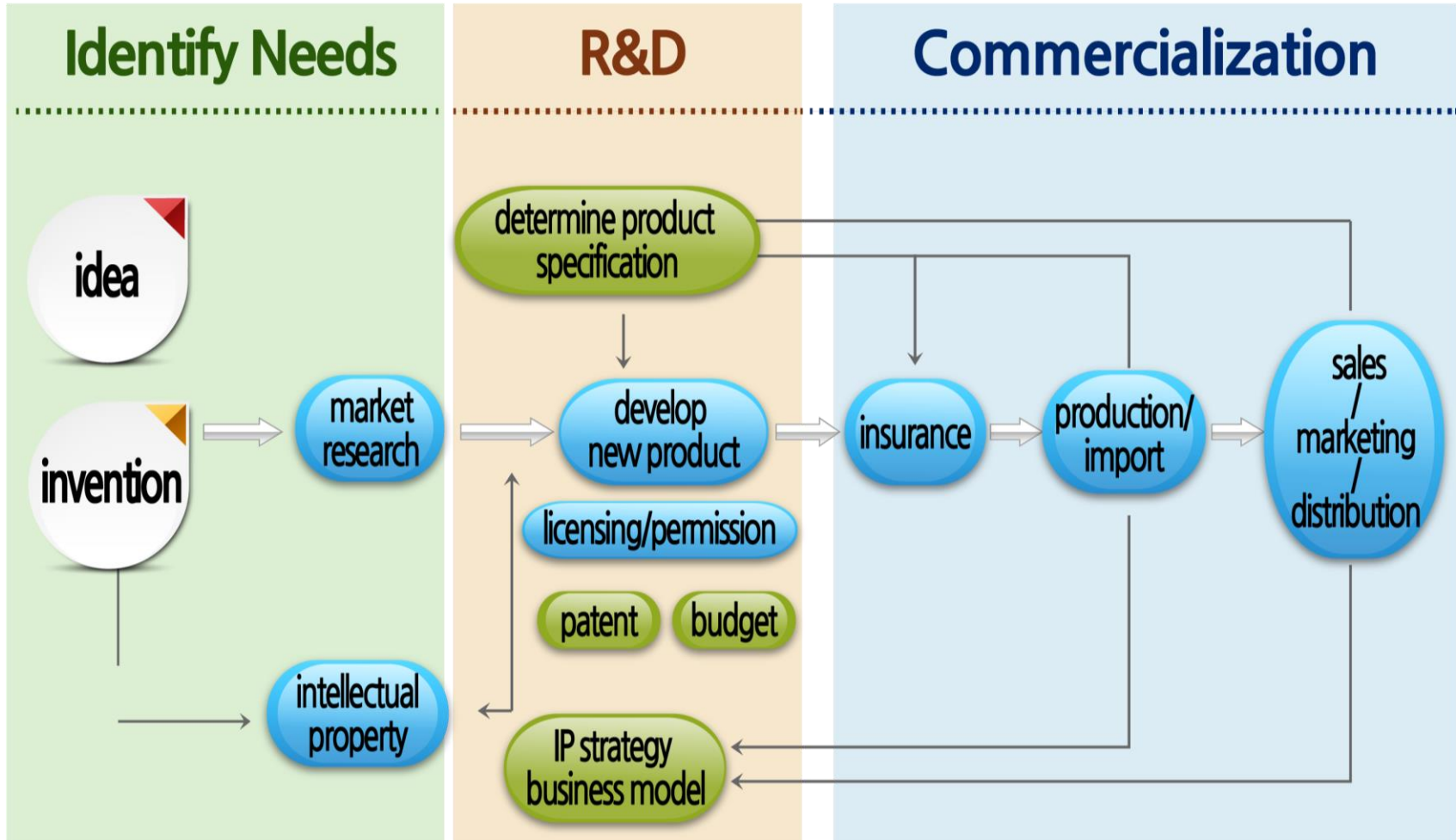


Support center for making global test product to “Create High Value”

Mission & Strategy

- » Building active excavation system of idea
- » Building efficacy evaluation system
- » Establishing test product development promotion process
- » Establishing technical right securing system of idea
- » Fostering T-C-E special workforce

Entire Processes of Medical Device Development



Active Searching System of Idea

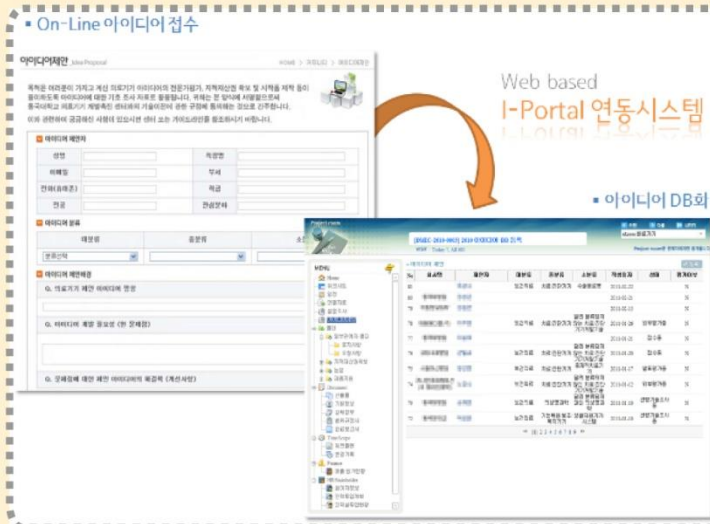


Building open idea collection system



1. Building On-line System for idea receipt

“Open Innovation”



2. Building I-Portal System for integrated management of idea

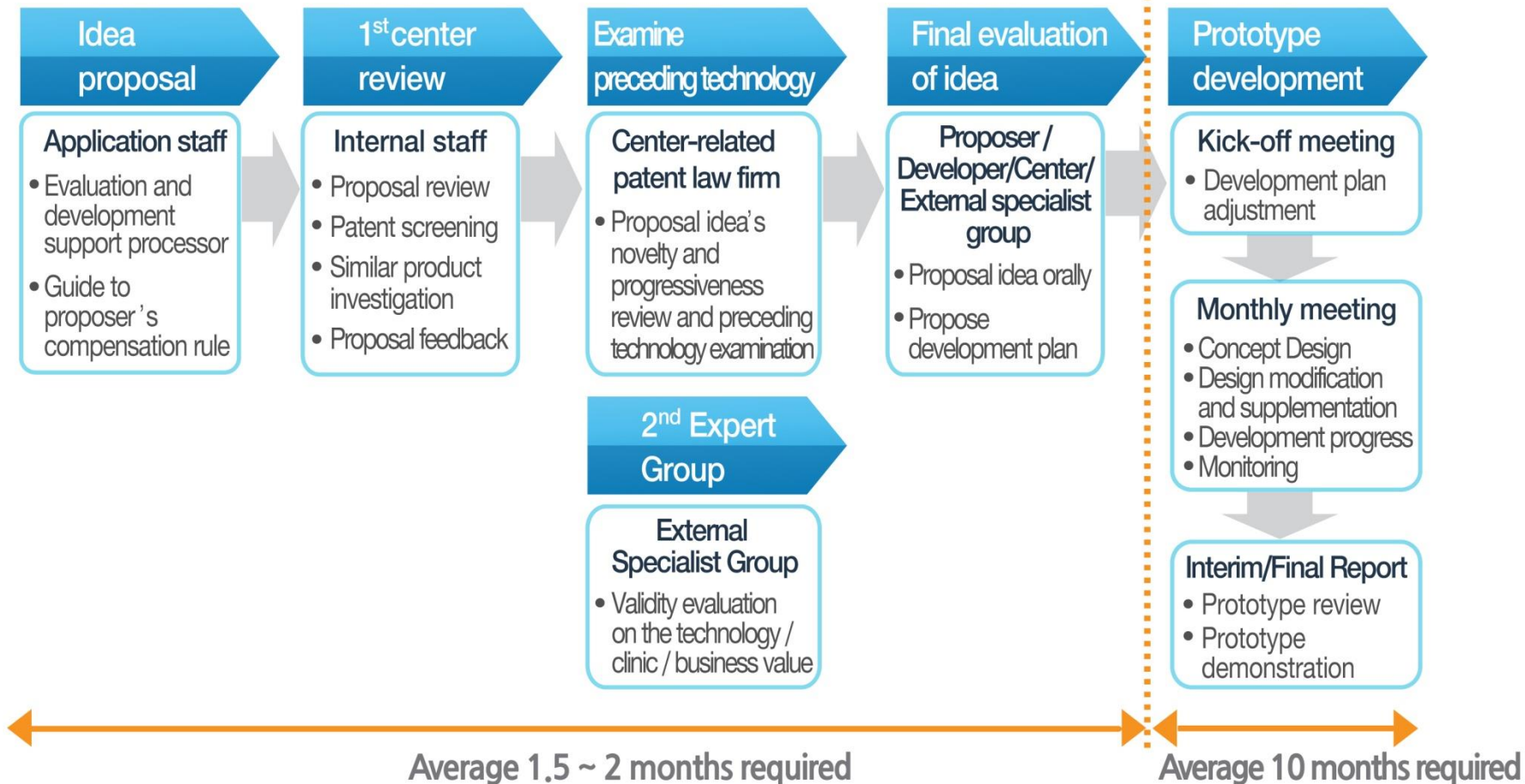
“I-Portal”(Project Management System) shared by DMIC, Proposer, Developer, and Evaluator

Idea Validity Evaluation System



➤ Idea collection and searching feedback process

1st prototype product can be drawn 'within 1 year'



The background is a light blue-grey gradient. It is filled with various white and light blue icons related to medicine and technology, including syringes, pills, a stethoscope, a globe, question marks, exclamation marks, and arrows. In the bottom left corner, a hand is shown holding a white card with some text and a logo on it.

Dongguk University Medical Devices Innovation Center

2. R&D Case

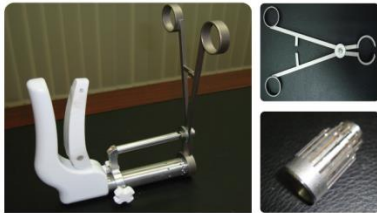
Status of Center Performance



Current state of prototype production

Aorta Cartridge

An automatic reinforcing anastomosis stapler for safe and efficient arterial anastomosis operations



Medical Headlamp

Development of a surgical headset with a lamp automatically controlled by the user's eyes

▼ Proposed concept



Radial Artery Hemostat

A hemostat to stop bleeding after hipbone arteriopuncture for vascular intervention diagnosis and arbitrativ treatment

▼ Appendix

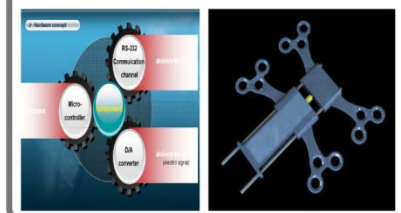


Distraction Osteogenesis Device

Prototype optimization of a finely vibrating distraction osteogenesis device

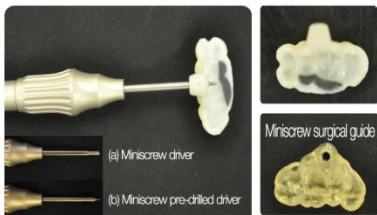
▼ Hardware Concept

▼ Proposed Concept



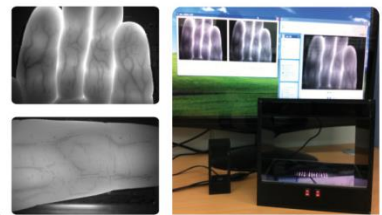
Development of a Surgical Guide System

Development of an accurate surgical guide system to prevent side effects in mini implant procedures



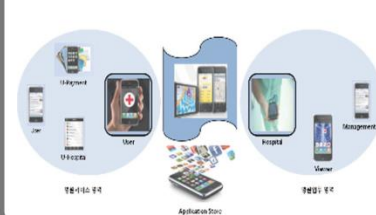
Fingertip Microvascular Imaging System

To determine vascular conjugation procedure accuracy after finger mutilation or skin burns



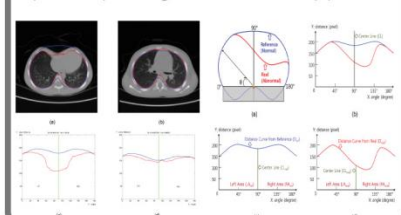
Mobile Medical Imaging Service

Development of diagnostic medical image storage, progression and retrieval technology for mPAC service



Thorax Deformation Analysis Program

An assessment index analysis program for both before and after operations and pre-operation planning for thorax anomaly patients



Status of Center Performance



Current state of prototype production

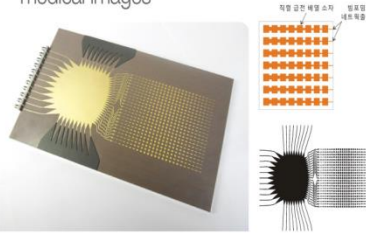
Development of a Dental Hand piece

A high intensity LED mounted dental hand piece with improved brightness and persistence over Halogen lamps



Millimeter Wave Medical Scanner

Development of a high speed scanner for receiving 35GHz millimeter wave medical images



Development of Bone Graft Material Replacing BMP

Production of bone graft material with good osteogenic and compound characteristics

Osteogenesis

:bone formation by living host cells

Osteoconduction

:bone formation via a scaffold

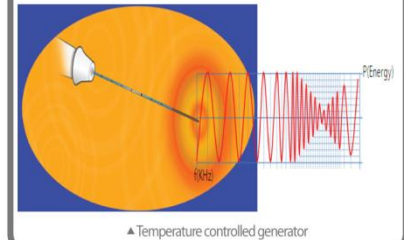
Osteoinduction

:stimulation of cells by surrounding proteins to form osteoblasts



Development of a Catheter for the prevention of vascular restenosis

A self-expanding catheter which uses high frequency mesh shape



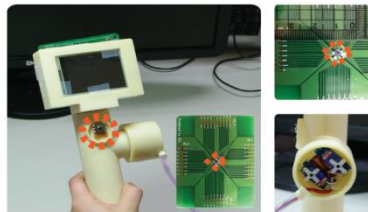
Portable Dizziness Diagnostic Device

A portable dizziness diagnostic device for evaluation of dizziness in daily life



Development of an Electronic Endoscope for Free Airways

Development of an electronic endoscope for free airways based on medical device micro image sensors



Noninvasive diastatic measuring device

Noninvasive diastatic measuring device using nano bio sensor



Scalp Diagnostic Device Location Tracing System

Face and eye location tracing algorithm from the front camera



Status of Center Performance



Current state of prototype production

Automatic knotting device to fix osseous tissue

Developing automatic knotting device to fix osseous tissue for minimal invasive surgery



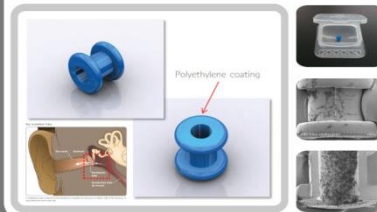
Developing puncture needle guide for the nasal cavity

Developing puncture needle guide for the nasal cavity



tympanostomy tube applied with surface processing technology

Developing tympanostomy tube applied with surface processing technology which induces antibiotic activation



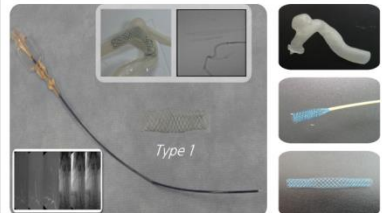
Developing cervical vertebrae intervertebral foramen dilator

Developing cervical vertebrae intervertebral foramen dilator to help treatment of cervical vertebral patient by using minimal invasive surgery



Blood vessel stent inside cranial cavity

Developing new blood vessel stent inside cranial cavity for the endovascular treatment of cerebral aneurysm



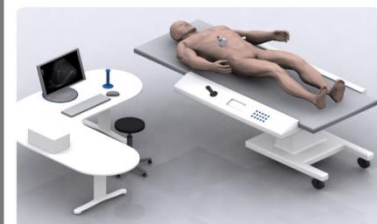
Developing complex womb manipulator and vagina tube

Developing complex womb manipulator and vagina tube



Ultrasonic wave impedance matching system

Analyzing impedance matching method of ultrasonic wave diagnosis/treatment devices



Wireless mobile ultrasound diagnostic device

A portable diagnostic device which has function of ultrasound generation and function of deposit



Status of Center Performance



➤ Current state of prototype production

NIR reflection type vascular imaging acquisition device

This device Intravenous Injection aiding kit for infant, obese patient and elderly people who can't find blood vessel



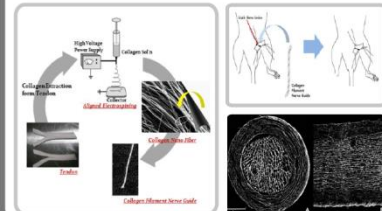
Ultraviolet light treatment secondary bath for atopy and psoriasis

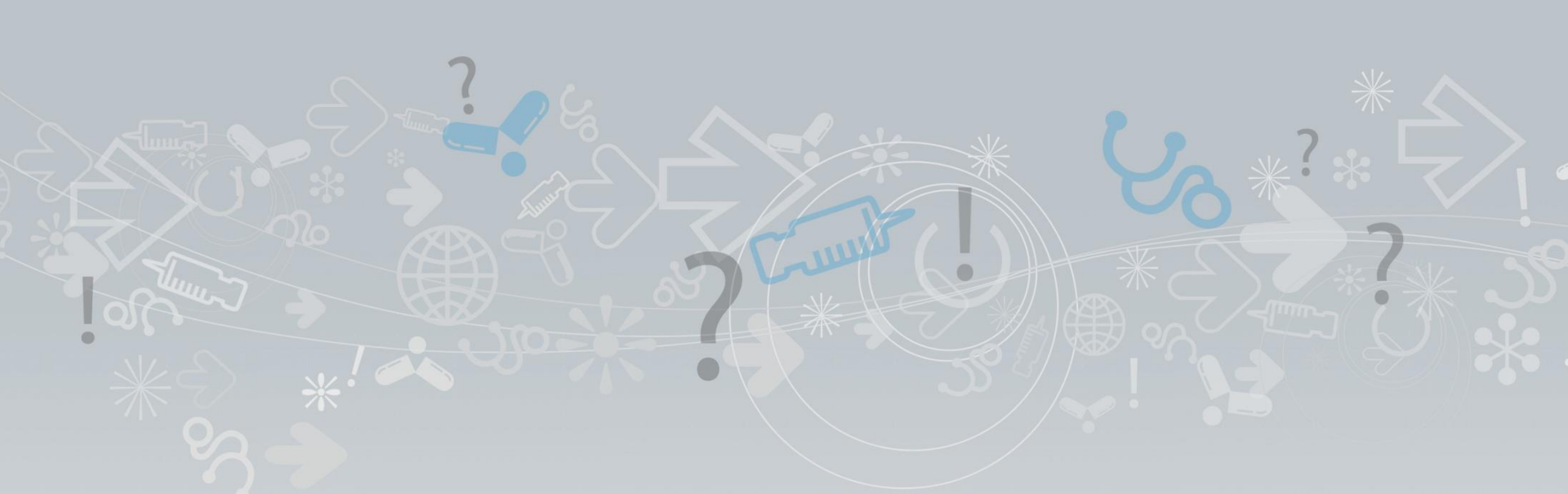
Secondary effects of the multi-disease treatment due to light source diversification



Development of Collagen Filament Nerve Guide

Localization of artificial nerve conduit for transplanting upon neurodeficit caused by damaged peripheral nerves





Thank you

for listening

Q & A

any question?

