KAIST Vision 2031
- KAIST, Together with the World

Making a Beautiful Difference beyond Imagination!

2018. 2. 16.

KAIST's 47th anniversary

KAIST 비전2031위원회
Vision 2031 Committee

Contents

KAIST Challenge and Innovation

February 2018

"Vision 2031" represents KAIST's willingness to take on new challenges and lead innovation. Since its establishment in 1971, KAIST has grown into a world-class university under the strong support of the state and the Korean people. In order to live up to public expectations, KAIST is now poised to take a new leap forward toward becoming a world-leading university.

The so-called "Terman's Report," which provided a crucial impetus for the establishment of KAIST, contains "dreams and vision" that look beyond the horizon of history. As suggested in the title of its final chapter, "The Dream of the Future," the report concludes as follows: "It will by 2000 be a great Institute of Technology with an international reputation. KAIS will have spearheaded a new era in education. Even more important, KAIS will have enhanced the self-confidence of Koreans, and will have become a cornerstone in the establishment of a stable free society in Korea."

The dream envisioned in the report has been fulfilled. KAIST has led the industrialization of Korea for half a century, fuelling rapid economic growth. Since its foundation, KAIST has produced 61,932 graduates, including 12,620 PhD degree holders, in science and engineering. KAIST graduates, who are now working at universities, research institutes, businesses, and governmental agencies, have played a pivotal role in the nation's industrialization and in the information revolution. Approximately 23% of those graduates have attained leadership positions in industry, academia, and research institutes in Korea.

Also, KAIST has served as a breeding ground for innovative startups, which has earned it the nickname "venture academy of Korea." The number of startups founded by our graduates is 1,456, creating about 32,000 jobs and 13.6 trillion won in annual sales. Given that the total amount of government funding for

KAIST for the past 46 years is 2.9 trillion won, the return on government investment is very high. In terms of startups only, it is safe to say that KAIST is one of the most successful government projects.

The latest international university rankings have confirmed KAIST's position as a world class institution; it ranked 41st overall in the 2017 QS World University Rankings, and in the QS list of new universities, those that are less than 51 years old, it ranked third. In particular, it topped the list of the world's most innovative universities, released by Thomson-Reuters in both 2016 and 2017.

With the arrival of the Fourth Industrial Revolution in the 21st century, KAIST now faces an opportunity to fulfill a new mission. As a university that was a beacon of hope to the Korean people fifty years ago when the nation was about to enter the stage of industrialization, one that became the spearhead of the nation's industrial development, KAIST will vigorously embark on a new journey toward its "second mission", to remain a beacon illuminating the future of Korea and humankind. Under the vision of "Global Value-Creative World-Leading University," KAIST will concentrate on innovations in five areas: 1) education; 2) research; 3) technology commercialization; 4) the globalization of the university; and 5) future strategies for the university and our country.

In this report, KAIST will present concrete action plans for innovation. These innovative strategies have been formulated as a result of intensive discussions with experts from various fields, as well as with KAIST members, for over a year. Indeed, we have continuously provided a forum for communication, such as on- and off-campus hearings, so that the process of drawing up plans can be shared by both KAIST members and the Korean people. In an effort to give the public easy access to the report, it will be published in the Korean language under the title of "2031 KAIST Future Report". Also, through the proclamation ceremony of 'KAIST Vision 2031,' we will introduce a new vision to the nation and its people, suggesting a path toward a hopeful future.

In 2031, when KAIST will celebrate the 60th anniversary of its founding, I have the firm conviction that KAIST will have made a leap forward toward becoming a global value-creative world-class university. Our second mission will be fulfilled

without fail. Our confidence for the new mission will be included in the "Vision 2031 Report (aka, the " Second Terman Report ") as follows:

"In 2031, KAIST will have spearheaded the 4th industrial revolution via innovation in education, research, technology commercialization and globalization. Even more important, KAIST will have enhanced the pride of Koreans, and will have become a cornerstone in the establishment of Korea as an advanced country."

Thank you.

Sung-Chul Shin
President of KAIST

KAIST VISION 2031 Executive Summary

Main Goal of Vision 2031: As a **global value-creative leading university**, KAIST seeks to contribute to the "happiness and prosperity prioritizes of humankind through innovation in science and technology."

1. Culture and Value Orientation of Vision 2031

□ Culture of KAIST Vision 2031

○ KAIST's culture emphasizes the values below, and promotes inclusiveness and respect among all members

  - Science and technology leaders who can solve problems and cooperate with others by using creativity to meet challenges

  - Creative talent who possess cognitive excellence, love of challenges, power to overcome adversity, and self-motivation

  - Identifying scientific issues and social problems, and cooperating across disciplines to create new value

  - Love of humankind based on respect and consideration among members

  - Carrying out responsibilities in education, research and administration with a strong sense of ethics

  - Fostering of mutual respect and development of constructive relations with local community and stakeholders

  - Global leaders who contribute to not only the development of Korea but also the advancement of humanity. Communicators who can build strong ties with the international community and work harmoniously with others to overcome global issues

□ Ideal KAISTian

○ Defines key virtues to be possessed by ideal KAISTians to fulfill the KAIST Vision and contribute to a positive culture

  - Core values previously emphasized were "challenge" and "creativity"

  - Talent to be nurtured with a new focus on C³: Challenge, Creativity, and Caring

  - C³ expected to serve as important criteria when recruiting students, faculty and staff

Integrated system to be formed by the innovation divisions of Vision 2031

Framework of KAIST Grand Vision 2031

글로벌 가치창출 선도대학
A global value-creative leading university

인류의 행복과 번영을 위한 과학기술혁신 대학
The university of science & technology innovation
for humanity's happiness and prosperity

Innovation in Education

Fostering Social-Value Enhancing Creative-Leaders

· Recruit Students with Creative Potential

· ITransform Curriculums and Systems

· ¡Transform Teaching and Learning Methods

Innovation in Research

Research on Challenging Problems Faced by Humanity & Countries

· IShaping Sustainable Research Environment

· IPromoting Creative & Risk–Taking Research

· Fostering Global–Leading Multidisciplinary Research Groups

Innovation in Technology Commercial-ization

Tech.–Value creating Entrepreneurial University

· Activating Entrepreneurship Education

· Strengthening Infrastructure for Startups

· Building Professional IP Management Systems

· Establishing Technology Holding Company & Cooperation Cluster

Innovation in Globalization

World Bridge KAIST by 2031

· Global campus

· Overseas campuses

· KAIST–initiated global research

· Expansion of KAIST development model to developing countries

Innovation in Future Strategy
A university that pursues "what" and "how"

KAIST 3C Spirit   **Challenge**   **Creativity**   **Caring**

< Integrated System of KAIST VISION 2031 >

○ Fundamental principles for optimal attainment of Vision 2031, 'C³'

 - C³ of "challenge", "creativity" and "caring" to serve as basis of KAIST Vision 2031

 - KAIST will build capacity to conduct research that prioritizes "what" over "how"

 - Vision sustainability to be guaranteed by integrating innovation strategies for a virtuous self-reinforcing system

○ Four innovation divisions to form complementary relations based on the aforementioned principles

○ Four innovation divisions to establish action strategies aimed at achieving"happiness and prosperity of humankind through innovation in science and technology.

○ Ultimate goal is to successfully complete the mission of becoming a "global value-creative leading university"

□ **KAIST Vision Slogan**

○ A simple slogan that expresses the spirit of KAIST Vision 2031 in a way that can be easily understood

Making a Beautiful Difference beyond Imagination!

○ KAIST Vision 2031 slogan relies on emotional language to convey the idea of "human-centered innovation," which everyone can relate to

 - "Difference"represents a love for challenges and the power to overcome adversity

 - "Imagination"represents the spirit of creativity

 - "Beautiful" represents a caring spirit, personally respectful inclusiveness, morality and social acceptance

3. Innovation Strategies of Each Division

Visions presented by the five divisions (education, innovation, technology commercialization, globalization, future strategy) for detailed execution of Vision 2031

□ Education Innovation

○ Core Vision of Education Innovation: "Fostering Social-Value Enhancing Creative-Leaders"

○ 17 strategies below proposed to achieve the vision

Innovation strategy	Action Item
Recruit Students with Creative Potential	⁻ Selection of creative talent ⁻ Selection of diverse students (emphasis on diversity) ⁻ Expansion of student support to attract outstanding students ⁻ Normalization of high school education by improving student recruitment method
Transform Curriculums and Systems	⁻ Strengthening of freshmen courses ⁻ Flexible semesters and flexible credit system ⁻ Strengthening of advisor role and graduation research ⁻ Curriculum monitoring and feedback ⁻ Establishment of the department of transdisciplinary science and engineering ⁻ Establishment of creative design lab and launch of training programs
Transform Teaching and Learning Methods	⁻ Establishment of Education 4.0 program ⁻ Establishment of smart learning infrastructure ⁻ Expansion of Massive Open Online Courses (MOOCs) and remote joint lectures ⁻ Extreme end lecture strategy ⁻ Lecture modularization for customized education ⁻ Establishment of bilingual environment ⁻ Establishment of system for education innovation

○ Changes to be driven by science and technology in the age of the fourth industrial revolution

  - "What kind of science and technology talent should we foster?" is an important issue in determining national competitiveness

  - KAIST must exert efforts to foster creative multidisciplinary leaders who enhance the social value of science and technology

○ Presenting a model of education to foster global leaders for the fourth industrial revolution under the College of Transdisciplinary and Fundamental Studies

- The non-departmental track of the College of Transdisciplinary and Fundamental Studies will contribute to fostering multidisciplinary talent with a strong foundation in basic science and engineering, and fast adaptability to the changing environment

- Formation of Steering Committee for Establishment of College of Transdisciplinary and Fundamental Studies; Committee will take charge of curriculum design and establishment of course development plans, and aim to launch the program in March 2019

- More diverse majors for students through the installation of College of Transdisciplinary and Fundamental Studies

○ Strengthening of global competence

- Students encouraged to compete on the global stage

- Grand vision based on a global mindset

· Students taught to reflect on how to change the world as a Global Shaper,
· How to drive innovation in the world as a Global Innovator,
· How to move the world as a Global Mover

- Expansion of opportunities to develop passion for volunteering, embrace challenges, make sacrifices, and take responsibility as leaders

· Promotion of global volunteering activities
· Invitation of Nobel laureates and other global leaders to serve as role models for students

○ Development and utilization of innovative lecture model

- Student-centered education innovation including flip learning and MOOCs: Offering of degree programs that integrate smart learning infrastructure such as Edu 4.0 and KOOCs with educational knowhow

- Social contributions: Expansion of virtual campus for upskilling of businesspeople

· Retraining programs have become essential for companies to enhance competitiveness in the age of the fourth industrial revolution. KAIST to provide remote lectures for businesspeople to study and work at the same time.

□ Research Innovation

○ Core Vision of Research Innovation: "Research on Challenging Problems faced by Humanity & Countries"

○ 13 strategies below proposed to achieve the vision

Innovation strategy	Action Item
Shaping Sustainable Research Environment	⁻ Innovation in Researcher Hiring System ⁻ Establishment of self-initiated research centers ⁻ Cross-Generation Collaborative Lab System ⁻ Stimulating Research Collaboration among KAIST, Industries & Research Institutes ⁻ Strengthen Research Planning Functions
Promoting Creative & Risk-Taking Research	⁻ Strengthening Creative/Risk-Taking Research ⁻ Attracting Outstanding/Diverse International Faculty ⁻ Providing Motivation to Spinoff Startups (by laboratories) ⁻ Improve Research Service System ⁻ Strengthening Research Capacity through Academic Information Service
Fostering Global-Leading Multidisciplinary Research Groups	⁻ Establishment of selection process for future-oriented flagship strategy research ⁻ Selection of candidate areas based on flagship selection process ⁻ Establishment and implementation of plans to support flagship research

○ Multidisciplinary practices have accelerated in the age of digital transformation and the fourth industrial revolution. Multidisciplinary research is not merely an option, but a must.

○ Multidisciplinary research building to be built to support multidisciplinary research in the age of the fourth industrial revolution. Meta－multidisciplinary research platform to be established to combine "multidisciplinary research" with "multidisciplinary research."

○ Selection of cross－generation collaborative labs for sustainable development of disciplines: First attempt in Korea to sustain academic success across generations based on cooperation between senior and junior faculty

○ Strengthening of cooperation among industries, universities, and research institutes

  - Strengthening of open innovation and collaborative research

  · Establishment of triple helix model of cooperation among industries, universities, and research institutes

  · Development of KAIST into an open innovation hub, where institutes and talent from Daedeok Innopolis and beyond gather to collaborate in innovative pursuits

○ 10 Flagship Research Areas

  - Six research areas aimed at solving global issues in relation to the fourth industrial revolution

  · Quantum Technology

  · Hyper-Connection Photonics

  · KAIST M3I3* Initiative
    * M3I3: Materials and Molecular Modeling, Imaging, Informatics and Integration

  · Super Intelligence Initiative

  · Development of Safety-Assured Smart City Platform based on Interconnected Cyber-Physical System

  · Innovation in space Access: Micro Launcher and CubeSat Cloud

  - Two research areas in bio/medicine/medical science/healthcare

  · WISE Brain: Wires of Senses and Emotions

  · Technology Convergence for Precision Medicine

  - One research area in energy/renewable energy/environment

  · Development of Cloud System for Energy Production, Storage & Distribution

  - One research area in national defense technology

  · Intelligent Unmanned System

□ Technology Commercialization Innovation

○ Core Vision of Technology Commercialization Innovation: "Tech.-Value creating entrepreneurial university"

○ 10 strategies below proposed to achieve the vision

Innovation strategy	Action Item
Design and expansion of entrepreneurship education	- Establishment of entrepreneurial university model for KAIST - Design of undergraduate and graduate entrepreneurship curricula to nurture entrepreneurs - Education on social values and ethics for scientist
Establishment of entrepreneurial support infrastructure	- Expansion of KAIST's entrepreneurial infrastructure for improved success rate in entrepreneurial activities - Establishment of entrepreneurial ecosystem through cooperation with external entrepreneurial infrastructure
Creation of intellectual property and sophistication of management process	- Establishment of goals for technology commercialization activities, and design of incentive system - Creation of intellectual property and design of patent application/management process - Promotion of industry/academy/research institute cooperation and interdisciplinary research, and enhancement of patent value
Expansion of technology investments and establishment of university-industry cooperation clusters	- Establishment of technology investment companies and expansion of technology investments - Establishment of university-industry cooperation clusters

○ University's R&DB is important not only in expanding funds, but also in creating jobs for youth and improving national competitiveness

○ KAIST's intellectual property and economic value must be maximized by expanding technology investment companies and startups

- Fostering of experts in technology commercialization: Increase in number of experts capable of identifying promising technology and companies.

- Establishment of policies for technology commercialization: Development of various policies to support investments in selected technology and companies. Review of general startup-related regulations to accelerate startup cycle.

- Case studies of student startups: Promotion of entrepreneurial culture by inviting successful entrepreneurs to inspire student startups

○ Establishment of cooperation infrastructure for startup promotion: Expansion of startup supporting infrastructure from Institute of Startup KAIST to Pangyo and Gangnam through participation in the Yangjae R&CD Innovation Hub

○ Promotion of investments in technology commercialization: Cooperation with investors at home and abroad to accelerate commercialization of KAIST's outstanding technology
- Example: MOU for research cooperation and technology commercialization cooperation signed with Israel's Yozma Fund to attract investment

○ Contribution to development of small- and medium-sized enterprises: Business environment has changed rapidly with the advent of the fourth industrial revolution. Small- and medium-sized enterprises constitute a significant portion of national economy, accounting for 99.9% of local businesses and 87% of jobs.
- Launch of K-Industry 4.0 for smart transformation of small- and medium-sized enterprises: Launch of K-Industry 4.0 Promotion Committee to support smart transformation of small- and medium-sized enterprises in Korea based on KAIST's outstanding human resources and technology

□ Globalization Innovation

○ Core vision of globalization innovation is "World Bridge KAIST by 2031."

○ 17 strategies below proposed to achieve the vision

Innovation strategy	Action Item
Global campus	‑ Establishment of campus without linguistic/cultural barriers ‑ Globalization of faculty ‑ Globalization of students and researchers ‑ Globalization of administrative system
Overseas campuses	‑ Establishment and management of overseas R&D centers (USA/EU and ASIA) ‑ Establishment and management of at least one overseas campus ‑ Development and utilization of advanced international multidisciplinary research/education programs ‑ Innovation in global technology commercialization strategies ‑ Innovation in PR strategies to enhance KAIST's visibility
KAIST-initiated global research	‑ Outbound international research ‑ Inbound international research ‑ Global commercialization of KAIST's outstanding research ‑ Establishment of vision and research strategies in KAIST-initiated research areas
Expansion of KAIST development model to developing countries	‑ Dispatching of research volunteers to developing countries and technical support (R&D technology and equipment) ‑ Supporting developing countries in the establishment of graduate schools in economic development, science, and technology ‑ Establishment of ASEAN-KAIST R&D Center ‑ Establishment of KAIST Spirit & Mind Foundation

○ Globalization is not an option, but a must

○ Establishment of Korean-English Bilingual Campus

  ‑ Expansion of opportunities to improve English proficiency

  ‑ Offering of Korean learning opportunities to international members. Development of cultural experience programs that integrate Korean language learning.

  ‑ Enforced bilingualism in information sharing media including the KAIST Portal

○ Establishment of foreigner-friendly campus environment
 - Identifying issues faced by international students, and finding solutions through counseling.
 - Gradual expansion of international food corner in school cafeterias
 - Expansion of KAIST Daycare Center
 - Providing international faculty with educational subsidies for their children through close cooperation with Taejon Christian International School

○ Greater efforts to enhance international reputation
 - Solidifying ties with WEF and other international organizations through joint organization of international events
 - Active participation in international events organized by university ranking organizations, such as THE and QS, to promote KAIST's excellence in education, research, and technology commercialization

□ **Future Strategy Innovation**

○ Establishment of "virtuous self-reinforcing system" to provide infrastructure for effective implementation of innovation strategies in education, education, technology commercialization and globalization under Vision 2031, and to ensure sustainable growth based on transparent assessment and motivation

○ Future strategies aimed at achieving the goal of becoming a "global value-creative leading university and one of the world's top 10"
 - Organization, human resources, and funds - Must be optimized for effective attainment of vision
 - Integration of innovation divisions - Future strategies serve as basic principles in establishing basic directions of four innovation divisions

○ Principles of implementation of future strategies
 - Efforts to fulfill KAIST's founding spirit, sense of duty to nation, and contributions to humankind

- Establishment of KAIST culture: Caring spirit added to core values of "challenge" and "creativity"

- Sustainability of strategies – Sharing among members, passing down to younger generations

- Holistic education and research through convergence of science and technology + cultural arts

○ Establishment of KAIST Future Strategy Research Center (tentative)
 - Think tank group that devises future strategies for KAIST and presents solutions to national issues in the age of uncertainty

 - Transition from HOW-oriented research to WHAT-oriented research

 ·Conducting research to set directions for the nation, humankind, and science and technology; identifying new issues instead of finding solutions to given problems

 - Making predictions for future society based on science and technology innovation, and fostering of future strategy think tanks

 - Long-term, continuous monitoring to ensure commitment to KAIST Vision 2031

○ World Economic Forum (WEF): International forum on the fourth industrial revolution
 - KAIST and WEF scheduled to hold international forum in Korea

 - Forum to stimulate discussions on future strategies needed for the fourth industrial revolution

 - KAIST will cooperate with WEF to become a global role model in the age of the fourth industrial revolution

4. Vision 2021 - Short-term action strategies

Vision 2021: Short-term action strategies for effective attainment of Vision 2031
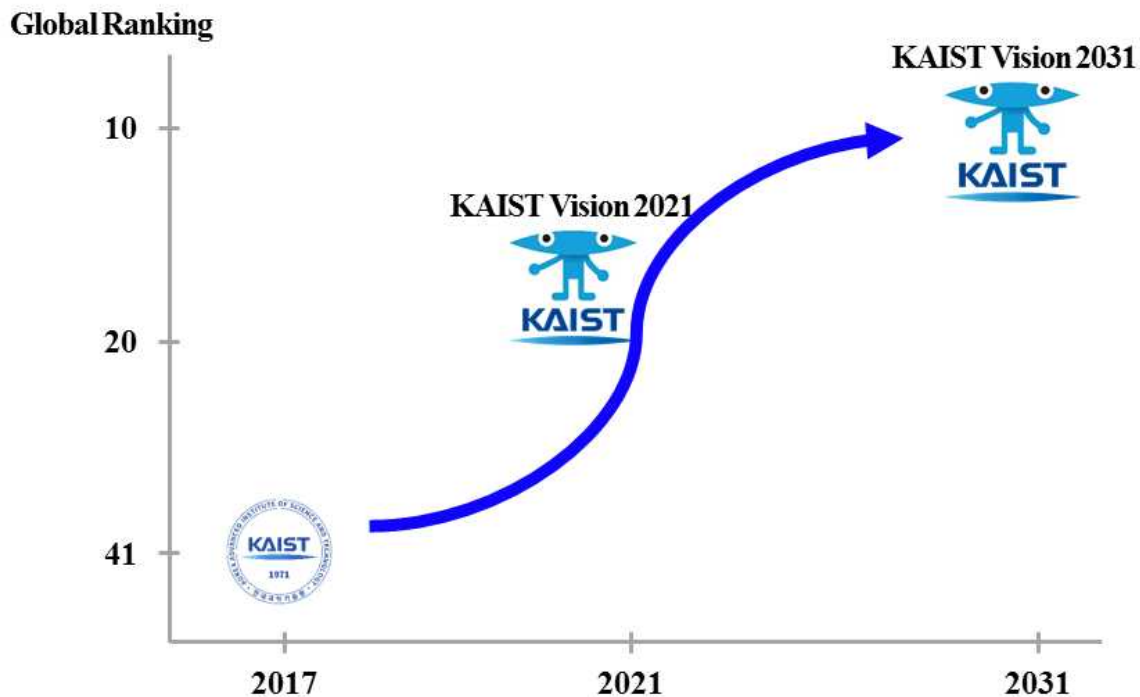
□ Short-term action strategies for education innovation

○ Recruitment of talent with creative potential

- Additional criteria to evaluate social capacity including C³(Challenge, Creativity, Caring)

Classification	Current	Improvement
Document screening (Stage 1)	Comprehensive evaluation based on academic performance, school records, statement of purpose, and letters of recommendation	- Emphasis on C³ in addition to existing method of evaluation ·(Challenge, Creativity) R&E, student clubs, experiential activities ·(Caring spirit, sense of community) Volunteering, group activities, relationship with peers, filial piety, and exemplary performance ·(Leadership) Performance as class leaders or student club leaders

Interview (Stage 2)	Comprehensive evaluation based on academic competence(problem-solving in mathematics and science) and social capacities	- In-depth evaluation with separate sessions for academic and social capacities ・(Increase in interview preparation time) 20 min (´17)→35 min (´18)→55 min (´19) ・(Additional evaluation by category) 20 min (´18)→40 min(´19) ☞ Session 1 (20 min): In-depth academic evaluation of mathematics, science, English, etc. ☞ Session 2 (20 min): Comprehensive evaluation of social capacities, including core values such as "challenge," "creativity," and "caring"

- Recruitment of honorary alumni as admissions officers

- Adjustment of ratio to diversify high school type and increase proportion of students possessing C³

Classification	Current	Improvement
Undergraduate program	Higher proportion of students from gifted high schools and science high schools ・Gifted/science high school: general high school = 7 : 3	- Selection of students who possess C³ with a more balanced distribution between gifted/science high schools and general high schools
	Higher proportion of male and Korean students ・Male / female = 8 : 2 ・Korean / foreigner = 94.1 : 5.9	- Increase in proportion of female students and socially challenged - Increase in proportion of international students from leading foreign high schools (80 students/year) ※ Improved assessment of scores obtained in international exams

- Policies to attract outstanding international students: Recommendation by embassies, expos for students on government scholarships, cooperation with current international faculty, visits to high schools of international students, support for promotional activities, etc.

○ Innovation in educational program and system to foster creative, multidisciplinary talent

- Establishment of College of Transdisciplinary and Fundamental Studies: Reorganization of academic units, curriculum development, and faculty recruitment (10 new faculty members by 2021)

- Convergence with humanities and social sciences: Meetings between natural sciences and humanities (two to three times per year); faculty

exchange with universities specializing in science and technology to provide lectures on humanities and social sciences

- Innovation in social value orientation of education: Agreement with Korea Foundation for Advanced Studies (September 2018; goal of at least 10 billion over the next five years)

○ Innovation in education methods to enhance competence of creative, multidisciplinary talent

- Establishment of Virtual University environment: Increase in network classrooms (20 classrooms) and teamwork rooms (50 rooms) by 2021

- Development and utilization of Massive Open Online Courses (MOOCs)

KOOC (KAIST MOOC), Coursera, K-MOOC		2017	2018	2019	2020	2021
	Developed	14	20	25	30	40
	Accumulated	41	61	86	116	156

- Expansion of Education 4.0 Program

	2017	2018	2019	2020	2021
Classes per year	138(5%)	170	200	250	400(15%)
No. of classrooms (accumulated)	3(21)	5(26)	5(31)	6(37)	8(45)

- STEAM (Science, Technology, Engineering, Arts, Mathematics) COLLEGE by Korea Foundation for the Advancement of Science & Creativity: Future-oriented science and engineering educational program that integrates elementary, middle and high school curricula to create jobs and resolve social issues; 40 courses selected across five universities specializing in science and technology

- Administration of unsupervised tests: Establishment of student honor code to instill sense of ethics among students

□ Short-term action strategies for research innovation

○ Innovation in sustainable research systems

- Strengthening of research planning function

· Planning and implementation of block funding for the fourth industrial revolution

· Prioritizing of seed projects

· Focus on 13 strategic projects of the Ministry of Science and ICT

- Implementation of policies to stimulate multidisciplinary, collaborative research

· Implementation of cross-generation collaborative lab system

· Career Quantum-Jump Grant (CQ-JG) - Customized support by research phase: Providing new/mid-career/experienced faculty with appropriate equipment and funds

· Opening of Fundamental Science Cafe: Space for sharing of ideas in fundamental science

· Multi-Sponsored Research and Education Program (MSREP): Establishment of education (remote lecture system) and research groups (utilization of research faculty and support for collaborative research labs) comprised of multiple companies and research institutes

○ Innovation in creative, risk-taking research support

- Sharing of latest research information

· RIMS* Discovery: Provides analysis of researchers, research achievements, and latest publications

  *RIMS (Researcher Information Management System)

· Sharing of knowledge with companies and research institutes based on archive of research reports

- Improvement of research system: Improvement of policies on balance accumulation, recruitment of IP attorneys, shortening of contract process with companies, shortening of contract process for international joint research

- Expansion of support for risk-taking research

· KC30+(KAIST Grand Challenge + seed money for Crazy but Grand Ideas): Equipment provided to KC30 projects to break the mold of conventional research and make new discoveries

· Assisted Creativity multidisciplinary research project: Research on multidisciplinary technology to maximize human creativity and other

skills irreplaceable by AI

○ Fostering of world-leading multidisciplinary research groups
 - Opening of multidisciplinary building for the age of the fourth industrial revolution

 - Support for research related to the fourth industrial revolution: National defense 4.0 research and education project, K-industry 4.0 project, etc.

 - Conversion of NExFIRE* multidisciplinary research projects to national projects: Integration of outstanding multidisciplinary research projects with Vision 2031 flagship projects to large-scale national projects
  * NExFIRE (Network of Excellence for the Fourth Industrial Revolution)

 - World Leading AI Initiative: Identification of issues through AI World Cub, expansion of AI education, and selection of promising projects through the Venture Research Program for Graduate Students

□ **Short-term action strategies for technology commercialization innovation**

○ Design and expansion of entrepreneurship education
 - Implementation of entrepreneurial curriculum platform for all MBA programs

 - Implementation of business analytics (BA) curriculum platform for all MBA programs

 - Introduction of advanced capstone design projects to regular courses in all departments: Recognition as basic elective in humanities, recognition as required/elective major, substitution for graduation research, etc.

 - Recruitment of students for Master of Entrepreneurship & Innovation: Jointly operated with the K-School and 18 departments

 - Launch of Graduate Minor Program in Entrepreneurship & Education: KAIST students on national scholarship

- Launch of CUop program with universities specializing in science and technology
  * CUop (Company-University Cooperation)

○ Establishment of entrepreneurial support infrastructure
 - Reorganization of Institute for Startup KAIST: Reorganization to strengthen capacity for entrepreneurial support

 - Amendment of regulations on faculty and student startups: Improvement of policies to promote and facilitate research-based startups by eliminating possible obstacles in the startup launching process for faculty and students

 ·(Improvement of faculty evaluation system) Acknowledging faculty contributions when advises launch startups based on research conducted under the supervision of advisors

○ Creation of intellectual property and sophistication of management process
 - Recruiting of experts to enhance investments, technology transfers, and professionalism: Establishment of technology investment companies and strengthening of capacity for technology transfers by cooperating with Israel's YEDA and other experts capable of identifying and commercializing outstanding technology

○ Expand venture support for job creation at national level
 - Open Venture Lab

 ·Providing a free space for business start-ups (Including office and internet infrastructure) to anyone who wants to start a venture during a certain period of time.

 ·KAIST faculty provide basic foundation training, consulting, and mentoring

 ·Starting from KAIST Hongreung Campus, it will be gradually expanded to the Munji Campus. KAIST will collaborate with related companies and government agencies to develop and spread this nationwide success model.

 - K-Industry 4.0

 ·The core goal is to enhance national competitiveness and maximize job creation through the growth of SMEs.

 ·Establishment of 'SME 4.0' production innovation platform of small

quantity batch production system by integrating manufacturing industry and ICT technology, such as cloud, AI, Big data.

·Establishment and support of E-School* Control tower: Cultivate regional people of talent to lead the 4th industrial revolution

   * Employment, Entrepreneur, E-learning

- Start-up idea contest & supporting seed capital

·Supports a part of seed capital for start-up ideas contest winner

·Provide Open Venture Lab Space and Service Priority to Selected Best Idea Ventures

○ Expansion of technology investments and establishment of university-industry cooperation clusters

- Establishment of technology investment companies

·Identification of promising technology and companies through investment council and external cooperation; diversification of investment type such as joint ventures, investment in existing company, investment in new startups, etc.

·Selection and management of investment companies based on pre-assessment of potential for success (technical, market validation)

- Expansion of technology transfers and commercialization through strategic creation of intellectual property

·Active response to infringement of rights including establishment of strategies for patent protection, royalty negotiations, and filing of lawsuits

·Strengthening of IP protection and funding through strategic cooperation with leading law firms and the Korean Intellectual Property Office

·Enhancement of IP professionalism and efficiency through cooperation with local/international patent offices, and expansion of international technology transfers

- Active investments in incubating companies (KAIST startups, technology transfers)

·Strategic consulting to attract investments and cooperation with investment companies

·Active attraction of accelerators, VCs, and CVCs, and organization

of IR forums

- Expansion of university-industry cooperation cluster: Expansion of KAIST's outstanding research achievements to small- and medium-sized enterprises in Seongnam through the K-GLOBAL project, and providing support to help companies attain world-class standards

- Fostering of technology-based startups with potential for growth in the age of the fourth industrial revolution: Used as criteria in selecting new incubating companies; active participation in projects related to the fourth industrial revolution

- Launch of regional cooperation projects based on capacity of entrepreneurial innovation: Regional and national expansion of entrepreneurial education through MOOCs

□ **Short-term action strategies for globalization innovation**

○ Global campus

- Enhancement of staff's linguistic skills

·Customized education through diverse language programs (hours, type, content)

- Development of new student exchange programs

·Research student exchange, visiting student program (for-credit course)

- Cultural integration of international members

·Cultural experience with Korean language learning, expansion of temple stay programs, promotion of KAIST ONE program, etc.

- Improved living conditions for international members

·Educational subsidies at Daejeon Christian International School (TCIS), TCIS Lecture Series by KAIST Professors

·Expansion of KAIST Day Care Center, expansion of international food corner in school cafeterias, etc.

- Global Leadership Activity (GLA) Southeast Asia Program

·Providing opportunities for outstanding teams in Humanity/ Leadership II to visit Southeast Asia

- KGLC (KAIST Global Leadership Center) Fellow Program

·Appointment of leadership experts (up to 10) to serve as mentors to students

○ Overseas campuses

- Plan to establish a research institute with support from the Chongqing Municipal Government

- ELK* overseas training

·Dispatching of 10 undergraduate students to Silicon Valley companies, research institutes, and universities in the United States
  * ELK: KAIST alumni company

○ KAIST-initiated global research

- Serving as an international hub by inviting world-leading researchers and organizing joint research and international symposiums

- More active exchange with strategic partner universities: Expansion of student exchange, joint research, seed fund for exchange programs, etc.

○ Expansion of KAIST development model to developing countries

- Expansion of overseas volunteering activities

- Continued implementation of Kenya Advanced Institute of Science and Technology project

□ **Short-term action strategies for future strategy innovation**

○ Acquisition of funds

- Freshmen donation campaign

·Allowing freshmen to experience becoming donors with a voluntary donation of KRW 10,000 during graduation

- Alumni fundraising activities

·Homecoming day, establishment of alumni management system, etc.

- General fundraising activities

·Organization of events for sponsors, invitation of students' parents, etc.

- Appreciation of donors

·Creation of KAIST Science Culture Park (space to commemorate donors)

·Health checkup services for major donors

- Expansion of global science and technology commercialization (cooperation with Yozma Group, centered on G-core)

- Promotion of future science and technology shares: Professional asset management

- Acquisition of additional funds for government innovation strategies

- KAIST VISION crowdfunding

○ HR management
- Expansion of new faculty/staff recruitment, and management of human resources

○ Reorganization
- Establishment of KAIST Research Center for Future Strategy

- Reorganization into research center-based matrix structure

○ Improvement of policies
- Review of legal and institutional regulations to enhance efficiency of education, research, technology commercialization, and globalization activities

○ Strengthening of cooperation with government
- Development of differentiated items for regional council member and standing committee member, and establishment of cooperation network

·breakfast meetings, policy forums, guest lectures, invitation to events, etc.

○ Number of faculty/students and budgeting

- Setting of specific quantitative goals for number of faculty, number of students, and expected budget to fulfill Vision 2031

	Target Index	2018	2019	2020	2021	2026	2031	Target Rate (~2021)	Target Rate (2021~)
HR	Number of Faculty	676	715	757	801	998	1,243	5.80%	4.50%
	Number of Students	11,654	11,771	11,889	12,008	12,620	13,264	1.00%	1.00%
	Student/Faculty ratio	17.24	16.46	15.71	15.00	12.65	10.67		
FR	Total Budget (million won)	858,600	927.288	1,001,471	1,081,589	1,481,870	2,030,291	8.00%	6.50%
	Government contributions	212,004	228,964	247,281	267,064	401,573	603,827	8.00%	8.50%
	Research Fund	382,655	418,357	457,389	500,064	734,758	1,079,600	9.33%	8.00%
	Etc	263,941	279,967	296,800	314,461	345,540	346,863		

※ Assumptions

1. The number of professors will increase to 1,200 by 2031. Achieve economies of scale

2. The student/faculty ratio will decrease to 10 by 2031.

3. Budget will reach 1 trillion won in 2021 and 2 trillion won in 2031. The budget per professor will be about 1.6 billion won.

4. The proportion of government contributions to the total budget will be 25% by 2021 and 30% by 2031.

5. Category of "etc." includes royalty incentives and earnings from operation of the fund. The fund's target is 2 trillion won by 2031.

* The key to realizing the VISION 2031 is securing sufficient finance resources. Therefore, continuous efforts are needed to increase research funding and government contributions. A lot of donations are necessary, especially from alumni associations.

※ Note

Under Vision 2031, the goal is to have 1,200 faculty members and a two trillion won in budget by 2031. The annual quantitative goals serve as rough guidelines in working towards the final goals. The attainment or non-attainment of quantitative goals is not an indicator of success or failure of Vision 2031

Ⅰ

Overview

1. KAIST Grand Vision 2031

Article 1 of the Korea Advanced Institute of Science and Technology Act states that the institute was established "to train highly qualified scientific and engineering specialists with profound theoretical background and practical application ability in the fields of science and technology required for developing industries, in order to conduct mid- and long-term research and development implemented in accordance with the national policies and basic and applied research for developing potential of national science and technology, and further to provide other research institutes, industrial sectors, etc. with research support."

For nearly five decades since its establishment in 1971, KAIST has exerted efforts to fulfill its founding purpose in education, research and technology commercialization. As a result, it has joined the ranks of world-class universities in a relatively short period.

However, the next fifty years will present unprecedented challenges. The fourth industrial revolution, accompanied by innovation in science and technology, will have an impact on economies, societies, and cultures. Against this backdrop, KAIST needs to define a new vision that addresses such changes, so as to continue fulfilling its founding purpose. "KAIST Vision 2031" will act as a blueprint, driving the institute to take the next step forward. Just as the Terman Report served KAIST in its early years in 1971, the new vision will be the cornerstone of success in the future.

KAIST VISION 2031

KAIST는 글로벌 가치창출 선도대학으로서
"인류의 행복과 번영을 위한 과학기술혁신 대학"을 추구한다.

As a **global value-creative leading university,**
KAIST endeavors to be the university of science & technology innovation
for humanity's happiness and prosperity.

KAIST Grand Vision 2031

Mission :	Global Value-Creative	Leading University
Strategy :	The university of science & technology innovation	**for** humankind's happiness and prosperity

□ KAIST Grand VISION 2031

○ "Humankind's happiness and prosperity," is presented as a practical, strategic goal of a "global value-creative leading university." That is, KAIST will develop into a leading university that creates global value through "science & technology innovation."

○ Humankind's happiness and prosperity: KAIST must not only pursue economic value, but also contribute to the advancement of humanity.

 - Humankind: The mission of KAIST at the time of its establishment in 1971 was the development of science and technology. Today, it should exert efforts to achieve universal values that extend beyond Korea, so as to benefit humankind as a whole.

 - Happiness: Happiness is a concept that encompasses sustainability (environment), dignified living, and qualitative satisfaction. Social entrepreneurship and the launching of social enterprises are also included.

 - Prosperity: Prosperity is the enjoyment of life, or the surpassing of basic needs in terms of economic and materialistic fulfillment.

○ Science & technology innovation: In keeping with its founding purpose, KAIST will work to achieve happiness and prosperity for humankind through innovation in science and technology.

○ The use of "the university" instead of "a university" reflects KAIST's determination to become "the best, first, and only one" in creating value for humankind.

□ Vision of the Four Divisions

○ KAIST Vision 2031 was developed based on voluntary, active participation by its key members and stakeholders: faculty, students, staff, and alumni. More than 100 faculty members volunteered to serve in the four divisions of the Vision Committee. A large-scale survey was conducted to collect feedback from students, alumni, and staff. The Board of Trustees, including the President, and the Vision Committee organized several meetings over the past eight months to achieve a consensus among all members. These efforts gave birth to the KAIST Vision 2031, comprised of four key innovation strategies and principles of future strategies aimed at integrating the different areas.

○ 5 Key Innovation Strategies

1. **Education**: Fostering Social-Value Enhancing Creative-Leaders

2. **Research**: Research on Challenging Problems faced by Humanity & Countries

3. **Technology commercialization**: Technology Value-creating entrepreneurial university

4. **Globalization**: World Bridge KAIST by 2031

5. **Future strategy**: A university that prioritizes "what" over "how"

Making a Beautiful Difference beyond Imagination!
A global value-creative leading university

The university of science & technology innovation for humanity's happiness and prosperity

Educational Innovation

Fostering Social-Value Enhancing Creative-Leaders

Internationalization Innovation

World Bridge KAIST by 2031

Technology Commercialization Innovation

Tech.-Value Creating Entrepreneurial U.

Research Innovation

Research on Challenging Problems faced by Humanity & Countries

Future Strategy Innovation

How+What, Virtuous self-reinforcing system
KAIST 3C Spirits: Challenge, Creativity, Caring
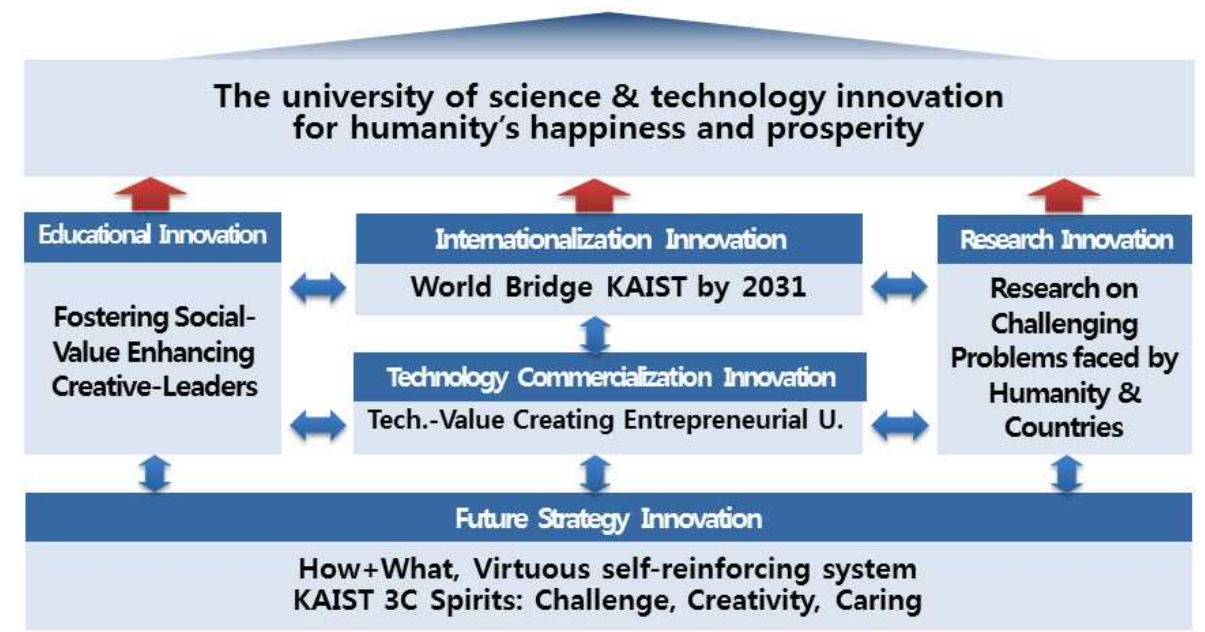
○ Fundamental principles for optimal attainment of Vision 2031

  - The C³, comprised of the core values of "challenge," "creativity," and "caring," serve as the basic spirit of the KAIST Vision 2031

  - KAIST seeks to build competence to conduct research that prioritizes "what" over "how"

  - Sustainability of vision guaranteed by integrating innovation strategies to establish a virtuous self-reinforcing system

○ Relationship and Role of 5 Innovation Strategies

  - The five innovation strategies complement one another based on the above fundamental principles

  - Action strategies carried out to achieve the goal of becoming "the university of science and technology innovation for humankind's happiness and prosperity"

  - Such efforts will enable KAIST to complete its ultimate mission of emerging as a "global value-creative leading university"

□ **KAIST VISION Slogan:** A simple slogan that expresses the spirit of KAIST Vision 2031 in a way that can be easily understood by anyone.

Making a Beautiful Difference beyond Imagination!

○ Final slogan was developed based on the best slogan selected from ideas proposed by students and faculty of KAIST

○ KAIST Vision 2031 slogan relies on emotional language to convey the idea of "human-centered innovation," which everyone can relate to

○ Slogan contains the core values of [challenge], [creativity], [Caring]

  - "Difference" represents a love for challenges and the power to overcome adversity

  - "Imagination" represents the spirit of creativity

  - "Beautiful" represents a caring spirit, personally respectful inclusiveness , morality and social acceptance

□ **KAIST's reason for existence:**

To be a global value-creative university that contributes to the advancement of humanity through S&T research and education based on the core value of "challenge, creativity and Caring"

○ Is KAIST fulfilling its founding purpose of "fostering elite human resources in science and technology"?

  - Over the past 47 years, KAIST has fostered talent to drive the nation's industrial development, and to serve in universities and research institutes.

○ Does it require a new vision and goal for the future?

  - KAIST must set a new vision and goal for the future.

  - The Terman Report predicted that new directions would be required in 2000.

- To play a pioneering role amidst such changes, KAIST must aim to be among the top 1% of knowledge-creating institutes.

·(For example) In the future, only knowledge-creating top schools will survive, and most education is expected to be in the form of online teaching, i.e. MOOCs.

- KAIST must build on past achievements and expand its vision to create/utilize science and technology knowledge not only for national development, but for the benefit of humankind.

> ex) Mission of top research-oriented universities: Research and education based on science and technology
> ① MIT mission: "(To) advance knowledge and educate students in science, technology, and other areas of scholarship that will best serve the nation and the world in the 21st century"
> ② NTU mission: "A great global university founded on science and technology, nurturing leaders through research and abroad education in diverse disciplines"

○ How to adapt for the future?

- What is newly expected of universities in light of paradigm shifts in society and technology innovation?

·Contribute to the nation's sustainable development by establishing new missions for the future, and employing innovative methods in teaching and research

- Need to establish visions and strategies for 2031 (WHAT FUTURE 2031)

·(From Follower to Frontier) by transitioning from "follower" to "frontier,"

·(From HOW to WHAT) by identifying new issues that have an impact on science and technology instead of simply solving given problems

- KAIST VISION 2031: Global value-creative leading university

·KAIST's new vision for mid/long-term development, reflects its determination to contribute to the advancement of humankind through education and research in science and technology.

·The Vision 2031 Report is expected to be an effective follow-up to the Terman Report.

2. Presentation of Objective Goal

□ Goal of KAIST VISION 2031

○ The key to success of Vision 2031

- The key to success of Vision 2031 lies in the commitment and self-realization of all members of KAIST.

- Success should be determined based on quantitative, qualitative, and strategic criteria.

- The qualitative and strategic goals are discussed throughout the report.

□ Objective Goal

To become one of the world's top 10 universities by 2031

○ based on listing in world university rankings

○ An objective, measurable summary measure

- It is a specific, measurable indicator used to assess the institute's performance in attaining the goals presented in Vision 2031.

3. Attainment of Goals Through Five Key Innovations

☐ Definition of the five divisions of innovation

- ○ Education, research, technology commercialization, globalization, and Future Strategy innovation

- ○ The five divisions must be integrated for synergy, and serve as a driving force in achieving KAIST's grand vision.

☐ Education innovation: Fostering Social-Value Enhancing Creative-Leaders

- ○ Greater emphasis on identifying new social problems, cooperating across fields to address such problems, and deriving new value

- ○ Recruiting talent with consideration of qualitative characteristics, such as cognitive excellence, willingness to take on new challenges, power to overcome adversity, and self-motivation

- ○ Introducing educational innovation and creative multidisciplinary learning to enhance problem-solving skills and capacity for cooperation

- ○ Employing advanced technology and innovative teaching methodologies to shift the paradigm from teacher-centered to student-centered learning

☐ Research innovation: Research on Challenging Problems faced by Humanity & Countries

- ○ KAIST to seek innovation as a research-oriented university and pioneering leader of future society and industry through the discovery of new areas for interdisciplinary research and novel technology development in preparation for the fourth industrial revolution

- ○ Paradigm shift from follower to pioneer, and from conducting quantitative/short-term research to creative/venture/transformational/

multidisciplinary research

○ Expansion of creative/venture/multidisciplinary research through research innovation, so as to ultimately fulfill the vision of "overcoming challenges faced by humanity and countries"

□ Technology commercialization innovation: Tech.-Value creating entrepreneurial university

○ "Value－creating"

　– Values include human resources, knowledge, economic value, and social value

　– Taking the lead in changing and influencing the world

○ "Entrepreneurial University

　– Becoming an entrepreneurial university based on foundation as a research－oriented university

　– Becoming a value creator in response to the needs of the nation/society

　– Strengthening technology commercialization based on past activities in education and research

　– Emphasis on social impact

　– Entrepreneurial University ＝ value－creating university

□ Globalization innovation: "World Bridge KAIST by 2031"

○ Laying a bridge between KAIST and the world, spreading KAIST's education and research throughout the world by 2031 and vice versa

○ Attraction of outstanding international faculty/students/researchers and enhanced global reputation for research conducted by KAIST

○ Organization of international consortiums and global commercialization for outstanding research

○ Enhanced international pride and value of KAIST members

○ Cradle of growth engines for the development of Korea and the world

□ Future strategy innovation: A university that prioritizes "what" over "how"

○ Principle or perspective or approach of future strategies in order to integrate the four key innovation strategies

○ Establishment of future vision and strategies: Transition from "How" research defined by others into problem-defining "What" research

○ Operation of think tank groups - More active long-term monitoring to assess progress in the implementation of Vision 2031

4. Sustainability of Strategies - Follow-up to Existing Long-term Strategy Report

□ Follow-up to Existing Long-term Strategy Report

○ Vision 2031 is built on KAIST's achievements and experiences accumulated over the past fifty years.

- The proposed strategies are aimed at creating a better future based on heritage and continuity, and not a complete abandonment of tradition.

- Vision 2031 includes notable results from KAIST's strategy reports.

□ Terman Report (Dec. 1970)

○ Korea Advanced Institute of Science (KAIS), a graduate school specializing in applied science and technology, was considered the only effective solution to boosting the Korean economy

○ KAIS, if successfully launched, was expected to grow into a world-class educational institute by the 21st century and to serve as a role model for similar universities outside of Korea

□ KAIST Long-term Development Strategies 1994-2005 (Oct. 1994)

○ Vision: World-class research-oriented educational institute

○ Goals
- Joining the world's top 10 in academic excellence
- Fostering of creative talent who possess leadership qualities
- Enhancing global competitiveness through innovation in science and technology

□ KAIST VISION 2010 (Jul. 2004)

○ Vision: World-class research-oriented university in science and engineering

○ Goals
- Achieving world-class academic excellence
- Fostering creative talent with global competitiveness
- Deriving meaningful results from national strategic research in science

and technology

□ KAIST VISION 2005 (Apr. 2005)

○ Vision: First, Best, the World in KAIST

○ Goals
 - Recruitment of top-class faculty
 - Development of top-class curriculum
 - Establishment of top-class infrastructure

□ KAIST Five-year Development Plan (Feb. 2007)

○ Vision: Solving major issues faced by humanity and creating new food resources

○ Goals: Becoming the world's best science and technology university
 - World's best educational system
 - World's best multidisciplinary research system
 - Management innovation based on autonomy and self-responsibility
 - Attainment of world-class standards in openness and cooperation

□ KAIST VISION 2025 (Jun. 2011)

○ Vision: Creating knowledge for humankind

○ Goals: Becoming a world-leading university in science and technology
 - Paving the way to the future through holistic, multidisciplinary education
 - Conducting creative research to usher in change and innovation
 - Development through harmony and cooperation
 - Achieving sustainable growth

□ KAIST Mid/Long-term Development Plan (Oct. 2013)

○ Vision: Becoming the world-leading center of science and technology

○ Goals
 - Fostering of multidisciplinary talent who possess academic excellence and creativity
 - Global research-oriented university that leads the knowledge-based, creative economy
 - Establishment of global campus based on sharing and cooperation

□ KAIST Core Values Report (Apr. 2014)

○ "challenge and Creativity" selected as KAIST's core values

5. KAIST's Development and Achievements

☐ **Establishment of new educational and research directions for the next fifty years by tracing the fifty-year history of KAIST's development and reviewing its key achievements**

☐ **KAIST's Development**

   ○ Established in 1971 with U.S. funding → Most innovative university in 2017

   ○ History

    – 1969 Report on "establishment of new applied science and technology graduate school in Korea" submitted to US/AID

    – 1970 Proposal submitted for "establishment of graduate school specializing in science and engineering"

    – Loan of six million dollars offered by US/AID

    – August 1970 Enactment of Korea Advanced Institute of Science (KAIS) Act

    – December 1970 Development of Terman Report (by US/AID investigators who assessed the feasibility of the establishment of KAIS)

    – February 16, 1971 Establishment of Korea Advanced Institute of Science (KAIS)

    – March 1973 First matriculation

    – August 1975 First commencement for master's degrees

    – August 1978 First commencement for doctoral degrees

    – February 1990 First commencement for bachelor's degrees

    – October 1996 Establishment of Korea Institute of Advanced Study (KIAS)

    – July 2003 Change in official title from "director" to "president"

    – May 2004 Establishment of National NanoFab Center (NNFC)

    – February 2009 Merger with Korea Science Academy

    – March 2009 Acquisition of Information and Communications University

    – May 2010 Completion of KAIST Institute (KI) Building

    – February 2018 Degrees conferred to 2,736 graduates (644 PhDs, 1,352 master's, and 740 bachelors)

    – 61,932 graduates (17,399 bachelors; 31,913 master's, 12,620 PhDs) have become leaders of industries, universities, research institutes, and

government agencies; KAIST's graduates account for 23% of leadership positions in local industries, universities, and research institutes (as of March 1, 2018)

- About 45% of graduates serving in industry, with half in conglomerates, and the remaining half in ventures and small/medium-sized enterprises; 20% of KAIST graduates who have joined venture capital firms are serving as CEOs

- 10,381 enrolled students (3,756 undergraduates, 2,762 master's, 1,209 integrated MS/PhD, 2,654 PhD students) (As of February, 2018)

□ KAIST's Achievement

○ World university rankings (Reuter, QS)

- According to the World University Rankings** released by QS(Quacquarelli Symonds)* on June 8, 2017, KAIST is 41st in the world.

* QS is a British company that has provided rankings of the world's top universities since 1994.
** More than 3,800 institutions around the world were considered based on six indicators: academic reputation (40%), employer reputation (10%), faculty student ratio (20%), citations per faculty (20%), international students (5%), and international faculty (5%).

<QS World University Rankings 2017>

Rank	University	Country	Trend
1	MIT	US	-
2	Stanford University	US	-
3	Harvard University	US	-
4	Caltech	US	▲1
5	University of Cambridge	UK	▼-1
6	University of Oxford	UK	-
7	UCL	UK	-
8	Imperial College London	UK	▲1
9	University of Chicago	US	▲1
10	Swiss Federal Institute of Technology Zurich	Switzer land	▼-2
41	KAIST	Korea	▲5

Source :QS

- KAIST, which celebrated its 46th year in 2017, ranked third in the QS Top 50 Under 50 2017/2018, a list of fast-rising young universities compiled by Quacquarelli Symonds (QS)

<QS Top 50 Under 50>

Rank	University (Year of Establishment)	Country
1	Nanyang Technological University (1991)	Singapore
2	Hong Kong University of Science and Technology (1991)	Hong Kong
3	KAIST (1971)	Korea
4	City University of Hong Kong (1984)	Hong Kong
5	POSTECH (1986)	Korea
6	Hong Kong Polytechnic University (1994)	Hong Kong
7	Aalto University (2010)	Finland
8	University of Technology Sydney(1988)	Australia

Source :QS

- In 2017, for the second consecutive year, KAIST ranked first in Reuters' annual ranking of Asia Pacific's Most Innovative Universities** . KAIST produced 923 patents between 2010 and 2015, more than 74 out of the 75 top universities. About 91.7% of basic research conducted at KAIST has had significant influence on commercial R&D activities (a high volume of KAIST patents cited in external research).

   ** Asia Pacific's Most Innovative Universities is a list compiled by Reuters and Clarivate Analytics of the 75 most innovative universities in the Asia Pacific Region.

○ Review of KAIST's World-class Research

- Professor Kilnam Chon, known as the father of the internet in Korea, played a key role in establishing internet connectivity in Korea on May 15, 1982. Korea became the second country in the world to be connected, following the United States. Chon has served as a professor at the School of Computing at KAIST since 1982.

https://www.youtube.com/watch?v=L5ICgINNPrE)

(http://www.cosmos.kaist.ac.kr/professor/webtoon-chonkn)

- Satellite Technology Research Center (SaTReC) is a KAIST-affiliated research center that conducts satellite research and fosters professionals in space technology. Since its establishment in August 1989, it has enjoyed success in the launch of independently developed satellites: KITSAT-1 in August 1992, KITSAT-2 in 1993, and KITSAT-3 in 1999.

(Photo:http://www.ilyoweekly.co.kr/news/articleView.html?idxno=6601)

- Professor Ryong Ryoo from the Department of Chemistry and a pioneer of mesoporous zeolite, received the Breck Award in 2010 from the International Zeolite Association. Using nanoporous materials with a pore diameter of 2 to 50 nm, he developed a nanocasting method and synthesized an ordered mesoporous carbon known as CMK, which stands for carbon mesotructured by KAIST. His creative research in the design of functional porous materials is expected to have diverse applications for highly efficient catalysts in chemistry, thereby raising the quality of human life.
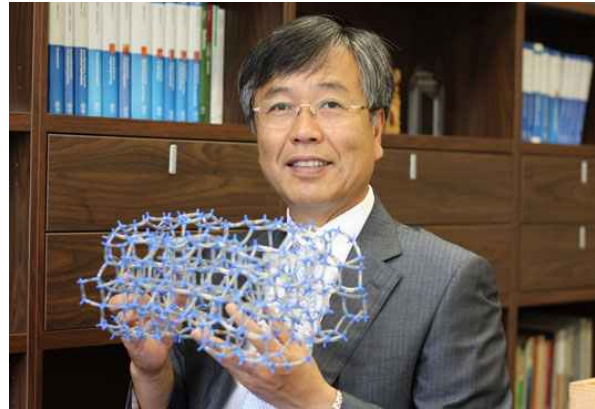
- Professor Sang Yup Lee of the Department of Biochemical Engineering published a paper titled "Microbial Production of Short-chain Alkanes" as the lead article in the October 2013 issue of Nature. The study proposed a platform for the production of various biocompounds such as biofuel and biodegradable plastic. The technology can be utilized to convert renewable biomass to alcohol and biodiesel, which can serve as biofuel, surfactant, and lubricant.

- Development of humanoid robot Hubo: Professor Jun-Ho Oh's team developed the humanoid robot Hubo, which won the 2015 Robotics Challenges hosted by the United States Defense Advanced Research Projects Agency (DARPA). The team received two million dollars in prize money, and earned recognition for their advanced technology. Hubo, the only humanoid robot to achieve commercial success, has been exported for research purposes to the United States, Singapore, and China.

□ **Alumni Statistics: Major Role in Korea's Economy and Academia**

○ KAIST has produced 12,620 PhDs, 31,913 master's, and 17,399 bachelor's since its establishment in 1971.

- KAIST saw 2 PhD graduates in 1978. This increased to 100 in 1987, 200 in 1994, 400 in 2000, and 644 in 2018. The 10,000th PhD degree was conferred in 2015.
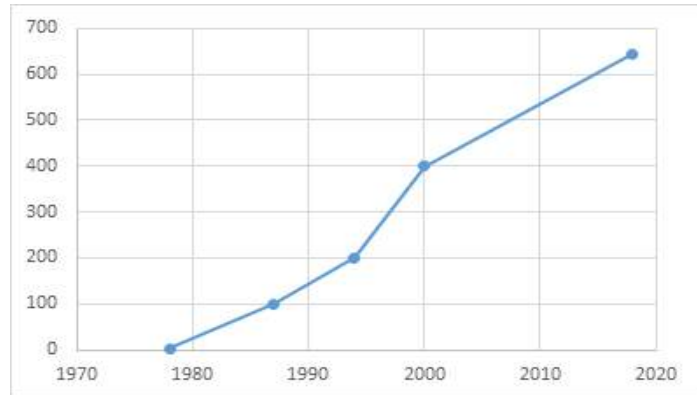
- According to data* on 7,400 PhD graduates provided by the KAIST Alumni (as of end-January 2015):

· 3,300 graduates, or 45%, were working in industry

· 2,300 (31%) were working in local/overseas universities, 1,600 (21%) in government agencies/government-funded research institutes/public institutes, and 200 international graduates (3%) returned to their home country.

· Out of the 3,300 graduates working in industry, 48% belonged to the top 10 conglomerates, and 52% had joined venture capital firms or mid-sized companies.

※ Source: KAIST Press Release (2/12/2015) "KAIST passes 10,000 mark in PhD degrees"

○ KAIST has created socioeconomic impact through the fostering of science and technology professionals. The economic value of KAIST's academic papers and patents amounted to 42.6 billion won and 322.2 billion won, respectively, in 2015.

※ Source: Korea Productivity Center. 2015. "Analysis of KAIST's Achievements and Value for the Past 45 Years."

○ Since its establishment in 1971, KAIST has received 2.9 trillion won in government investment, and 3 trillion won in government-commissioned research. Companies founded by KAIST graduates recorded 13.6 trillion won in sales, indicating a high ROI. This demonstrates that the establishment of KAIST has contributed to national development.

□ **KAIST as a Benchmark – Japan's JAIST, Hong Kong's HKUST, Singapore's Nanyang Technological University, Uruguay's University of the Republic, Azerbaijan's Azerbaijan Technical University, etc.**

○ HKUST

- In the mid-1990s, the founding committee of HKUST visited KAIST's Hongneung campus. KAIST served as a benchmark in terms of the management of a research-oriented university, and incentive policies for researchers.

○ Japan Advanced Institute of Science and Technology (JAIST)

- A postgraduate university modeled after KAIST and established in 1990, offers various programs of advanced research and development in science and technology.

○ Establishment of Kenya Advanced Institute of Science and Technology

- Similar to how the United States supported the establishment of KAIST in 1971, the Korean government is supporting the establishment of a similar institute in Kenya with KAIST as a benchmark.

6. Reflection

□ **A reflection of KAIST's past 50 years**

○ KAIST has seen continuous growth in the past fifty years, and has been recognized as one of the best emerging universities and the most innovative university in the region.

○ However, it is no exception to the saying, "failure is the mother of success." There have been times when KAIST could have done better.

○ True innovation is achieved not by concealing failed attempts but by learning from past mistakes."

☐ **Need to establish vision and strategies as a WHAT-focused university that prioritizes new directions over stability (What+How)**

　ｏ Significant growth observed in quantitative research results, i.e. number of papers. Research success attained through Hubo, KITSAT-1, etc.

　ｏ Tendency to conduct risk-averse and follower research: KAIST has conducted HOW-focused research and produced SCI papers. It should conduct WHAT-focused research and present directions for future societies, and place less emphasis on quantitative indicators, i.e. number of papers in faculty/student evaluation.

☐ **Efforts in quantitative development**

　ｏ Impact factor has emerged as an important criterion in determining the quality of research.

　 - For the 2,711 papers published by KAIST from 2016 to 2017 (Web of Science), the h-index was 21, and the average number of citations per item was 2.08.

　 - During the same period (2016 to 2017), Nanyang Technological University published a total of 9,362 papers (Web of Science) with an h-index of 48 and average number of citations of 2.75. This is qualitatively and quantitatively superior to the publication record of KAIST.

　ｏ KAIST's international collaboration has remained largely stagnant since 2012. While it has seen an overall quantitative improvement in research, outputs in the top 10% have not. The number of papers cited in patents has continuously decreased since 2012. As such, more effort must be made to qualitatively improve research.

☐ **Do members of KAIST feel a strong sense of duty to the nation?**

　ｏ KAIST faculty have a relatively strong sense of duty to contribute to the development of science and technology. This sense of duty must serve as a driving force for education and research.

　 - KAIST must undertake research in areas showing promise in creating public value, even if they do not contribute to economic growth.

□ **Contribution to social and economic development through the fostering of female scientists**

○ KAIST female faculty ratio

‐ Female faculty account for 10.4% (66 persons) of KAIST faculty (636 persons), which is the highest among science and engineering universities in Korea.

‐ KAIST also has the highest percentage of female assistant professors in Korea at 24.8% (32 persons) out of a total of 129.

○ KAIST female student ratio

‐ Female students account for 21.8% of master's students (male and female students combined is 2,973), and 16.9% of PhD students (male and female students combined is 3,645), making KAIST the cradle of female research talent in Korea.

○ However, there is still room for improvement in the rate of increase of female faculty and students.

○ Fostering of creative female scientists expected to contribute to social/industrial development in the age of the fourth industrial revolution.

□ **Value creation through technology investment companies and innovative startups**

○ KAIST must extend beyond R&D to Research & Development Business (R&DB) and consider the economic value of its activities

‐ KAIST owns 11 companies (two subsidiaries and nine investment companies) as of end‐2016. More active fostering is needed.

□ **Need to raise social value of students**

○ Social bias against KAIST students is that they tend to be individualistic and lack capacity for cooperation

○ Education/research culture at KAIST must be adapted to change public perception

‐ More efforts to produce tangible results that have an impact on society

- Strengthening of humanities education
- Adopting a more active attitude for students to excel outside school boundaries
  · For example, Steve Jobs considered calligraphy one of the most influential courses he took.

□ Poor performance in internationalization

○ While KAIST has exerted significant efforts in internationalization, it has fared poorly in world university rankings compared to competitors.

○ More active internationalization will build a stronger global presence through international joint research and international exchange. These activities will have a positive influence, improving KAIST's standing in world university rankings.

○ More practical efforts required for internationalization.
- KAIST must transition to a fully bilingual campus instead of simply providing English lectures or increasing the use of English.
  · Staff should have global competence, and the administration must provide bilingual services
- More attractive awards and incentives needed to attain internationalization goals.

□ Gap in research performance and ranking between HKUST and KAIST

○ HKUST uses English as the formal language of instruction, is located in the global business hub of Hong Kong, and has attracted outstanding faculty

○ HKUST has attracted outstanding faculty by providing attractive salaries and research environment

○ HKUST has a strict policy that motivates faculty to consistently produce results
  · e.g. Full-time professors face salary cuts for poor performance, and may receive lower salary than when they were first appointed

□ Need to reflect on advisors' role in student guidance

　○ Do faculty members serve in dissertation committees after reading and understanding submissions?

　○ Is the faculty-to-student ratio appropriate?

　○ Time invested in student guidance must be assessed to ensure students' right to learn and to improve their research capacity

　○ Have faculty members, in performing their duties as educators and teachers, served as role models for students?

□ SWOT Analysis of KAIST

Strengths	Weaknesses
- Science and technology university established under special law - Emphasis on "challenge" and "creativity" as the basic spirit of education and research - High participation on establishment of strategies aimed at goal of becoming a "global value-creative leading university" - Continuous increase in global university rankings (international awareness) - Flexibility/professionalism to identify and concentrate on new, promising research areas - Outstanding research personnel and research excellence: World-class research competitiveness (of individual professors) - Strong foundation for creative multidisciplinary education through non-departmental system - Establishment of leading faculty teaching model (Education 4.0, KOOC, etc.) - Well-established alumni network in various sectors of society	- Weakened sense of duty to represent Korea in becoming a world-class university - Preference for stable research over risk-taking research - Conducting how-oriented research to solve given problems rather than what-oriented research that defines new issues for humankind - Limitations imposed by Korea's emphasis on number of publications in research assessment - Weak foundation for international research aimed at solving global issues - Less investments compared to world-leading universities - Tendency to assess all faculty (including international faculty) using the same criteria

Opportunities	Threats
- Necessity of science and technology in responding to changes in society and global issues - Emphasis of role on university in leading the fourth industrial revolution - Shift in paradigm with emphasis on qualitative excellence in research and multidisciplinary education/research - Increased social demand for global talent with creative and multidisciplinary thinking - More opportunities for global research and exchange with KAIST's enhanced global reputation	- Stiffer research competition with increase in research investments by world-leading universities - Decrease in government support as a matter of fairness for all universities - Stiffer global competition in attracting outstanding personnel - Decrease in students caused by low childbirth, and avoidance of science and engineering - Lack of globalization-related social awareness and infrastructure within and outside the university - Difficulties in attracting outstanding international students as a university in a non-English speaking country

7. Integrated Model of Five Key Innovation Strategies

☐ **Integrated model of five key innovations**

  ○ The five areas are closely related to one another

  ○ Their integration into a single model will lead to the success of KAIST Vision 2031.

  ○ Future strategies include basic principles, perspectives, and frameworks for the four divisions.

☐ **5 Key Innovation Strategies**

  1. **Education**: Fostering Social-Value Enhancing Creative-Leaders

  2. **Research**: Research on Challenging Problems faced by Humanity & Countries

  3. **Technology commercialization**: Technology Value-creating entrepreneurial university

  4. **Globalization**: World Bridge KAIST by 2031

  5. **Future strategy**: A university that prioritizes "what" over "how"

Making a Beautiful Difference beyond Imagination!

A global value-creative leading university

The university of science & technology innovation for humanity's happiness and prosperity

Educational Innovation	Internationalization Innovation	Research Innovation
	World Bridge KAIST by 2031	
Fostering Social-Value Enhancing Creative-Leaders	**Technology Commercialization Innovation**	**Research on Challenging Problems faced by Humanity & Countries**
	Tech.-Value Creating Entrepreneurial U.	

Future Strategy Innovation

**How+What, Virtuous self-reinforcing system
KAIST 3C Spirits: Challenge, Creativity, Caring**

II
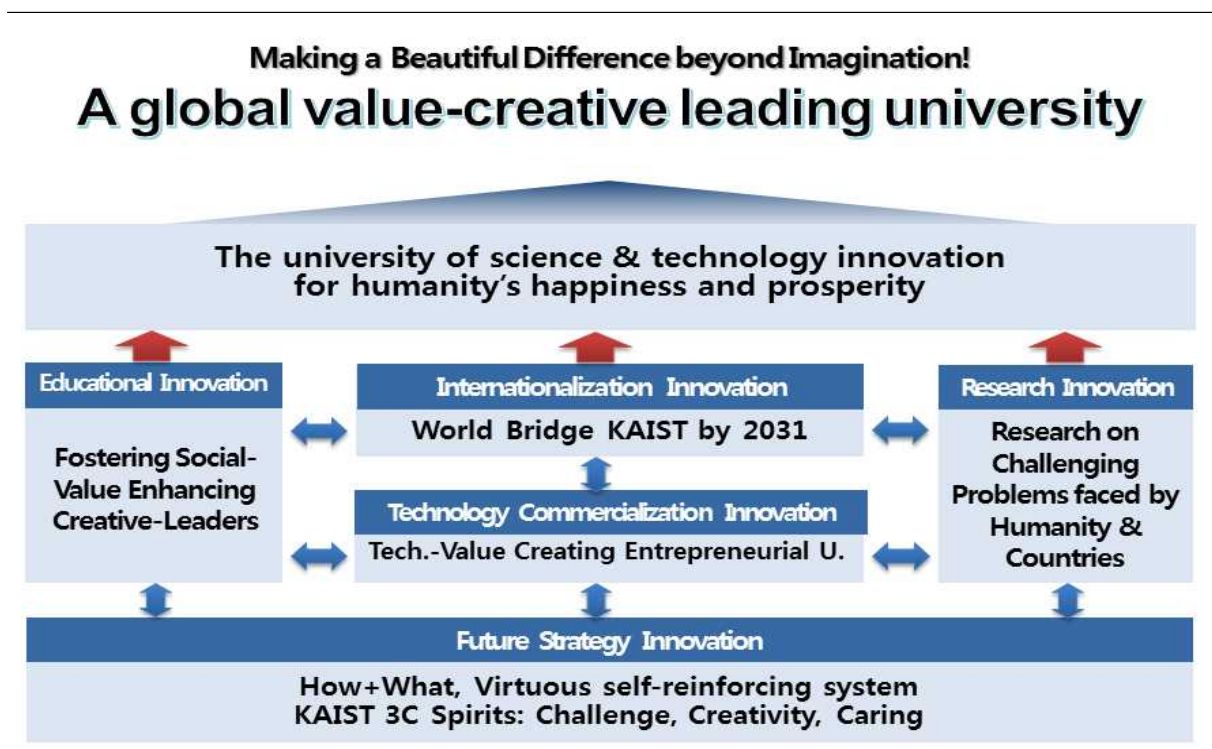
Survey

1. Survey Outline

☐ **Purpose: To collect feedback from members and establish strategies for KAIST Vision 2031.**

　○ All members of KAIST must participate and communicate actively in working toward Vision 2031.

　○ A survey was conducted to obtain feedback from key members of KAIST.

☐ **Subject: Students, alumni, faculty, staff**

☐ **Period: 6/15/2017 to 7/23/2017**

☐ **Method: Online survey (Google form) distributed four times via e-mail**

　○ Confirmation of Korean/English survey (6/19)

　○ Online distribution: 1st e-mail (6/19), 2nd (6/29), 3rd (7/10), 4th (7/17)

☐ **Results summary: Need to foster creative talent in science and technology to contribute to the development of humanity with consideration of KAIST's purpose for the future, vision, challenges, priorities, and ideal qualities of individuals**

　○ Change in purpose from fostering of human resources for industry to fostering of research personnel in the fields of science and technology

　○ KAIST envisions becoming the think tank of Korea and a world-leading university with a focus on science and technology

　○ Sense of crisis due to a lack of shared vision

　○ Attracting outstanding faculty and acquiring more funds to develop into one of the world's top 10 universities

　○ Need to foster creative talent

☐ **Strategies for innovation to be established with sufficient consideration of feedback from KAIST members.**

2. Survey Results

□ Survey results (response rate 3.5%)

Response rate 5.5% (654/11,920) — Student

Response rate 27.4% (295/1,077) — Faculty

Response rate 15.3%(297/1,944) — Staff

Response rate 1.4% (469/34,647) — Alumni
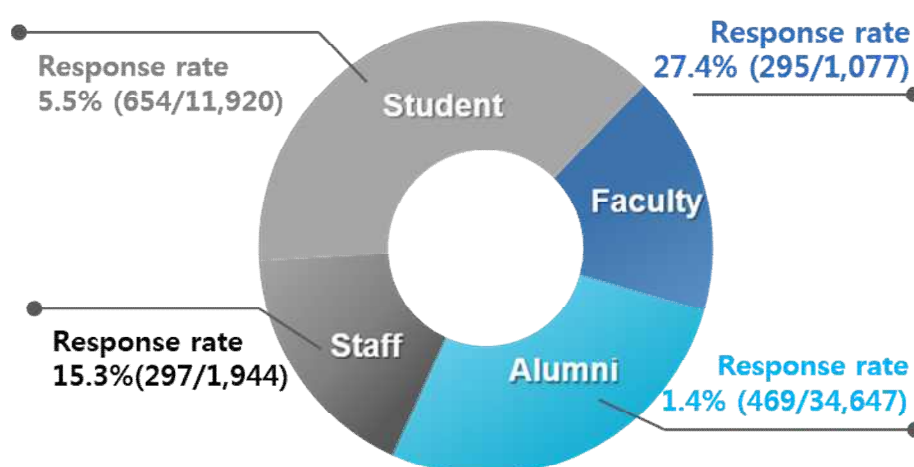
(Unit: 1 person)

Classification	Student	Faculty	Alumni	Staff	**Total**
No. of invitees	11,920	1,077	34,647	1,944	**49,588**
No. of respondents	**654**	**295**	**469**	**297**	**1,715**
Response rate	5.5%	27.4%	1.4%	15.3%	**3.5%**
Percentage	**38.1%**	**17.2%**	**27.4%**	**17.3%**	**100%**

3. Key Responses

□ KAIST's future purpose: "Fostering of research talent in science and technology"

1. What should be the purpose of KAIST in 2031?
   ① Fostering of key talent for industry
   ② Fostering of research talent in science and technology
   ③ Science and technology development
   ④ Fostering of future leaders
   ⑤ Other

Future Goals

1. Fostering core industrial technology manpower — **12%**
2. Fostering research manpower in science and technology — **37%**
3. Advancement of science and technology — **25%**
4. Fostering future leaders — **24%**
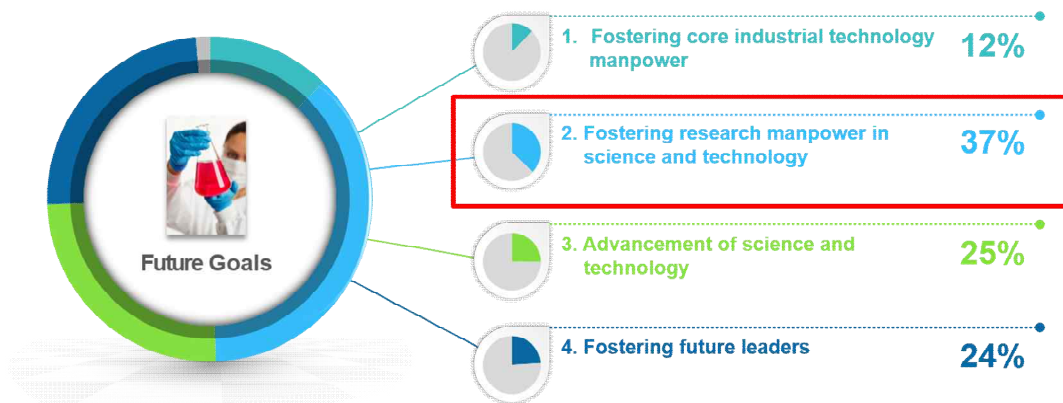
□ KAIST's future role: "Think tank of Korea's science and technology and world leader of academic development"

2. Which role would citizens expect KAIST to fulfill in 2031?
   ① A world-leading university in academic development
   ② A world-leading university in industrial technology development
   ③ An institute that fosters leaders to serve Korea and the world
   ④ A think tank of Korea with a focus on science and technology
   ⑤ Other

KAIST in 2031

1. A university leading the world's academic development — **30%**
2. A university leading the world's industrial technology development — **21%**
3. An institution fostering leaders of Korea and the world — **17%**
4. "think tank" for Korea in science and technology — **31%**
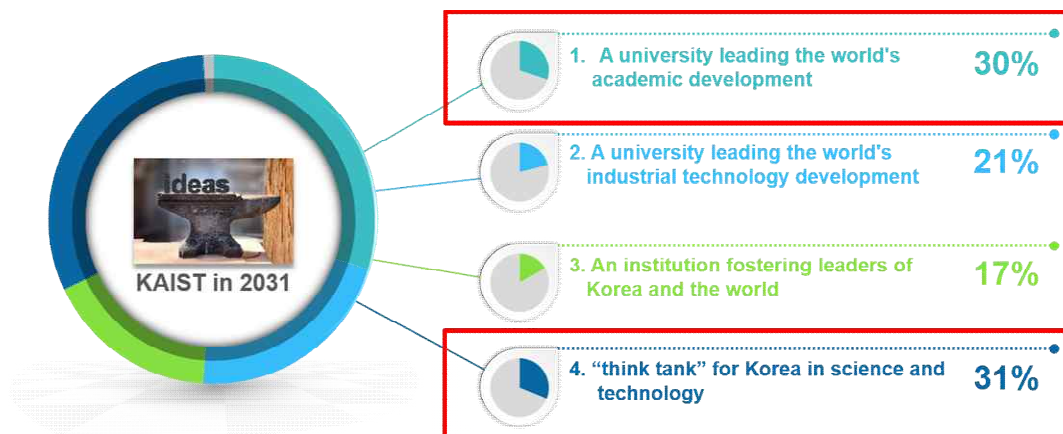
□ KAIST's challenge: "Lack of shared vision"

3. Which of the following is a challenge for KAIST?
   ① Lack of shared vision
   ② Lack of sense of responsibility
   ③ Lack of sense of ethics
   ④ Lack of service spirit
   ⑤ Other

Main Challenge

1. Lack of shared vision — 40%
2. Lack of a sense of duty — 27%
3. Lack of ethics-related awareness — 14%
4. Lack of service spirit — 10%
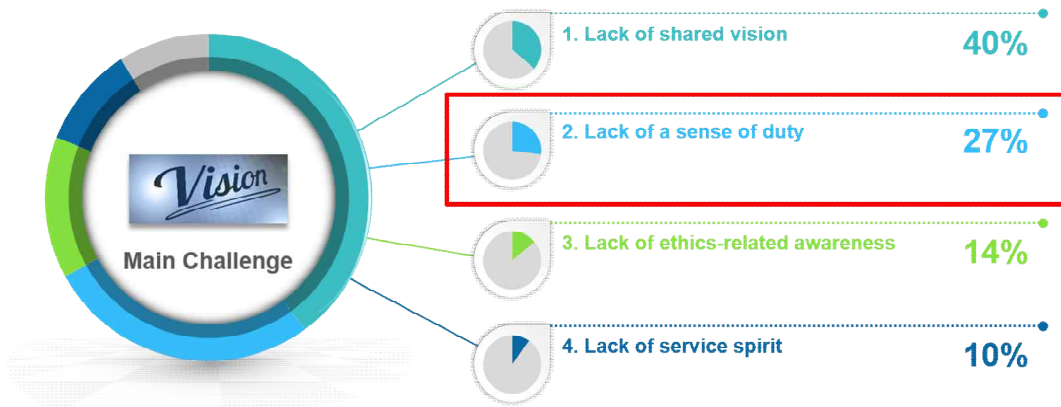
□ KAIST's priority: "Recruitment of outstanding faculty and fund acquisition"

4. What should KAIST prioritize in order to become one of the world's top 10 universities?
   ① Recruitment of outstanding faculty
   ② Recruitment of outstanding students
   ③ Fund acquisition
   ④ Recruitment of international faculty/students
   ⑤ Other

Priority Task

1. Attract outstanding faculty — 31%
2. Attract outstanding students — 23%
3. Secure more financial resources — 28%
4. Attract international faculty and students — 10%
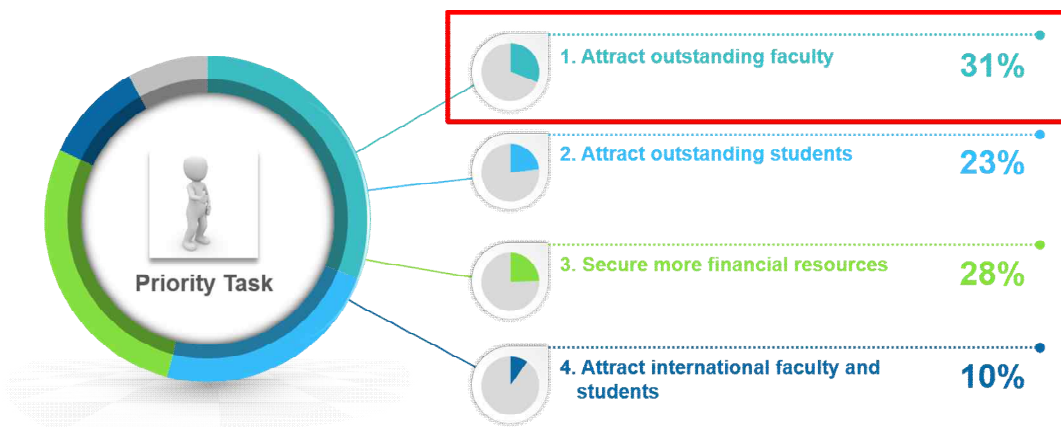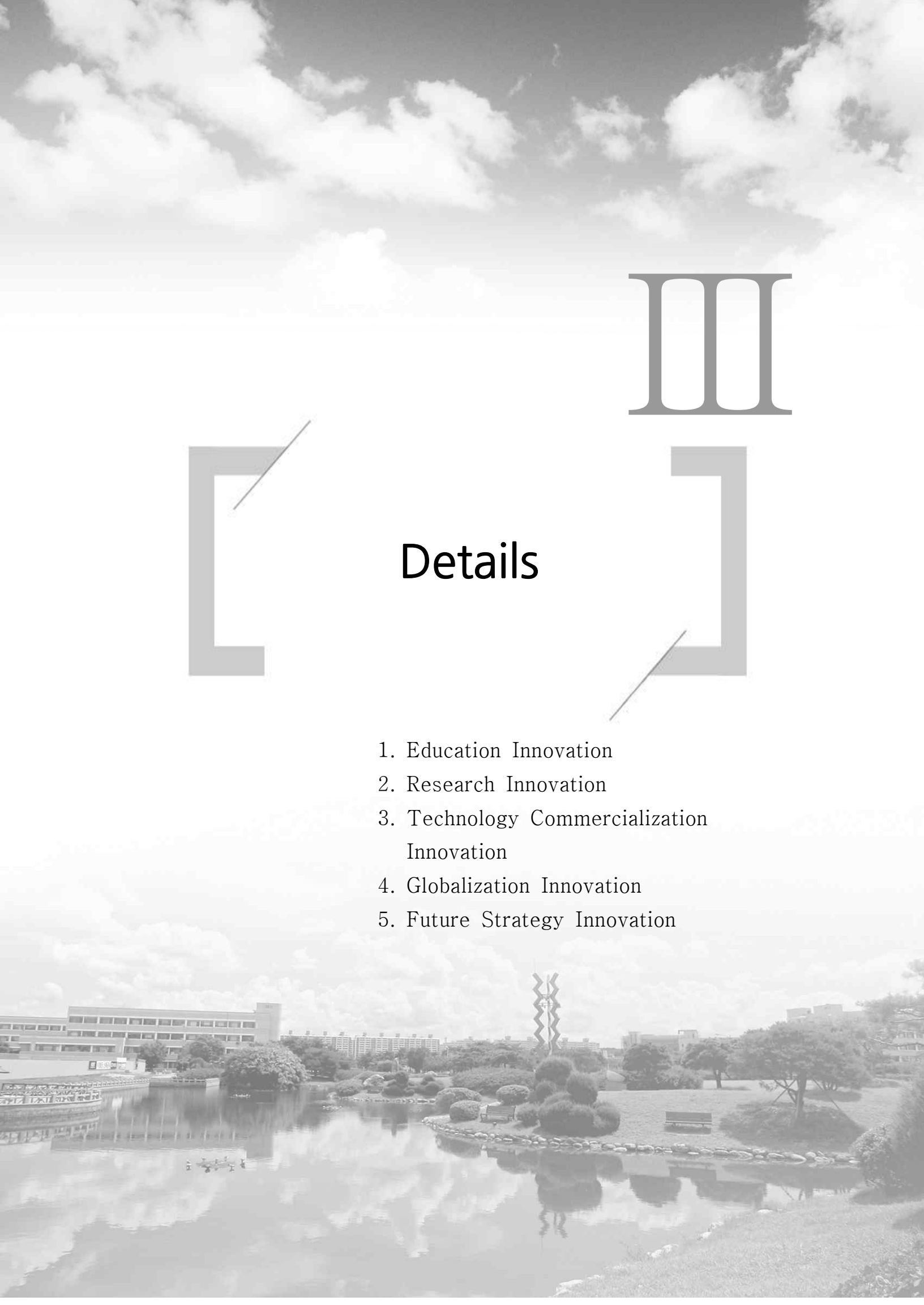
□ Ideal KAISTian: "Creative talent"

5. How would you describe the ideal individual to be fostered by KAIST?
   ① Creative talent
   ② Leadership talent
   ③ All-around talent
   ④ Entrepreneurial talent
   ⑤ Other

Type of Talent

1. Creative talent — 44%
2. Leadership talent — 20%
3. Holistic talent — 21%
4. Entrepreneurial talent — 14%
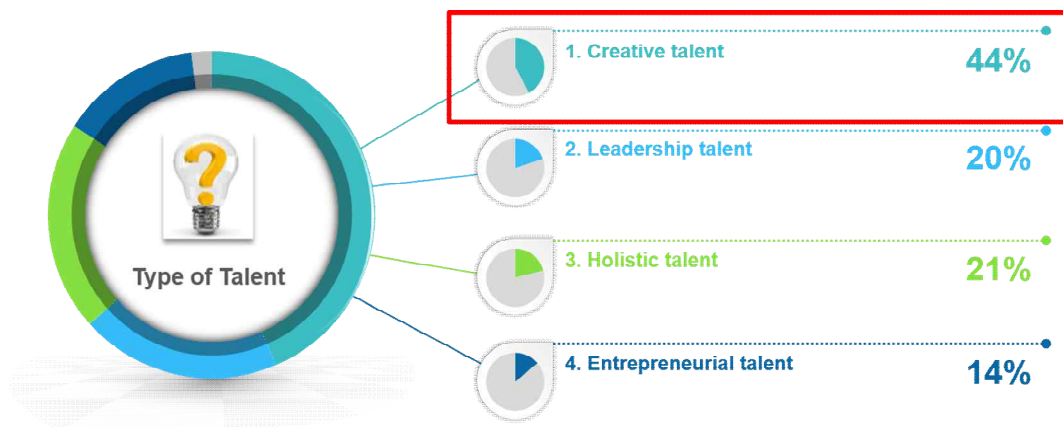
Ⅲ

Details

1. Education Innovation

☐ **Vision: "Fostering Social-Value Enhancing Creative-Leaders"**

Fostering Social−Value Enhancing Creative−Leaders

01
Recruit Students with Creative Potential

- Selection of creative talent

- Selection of diverse students

- Expansion of student support to attract outstanding students

- Normalization of high school education by improving student recruitment method

02
Transform Curriculums and Systems

- Strengthening of freshmen courses

- Flexible semesters and flexible credit system

- Strengthening of advisor role and graduation research

- Curriculum monitoring and feedback

- Establishment of the department of transdisciplinary science and engineering

- Establishment of creative design lab and launch of training programs

03
Transform Teaching and Learning Methods

- Establishment of Education 4.0 program

- Establishment of smart learning infrastructure

- Expansion of Massive Open Online Courses (MOOCs) and remote joint lectures

- Extreme end lecture strategy

- Lecture modularization for customized education

- Establishment of bilingual environment

- Establishment of system for education innovation

□ Road Map for Innovation Strategies

Classification	2021	2026	2031
<Innovation strategy 1> Recruit Students with Creative Potential	– Introduction of student admission category with affective traits as criteria – Increase in recruitment of students from general high schools, female students, and international students (by 5% compared to 2017)	– Expansion of student admission category with affective traits as criteria – Increase in recruitment of students from general high schools, female students, and international students (by 5% compared to 2021)	– Complete implementation of student admission category with affective traits as criteria – Increase in recruitment of students from general high schools, female students, and international students (by 5% compared to 2026)
<Innovation strategy 2> Transform Curriculums and Systems	– Improvement of graduation research – Strengthening of freshmen courses – Expansion of faculty, student, curriculum templates, and multidisciplinary course	– Implementation of flexible semesters and flexible credit system – Strengthening of freshmen courses – Establishment of creative convergence college – Expansion of graduate programs	– Expansion of flexible semesters and flexible credit system – Development of leading education and research clusters in KAIST – Serving as benchmark for all universities in the world
<Innovation strategy 3> Transform Teaching and Learning Methods	– Edu 4.0 courses 15% (400/year) – Edu 4.0 satisfaction 4.1 – Edu 4.0 classroom 40 – Network classroom 20 – Recording studio 15 – Smart teamwork room 50 – Coursera 30 – KOOC 50 – K-MOOC 20 – Remote joint lecture 10 – Acquisition of module content for 5% of courses – Trial run for modularized lectures	– Edu 4.0 courses 30% (900/year) – Edu 4.0 satisfaction 4.2 – Edu 4.0 classroom 60 – Network classroom 40 – Recording studio 25 – Smart teamwork room 100 – Coursera 60 – KOOC 100 – K-MOOC 40 – Remote joint lecture 20 – Acquisition of module content for 25% of courses – Expansion of modularized lectures	– Edu 4.0 courses 50% (1500/year) – Edu 4.0 satisfaction 4.3 – Edu 4.0 classroom 80 – Network classroom 60 – Recording studio 40 – Smart teamwork room 200 – Coursera 100 – KOOC 300 – K-MOOC 80 – Remote joint lecture 40 – Acquisition of module content for 50% of courses – Recommendation of lecture modules to individual students

2. Research Innovation

□ Vision: Research on Challenging Problems faced by Humanity & Countries

Research on Challenging Problems faced by Humanity & Countries

01

Shaping Sustainable Research Environment

· Innovation in researcher/ research faculty system

· Establishment of self-initiated research centers

· lCross-Generation Collaborative Lab System

· Stimulation of research cooperation among industries, universities, and research institutes

· Strengthening of research planning function

02

Promoting Creative & Risk-Taking Research

· Strengthening of creative/risk-taking research

· Acquisition of outstanding/diverse international faculty

· Providing motivation for launch of startups (by laboratories)

· Improvement of research administrative services

· Strengthening of research capacity through academic information services

03

Fostering Global-Leading Multidisciplinary Research Groups

· Establishment of selection process for future-oriented flagship strategy research

· Selection of candidate areas based on flagship selection process

· Establishment and implementation of plans to support flagship research

□ Road Map for Innovation Strategies

Classification	2021	2026	2031
Innovation strategy 1 Innovation in sustainable research systems	– Support for establishment/management of three multidisciplinary convergence research centers (fourth industrial revolution, etc.) – Designation of and support for at least 30 cross-generation collaborative laboratories – Expansion of outstanding research faculty (10% of full-time faculty) – Establishment of research planning control tower or strengthening of role of Office of research Affairs	– Support for establishment/management of six multidisciplinary convergence research centers – Designation of and support for at least 50 cross-generation collaborative laboratories – Expansion of outstanding research faculty (20% of full-time faculty) – Expansion of personnel for research planning control tower	– Support for establishment/management of 10 multidisciplinary convergence research centers – Designation of and support for at least 60 cross-generation collaborative laboratories – Expansion of outstanding research faculty (30% of full-time faculty) – Serving as national think tank through expansion of research planning control tower
Innovation strategy 2 Innovation in creative, risk-taking research support	– Implementation of creative/risk-taking research support system – Expansion of outstanding international faculty to 10% of Korean faculty – Introduce a system to support colleges/ departments (in analysis of research trends based on academic databases) – Increase in analytical equipment/personnel and joint utilization of researchers by 20% compared to 2017	– Expansion of creative/risk-taking research support system (at least 10 department) – Expansion of outstanding international faculty to 20% of Korean faculty – Reinforce the system to support colleges/ departments (in analysis of research trends based on academic databases) – Increase in analytical equipment/personnel and joint utilization of researchers by 20% compared to 2021	– Implementation of creative/risk-taking research support system of all departments – Expansion of outstanding international faculty to 30% of Korean faculty – Build the system to support colleges/departments (in analysis of research trends based on academic databases) – Increase in analytical equipment/personnel and joint utilization of researchers by 20% compared to 2026

Classification	2021	2026	2031
Innovation strategy 3 Fostering of world-leading multidisciplinary research groups	- Flagship research group: Selection/support of five groups - Flagship research personnel: - Faculty participating in five research groups to account for 15% of full-time faculty - Recruitment of 15 research faculty and researchers to participate in research groups - Each flagship group to participate in at least one global cooperation research project (total of five)	- Flagship research group: Selection/support of eight groups - Flagship research personnel: - Faculty participating in eight research groups to account for 25% of full-time faculty - Recruitment of 30 research faculty and researchers to participate in research groups - Each flagship group to participate in at least one global cooperation research project (total of eight)	- Flagship research group: Selection/support of ten groups - Flagship research personnel: - Faculty participating in ten research groups to account for 30% of full-time faculty - Recruitment of 45 research faculty and researchers to participate in research groups - Each flagship group to participate in at least one global cooperation research project (total of ten)

□ 10 Flagship Research fields of World-leading multidisciplinary

○ 10 Flagship research fields defined to fulfill the vision of "overcoming challenges faced by humanity and countries"

○ Core technology research related to the 4ᵗʰ Industry Innovation(6 fields)

 - Quantum Technology

 - Hyper-Connection Photonics

 - M3I3 Research Initiative (Materials and Molecular Modeling, Imaging, Informatics and Integration]

 - Super Intelligence Initiative

 - Development of Safety-Assured Smart City Platform based on Interconnected Cyber-Physical Systems

 - Innovation in Space Access: Micro Launcher and CubeSat Cloud

○ Bio/Medical/ Medical science /Healthcare (2 fields)

 - WISE BRAIN (Wires of Senses and Emotions)

 - Platform for Next Generation Precision Medicine

○ Energy/Environment(1 field)

 - Development of Cloud System for Energy Production, Storage & Distribution
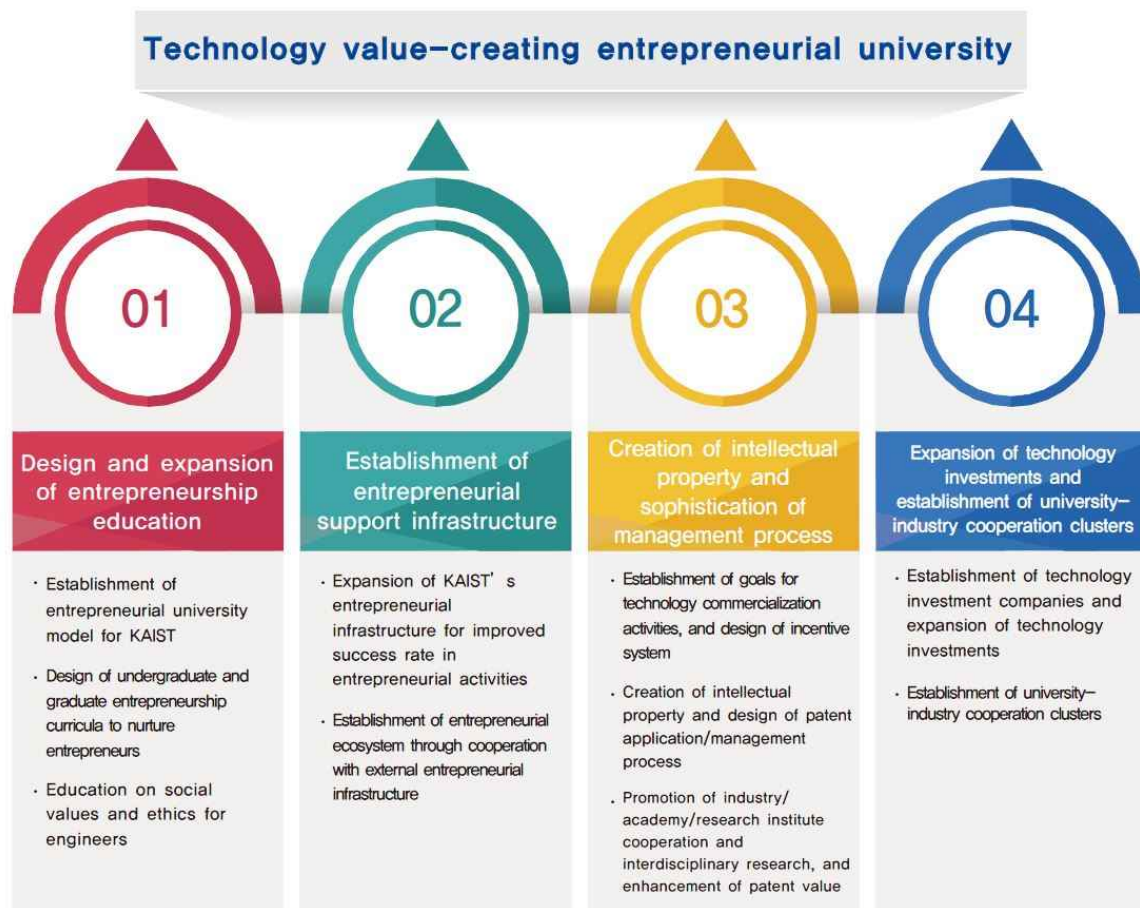
○ Defense Science and Technology (1 field)
  - Intelligent Unmanned System

□ Emerging Innovative Research Ideas

○ In addition to the 10 currently defined research fields, we maintain the flexibility and openness to accommodate the emerging innovative research fields as additional Flagship research projects in the future.

  - Developing Emerging Innovative Research Ideas continuously supporting and developing as Flagship research projects

○ Especially, encouraging and supporting creative/challenging research of new faculty and graduate students

3. Technology Commercialization Innovation

□ VISION: Tech.-Value-creating entrepreneurial university

Technology value-creating entrepreneurial university

01 — Design and expansion of entrepreneurship education

- Establishment of entrepreneurial university model for KAIST
- Design of undergraduate and graduate entrepreneurship curricula to nurture entrepreneurs
- Education on social values and ethics for engineers

02 — Establishment of entrepreneurial support infrastructure

- Expansion of KAIST's entrepreneurial infrastructure for improved success rate in entrepreneurial activities
- Establishment of entrepreneurial ecosystem through cooperation with external entrepreneurial infrastructure

03 — Creation of intellectual property and sophistication of management process

- Establishment of goals for technology commercialization activities, and design of incentive system
- Creation of intellectual property and design of patent application/management process
- Promotion of industry/academy/research institute cooperation and interdisciplinary research, and enhancement of patent value

04 — Expansion of technology investments and establishment of university-industry cooperation clusters

- Establishment of technology investment companies and expansion of technology investments
- Establishment of university-industry cooperation clusters

□ Road Map for Innovation Strategies

Classification	2021	2026	2031
<Innovation strategy 1> Expansion of entrepreneurship education	- Entrepreneurship included as mandatory course for undergraduates (50%) - Expansion of (graduate) entrepreneurship programs	- Entrepreneurship included as mandatory course for undergraduates (75%) - Design of customized entrepreneurial support programs	- Entrepreneurship included as mandatory course for undergraduates (100%) - Design of top-level entrepreneurial support programs
<Innovation strategy 2> Establishment of entrepreneurial support infrastructure	- Establishment of entrepreneurial support platform in Asia (installation of two overseas branches)	- Establishment of global entrepreneurial support platform (installation of five overseas branches)	- Mutual cooperation with global entrepreneurial support platforms (attraction of outstanding entrepreneurs)
<Innovation strategy 3> Creation of intellectual property and sophistication of management process	- IPR ROI (3%) - Customer-pull patenting - Adjustment of TLO organization's function, and strengthening of incentive system - Open Venture Lab (Seoul Campus, Munji Campus)	- IPR ROI (5%) - Patent portfolio management - Strengthening of TLO organization's professionalism and autonomy	- IPR ROI (10%) - Enhancement of economic value of intellectual property - Development of patenting process, and acquisition of TLO organization's independence
<Innovation strategy 4> Establishment of entrepreneurial support infrastructure	- Establishment of supporting system for technology investment companies - Active incubation of startups on campus - K-Industry 4.0	- Generation of outcomes by technology investment companies - Establishment of university-industry cooperation startup convergence center on campus	- Enhancement of outcomes by technology investment companies - Establishment of university-industry cooperation clusters on campus

4. Globalization Innovation

□ **VISION: World Bridge KAIST by 2031**

World Bridge KAIST by 2031

01 Global campus

· Establishment of campus without linguistic/cultural barriers

· Globalization of faculty

· Globalization of students and researchers

· Globalization of administrative system

02 KAIST overseas campuses

· Establishment and management of overseas R&D center (USA/ EU and Asia)

· Establishment and management of at least one overseas campus

· Development and utilization of advanced international multidisciplinary research/ education programs

· Innovation in global technology commercialization strategies

· Innovation in PR strategies to enhance KAIST's visibility

03 KAIST-initiated global research

· Outbound international research

· Inbound international research

· Global commercialization of KAIST's outstanding research

· Establishment of vision and research strategies in KAIST-initiated research areas

04 Expansion of KAIST development model to developing countries

· Dispatching of research volunteers to developing countries and technical support (R&D technology and equipment)

· Supporting developing countries in the establishment of graduate schools in economic development, science, and technology

· Establishment of ASEAN– KAIST R&D Center

· Establishment of KAIST Spirit & Mind Foundation

□ **Road Map for Innovation Strategies**

5. Future Strategy Innovation – Principles and Perspectives for Integration

□ **Vision 2031: To become a global value-creative leading university and join the world's top 10**

□ **Organization, human resources, and funds**

  ○ Organization, human resources, and funds must be optimized to attain Vision 2031.

  ○ Specific actions will be taken through an open-minded culture and exemplary leadership.

□ **Future strategies serve as basic principles in establishing basic directions of four key innovation strategies.**

  ○ Establishment of "short-term, mid-term, and long-term" future-oriented vision and strategies for the four divisions: education innovation, research innovation, technology commercialization innovation, and globalization innovation.

□ **Principles of implementation of future strategies**

  ○ Instilling of sense of duty to nation in support of KAIST's founding spirit

  ○ Establishment of KAIST culture (challenge, Creativity, Caring)

  ○ Sustainability of strategies: Sharing among members, passing down to younger generations

  ○ Shared strategies (becoming one of the top 10 universities, global value-creative university)

  ○ Transition from HOW-oriented research to WHAT-oriented research: Conducting research that identifies new issues instead of finding

solutions to given problems

○ Promoting convergence between science and arts

○ Making predictions for future society based on science and technology innovation, and fostering of future strategy think tanks

○ Long-term, continuous monitoring to ensure commitment to KAIST Vision 2031.

□ Strategy for Unification of Korea through Science and Technology

○ Beyond political ideology, South and North Korea are promoting exchanges in science and technology.

○ Establishment of KAIST campus in DMZ

IV

Action Strategies

1. Outline of Action Strategies

☐ **Establishment of action strategies through comparative analysis with competing (benchmark) universities.**

  ○ Identification of implications based on in-depth analysis of organization, governance, leadership, human resources, and finances.

  ○ Criteria for selection of benchmark universities
   - Research-oriented universities with global competitiveness and similar to KAIST in terms of education/research goals

  ○ Significance of benchmarking
   - Adoption of strategies best suited for KAIST based on analysis of each university's advantages and disadvantages instead of blind imitation

  ○ Benchmark universities: MIT, Stanford, Nanyang Technological University
   - Innovative universities such as Babson College and Franklin W. Olin College of Engineering will also be analyzed to identify learning points for KAIST

☐ **Short-term (2017~2021) strategies: Establishment of interim goals of Vision 2031.**

  ○ KAIST Research Outcome Plan
   - Institutional goals to be attained during the term of office of President Sung-Chul Shin
   - Establishment of research/research support strategies and performance goals based on the president's management philosophy, and identification of specific performance indicators

<Research outcome plan strategies and performance goals, and their relation to the President's management philosophy>

○ Relationship between "KAIST's Research Outcome Plan" and "KAIST Vision 2031"

Research Outcome Plan(Vision 2021)	KAIST Vision 2031
Short-term action strategies	Long-term, strategic goals

○ Goal system

○ Performance goals and road map - Specific performance indicators

Strategic Goal 1. Fostering of outstanding creative talent			
Name of indicator	Past (2014~2016)	Term of Office (2017~2021)	Final Goal (2025, 2031)
Performance Goal 1-1.	[Research/education] Fostering of creative talent in science and technology		
Fostering of outstanding students	- 92 awards in international academic conferences - 13 awards in international competitions	- 117 awards in international academic conferences - 19 awards in international competitions	- 130 awards in international academic conferences - 29 awards in international competitions
Non-departmental system design and satisfaction rating	- New area of development	- Design of non-departmental system for 2017~2018 - Satisfaction rating 4.20	- Complete implementation of KAIST non-departmental system - Satisfaction rating 4.50
Registration of patents based on real-world problem-solving	· 11 registered patents	· 20 registered patents	· 30 registered patents
Performance Goal 1-2. [Research/education] Enhancement of global competence			
Campus internationalization	- International faculty 8.3% - International students 5.4%	- International faculty 15% - International students 10%	- International faculty 20% - International students 15%
Satisfaction of exchange students	- Satisfaction rating 3.95	- Satisfaction rating 4.30	- Satisfaction rating to improve to 4.50 in the long term
Global leadership activities	- Two countries - 51 dispatched students	- Five countries - 100 dispatched students	- Maintained at 100 students dispatched to five countries
Performance Goal 1-3. [Research/education] Establishment of education/research infrastructure			
Satisfaction with Education 3.0 PLUS education	- Satisfaction rating 3.88	- Satisfaction rating 3.98	- Satisfaction rating 4.0
Expansion of journal subscription and books read per student	- Subscribed to 11,200 journals - 57 books read per student	- Subscribed to 16,000 journals - 66 books read per student	- Subscribed to 16,500 journals - 70 books read per student
Satisfaction with lab safety culture campaign	- Satisfaction rating 4.08	ˋ Satisfaction rating 4.18	ˋ Satisfaction rating 4.30
Satisfaction with student rights and social inclusion	- New area of development	- Satisfaction rating 3.30	- Satisfaction rating 3.60

Strategic Goal 2. Generation of global research outcomes

Name of indicator	Past (2014~2016)	Term of Office (2017~2021)	Final Goal (2025, 2031)
Performance Goal 2-1. [Basic/future-oriented] Leader of basic research			
Entering top 20 in QS Subject Ranking (natural science and other fields)	- Two fields in Top 20 in QS Subject Ranking	- Four fields in Top 20 in QS Subject Ranking - One field in Top 10 in QS Subject Ranking	- Five fields in Top 20 in QS Subject Ranking - One field in Top 10 in QS Subject Ranking
IF of at least 3.0 in global climate change/healthcare	- 79 papers with IF of at least 3.0	- 104 papers with IF of at least 3.0	- 125 papers with IF of at least 3.0
IF of at least 1.0 for SCOPUS/KCI papers on IoT	- 2 papers with IF of at least 1.0	- 12 papers with IF of at least 1.0	(Not applicable)
Performance Goal 2-2. [Basic/future-oriented] Leader of applied research			
Entering top 20 in QS Subject Ranking (engineering)	- Two fields in Top 20 in QS Subject Ranking	- Five fields in Top 20 in QS Subject Ranking	- Five fields in Top 20 in QS Subject Ranking - Three fields in Top 10 in QS Subject Ranking
Overseas patents	- 327 overseas patents	- 360 overseas patents	- 380 overseas patents
SAR satellite development technology compared to developed countries	- Technology level 30%	- Technology level 80%	- World's best
Machine learning process innovation	- New area of development	- 99% precision compared to recall	- 99% precision compared to recall; world's best

Strategic Goal 3. Creating value through technology commercialization and entrepreneurial activities			
Name of indicator	Past (2014~2016)	Term of Office (2017~2021)	Final Goal (2025, 2031)
Performance Goal 3-1. [Commercialization] Promotion of entrepreneurial education			
Satisfaction with K-School education	- Satisfaction rating 4.00	- Satisfaction rating 4.30	- Satisfaction rating 4.50
Expansion of social enterprises	- 37 graduates produced by social entrepreneurship program - 31 social enterprises	- 132 graduates produced by social entrepreneurship program - 110 social enterprises	- No. of graduates of social entrepreneurship program and social enterprises to increase to 159%
Performance Goal 3-2. [Commercialization] Strengthening of technology commercialization			
No. of technology investment companies	- 9 technology investment companies	- 32 technology investment companies	- 40 technology investment companies
Amount of technology investment	- 40 million won (recent three years)	- 780 million won accumulated over five years	- 320 million won acquired per year
Performance Goal 3-3. [Commercialization] Promotion of student startups			
No. of student startups	- 46 student startups	- 121 student startups	- 136 student startups
Satisfaction with student startup support program	- New area of development	- Satisfaction rating 3.90	- Satisfaction rating of at least 3.90

2. Organization and Governance
- Capacity for Convergence and Collaborative Research

□ **Organization and governance**

○ The organization must be suited to carry out the proposed strategies.

○ The vision and goals cannot be attained if the organization is not a good fit with the strategies.

○ Effective governance is required to oversee the organization.

○ The organization and governance must be discussed in order to achieve the goals of Vision 2031.

□ **Ideal university organization – Matrix structure**

○ Development of flexible structure while maintaining the basic departmental framework to encourage cooperation and multidisciplinary research among faculty

○ Need to improve faculty evaluation system

 - Participating faculty to be evaluated by senior faculty of research groups, in addition to head of department

 - Individual faculty may assign different weights to their evaluation

<Figure> Organizational structure to maximize excellence, applicability, professionalism, and flexibility

① Current: Department-based (functional dimension)
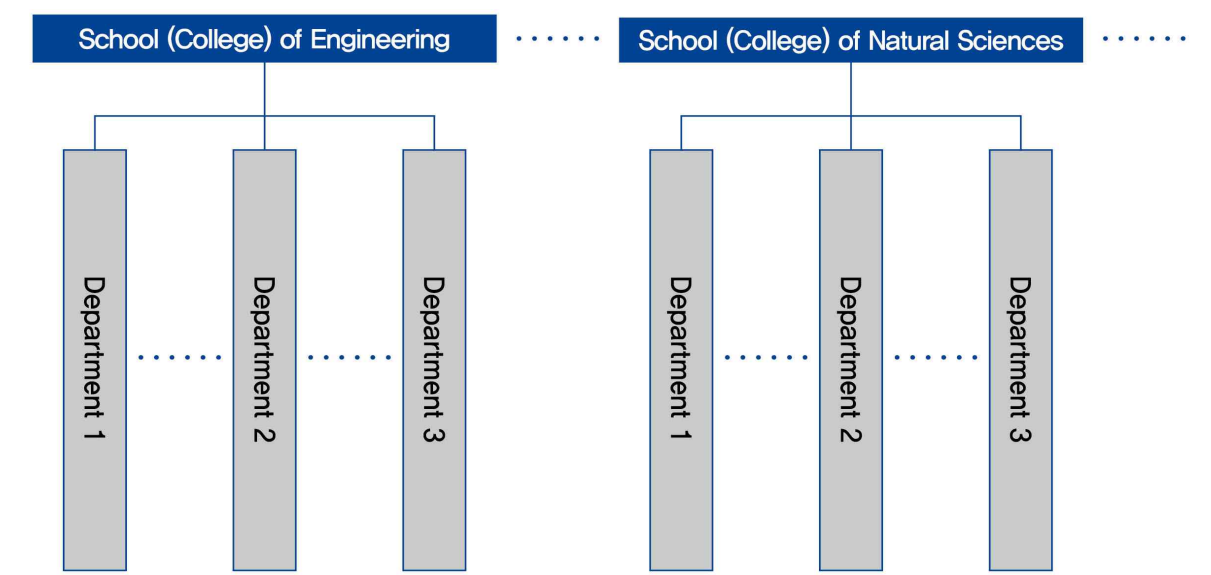
② Proposal: Establishment of matrix-based (cross-functional dimension) research organization according to research areas and functions (strengthening role of research center supervisors in faculty evaluation and budget allocation)
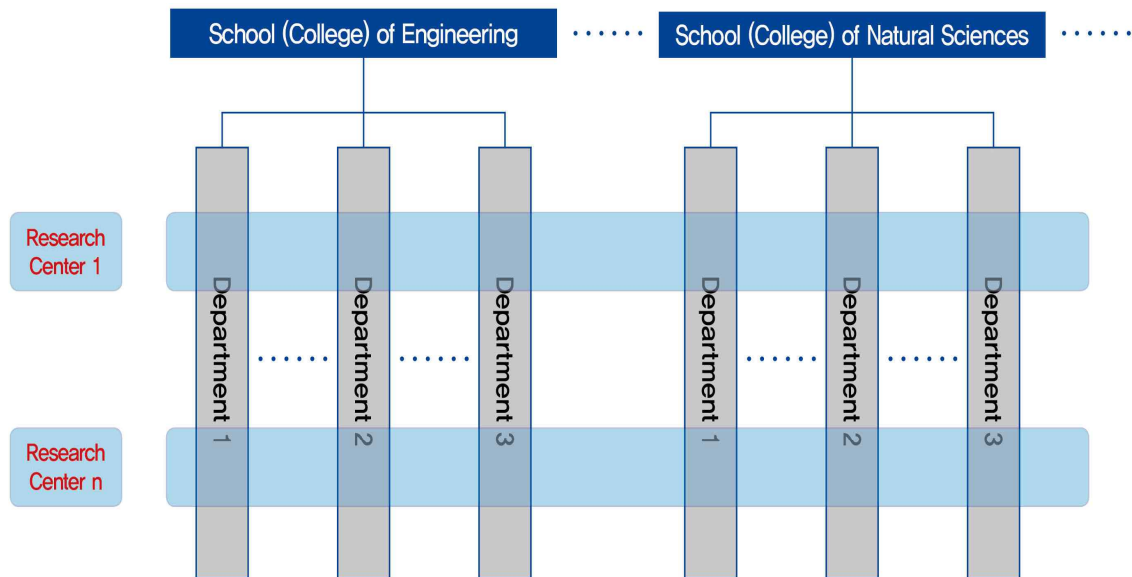
□ Introduction of mega-lab for large-scale research

○ Achieving large-scale economic effect and maximizing results through active cooperation among faculty of various disciplines

  - Integration with research innovation strategies of Vision 2031

  - Prediction of science and technology trends, and maximization of synergy through collaborative research between current and new personnel

□ Weizmann benchmarking for active technology commercialization

○ Weizmann Institute of Science

  - Cooperates with Yeda Research and Development Company to register patents, commercialize intellectual property, and support startups (Annual royalty of KRW 100 billion)

○ Yozma Group

  - A venture capital firm with more than 20 companies listed on NASDAQ or acquired by global companies

  - Establishment of KAIST-Yozma-Weizmann Institute (MOU signed in October 2017)

☐ Governance: Board of trustees, term of office of president, and role of faculty council

○ Improvement of policy on presidential term

　– E.g.: Decision on reappointment based on midterm evaluation results after three years

　·Excluded as presidential candidate if results indicate poor performance; search for new presidential candidates conducted at least one year; changes to take effect from next president's term of office

○ Strengthening role of board of trustees and faculty council

　– Development of measures to expand institutional autonomy in forming the board of trustees, and strengthening of contributions by faculty council in establishing research strategies

☐ Role of student council, alumni, and parents' association

○ Student council must play a more active role to "strengthen students' learning and research capacity"

○ Alumni and parents must explore direct and indirect ways, including donations, to contribute to school development. KAIST must give sufficient consideration to the opinions of alumni and parents in establishing major policies.

☐ Role of president and administrative personnel: Building of effective ties with government

○ Need to strengthen KAIST's role as a professional institute dedicated to the development of national policies on science and technology instead of passively meeting government demands.

○ Cooperating with four other universities specializing in science and technology and the National Research Council of Science & Technology to serve as a think tank of Korea.

☐ **Center for Ethics & Human Rights, Ombudsperson**

○ Installation of Committee on Social Inclusion on September 1, 2017: Enhancing mutual respect and social inclusion, and survey of campus safety

○ Meeting of human rights organizations

  - Comprised of Ombudsperson, Center for Ethics & Human Rights, Counseling Center, and Graduate Association Students Human Rights Center.

  - Establishment of consistent, transparent strategies to protect human rights.

☐ **Desirable culture and ideal qualities of students**

○ Need to identify ideal undergraduate/graduate student qualities that contribute to the realization of the KAIST Vision

  - Ideal students: Creative leaders with a global outlook and the capacity to enhance social value through science and technology

  · Individuals who can **identify scientific issues and social problems**, and cooperate across disciplines to **create new value**

  · **Creative talent** who possess cognitive excellence, love of challenges, power to overcome adversity, and self-motivation

  · **Science and technology leaders** who can solve problems and cooperate with others by using creativity to meet challenges

  · Global leaders who contribute to not only the development of Korea but also the advancement of humanity.

  · Communicators who can build strong ties with the international community and work harmoniously with others to overcome global issues.

○ Efforts to foster ideal KAISTians

  - Strengthening of sense of duty to nation in support of KAIST's founding spirit

  - Development of core values (challenge, Creativity, Caring) and vision (global value-creative university)

  - Collecting feedback from young faculty to develop new symbols, logos, school flowers, and school trees in commemoration of KAIST's 50th (2021) and 60th (2031) anniversary

  - Need to establish university identity, including logos and brands, to ensure consistency in KAIST's reputation

☐ Change in department and program operations

○ Benchmark universities

  – E.g.: Faculty affiliated with departments (or research organizations), and students affiliated with education programs

○ Exploring ways to improve operation of graduate education program

  – E.g.: If necessary, a separate entity from the research organization should be established under each program to support academic affairs of graduate students.

☐ Encouraging convergence through support for multidisciplinary research groups

○ Atmosphere that encourages discussions with peers; lowering of barriers between departments

☐ Establishment of relationship between head of doctoral dissertation committee and advisor

○ Separation of head of doctoral dissertation committee and advisor

  – Improvement of existing one advisor per student system and development of measures for faculty from various departments to participate in thesis guidance

  · expand educational opportunities in student's research interest

  · enhance student research capacity and facilitate knowledge acquisition across departments (see proposal on strengthening of graduate students' multidisciplinary research capacity by Research Innovation Division)

○ Give sufficient consideration to departmental characteristics and opinions of faculty and students.

  – Allow departments to choose between the current system and the multiple advisor system.

  – Modification to current system unnecessary if issues can be resolved without doing so.

3. Human Resources - Students, Faculty, and Staff

☐ Driving force in fulfilling the KAIST Vision: KAIST members (students, faculty, and staff)

○ Human resources should be optimized to a size that is most effective in achieving the KAIST Vision 2031.

○ Role models should be defined, so as to encourage members to gain competence and establish a sense of ethics.

☐ Optimal number of students and faculty

○ Overseas benchmark: Compared to MIT, KAIST has a similar number of students but 40% fewer faculty.

○ Number of faculty to match MIT by 2031

☐ Ideal qualities of KAIST faculty

○ Intellectuals who understand and exert efforts to achieve the KAIST Vision

○ Highly motivated and ethical persons who contribute to the advancement of humanity through innovative research in science and technology

○ Leaders who provide guidance to students, cooperate harmoniously with peers, and conduct research aimed at overcoming global issues

☐ Faculty recruitment and evaluation system

○ Need to establish efficient system to recruit faculty who possess qualities deemed ideal by KAIST

○ Development of faculty evaluation system to support matrix structure (evaluation also conducted by adjunct department or research center)

○ Providing incentives to motivate individual faculty

○ Encouraging cooperation with peers and younger/older generations

☐ Innovation in faculty recruitment

○ Dual recruitment system

 - Bottom-up(Recruitment based on department's recommendation)

 - Top-down (recruitment initiated by main administration in consideration of strategic, promising fields)

 ·E.g.: Ten faculty members are recruited each year by the main administration in strategic research fields, and such faculty may request to join an organization of their choice (department, research center)

 ·E.g.: Operating a program similar to MIT's Whitehead fellowship to guarantee an independent research period for newly recruited, outstanding faculty and support the pioneering of new research fields

☐ Ideal qualities of KAIST staff

○ Intellectuals who understand and exert efforts to achieve the KAIST Vision

○ Individuals who provide the best services to maximize the potential of faculty and students

○ Individuals who show respect and are considerate to their peers

○ Individuals who exert efforts to build strong ties with the local community and government

○ Individuals who carry out responsibilities with a strong sense of ethics

☐ Staff recruitment and evaluation system

○ Improvement of staff's functions to support faculty research systematically and minimize burden on the administration
 ·E.g. MIT utilizes post-docs in a supporting role in education and research

○ Gradual conversion of part-time staff to full-time in support of national policy

○ Enhancement of job professionalism by re-considering cyclic allocation of human resources every 1 to 2 years

○ Improvement of staff competence through visits to global universities and expansion of staff training programs

☐ **Improvement of incentive system**

○ Implementation of strict, fair evaluation system

  – Development of transparent, objective personnel system by reflecting feedback from all members

○ New system to include incentives that encourage individual faculty or staff to take the initiative in maximizing their creative capacity

○ Specific measures needed to encourage cooperation among members based on mutual respect and consideration

☐ **Reinforcement of honor code for faculty and staff**

○ Increase in social responsibility of researchers by emphasizing ethical conduct through the establishment of research ethics and transparent execution of research funds

○ Expanded declaration of integrity and presentation of awards to faculty/staff who demonstrate a strong sense of ethics

○ Introducing administration of unsupervised tests and pursuing responsible expression in SNS

○ Removing corruption and fostering faculty/students who possess creativity, passion, and high morals

KAIST Declaration of Integrity

As an executive/staff member of KAIST, I hereby agree to carry out my responsibilities with integrity and play my part in creating a corruption-free campus by observing the following.

I pledge to observe all laws and regulations in carrying out my responsibilities, and to faithfully perform duties that fall within my authority based on the principles of honesty and reliability

I pledge to avoid any acts that go against workplace fairness, including the misuse of my position to solicit or accept any gifts or favors.

I pledge to not request or receive bribes, nor ask or accept requests for unjust benefits.

I pledge to adhere to the honor code and to uphold its standards in performing my duties.

I pledge to participate actively in the implementation of anti-corruption policies.

April 17, 2017

Executives and staff of KAIST

4. Funding

□ measuring an optimal funding amounts and increasing funding sources

○ In addition to competent human resources, funding is essential for KAIST to attain its vision.

○ Various measures should be developed to set optimal funding amounts and increase funding sources based on analysis of benchmark universities.

□ Scale and method of fund acquisition

○ Establishment of quantifiable, sustainable goal
  - Two trillion won delivered to the KAIST fund by 2031
  - Formation of KAIST Vision 2031 Fundraising Committee to attain fundraising goals
  - To be pursued continuously regardless of president's term of office
  · Key projects may vary depending on president, but fundraising efforts and campaigns must continue for sustainable development.
  · All members of KAIST must exert efforts over the long term, recognizing the efforts of former presidents and showing support for undertakings by new presidents

○ Fund management profits significantly lower than those of Stanford and MIT
  - KAIST's fund management profits are mostly in the form of interest and amounted to 3.5 billion won in 2017. Profits generated through deposits and bonds. Average rate of return in 2017 was 2.08%.

○ Need specialized research areas to invest research funds and generate profits, similar to Stanford's SLAC and MIT's Lincoln Lab
  - E.g.: New medicine development technology → listing in stock market → royalty profits

○ Need to attract more donations from alumni and companies
  - Setting of fundraising goal for alumni - Own trillion won by 2031

□ Funding responsibility: Granting autonomy to departments and colleges (authority + responsibility)

○ Need for colleges to attract more donations from alumni or companies, and to conduct independent research with such profits

○ Departments to assume (some) responsibility in fund acquisition and expansion instead of relying on the university. Relevant departments to be given more authority and responsibility

☐ Acquisition of additional funds through establishment of large-scale research centers and hospitals

○ (Short-term) KAIST Clinic makes a loss of 2 billion per year. The Clinic's profit model should be re-inspected to generate profit.

○ (Mid/long-term) Need to establish large-scale research center/hospital for multidisciplinary research in biomedical and bioengineering fields
- Difficult to derive meaningful results based on current system, which relies on other universities/hospitals to conduct clinical trials

○ Expansion of funds through technology startups
- E.g.: Global commercialization (NASDAQ listing) of outstanding biomedicine technology based on the Yozma Fund

☐ Profit generation through professional fund management

○ Increasing profit of university funds by utilizing professional institutes

○ Benchmarking university-affiliated management companies (fund management by CFO and other experts) such as Harvard Management Company and Stanford Management Company to establish an effective fund management and profit re-investment system

○ Generating profits through strategic fund management
- Installation of management entity including CFO or other fund management experts for strategic management of university funds

○ Continuous investment of profits from university funds in operations, research, and improvement of student support/education infrastructure

☐ Role of alumni

○ Fundraising goal set by KAIST Alumni – One trillion won by 2031

○ Continuous efforts to raise funds through alumni

- Launch of campaign to encourage regular donations, more active marketing (KAIST Development Fund newsletters, marketing of campus events, etc.), recruitment of parent sponsors, etc.

○ Establishment of specific goals such as fundraising target amount for alumni and recommendation of outstanding talent

☐ Areas of improvement for government budget

○ Active government support is necessary

- KAIST is a bridgehead to secure Korea's global competitiveness in science and technology

· Korea's industrial competitiveness is in crisis due to the growth of China and India in the fields of science and technology.

· The number of talented people in the fields of science and technology is decreasing due to an avoidance of natural science and engineering.

· KAIST needs active support from the government for its role in science and technology.

- Government support should be increased to 25% of total budget by 2021 and to 30% by 2031

○ Nanyang Technological University's funding source

- Government support accounting for 47.5% of income, excluding investment returns, in 2016, and 44.8% in 2017

- Nanyang Technological University has seen rapid growth based on large amounts of government funding

○ Need to reinforce national defense research and exert efforts to receive funding from government's national defense R&D budget

- Increase in government R&D budget expected to be difficult in the future

- KAIST has attained world-class standards in science and technology over the past fifty years, and is capable of contributing to national defense R&D

- The government accounts for 75% of national defense R&D in Korea, while the private sector accounts for 75% of national defense R&D in the United States (as of 2008)

- In 2014, the government budget for national defense R&D was the second highest (13.5%, 2 trillion 378 billion won), trailing behind industrial

manufacturing (28.8%, 5 trillion 74 billion won)

- National defense R&D budget is categorized into basic research, core technology development, dual use technology, and professional use technology; rate of budget increase is higher than that of defense and defense improvement expenditures

- Discussion forum on national defense R&D recognized the need to develop an open cooperation platform, including the establishment of the Defense-security Research Center (DSRC) and an R&D group dedicated to civilian-military technology cooperation (http://hellodd.com/?md=news&mt=view&pid=62806)

- Need to establish national defense research institute modeled after Caltech's JPL, Georgia Tech's Military Communications Research Institute, and MIT's Lincoln Lab

5. Number of Faculty/Students and Budgeting

□ **Number of Faculty/Students and Budgeting**

○ Specific quantitative goals set for number of faculty, number of students, and expected budget to fulfill Vision 2031.

	Target Index	2018	2019	2020	2021	2026	2031	Target Rate (~2021)	Target Rate (2021~)
HR	Number of Faculty	676	715	757	801	998	1,243	5.80%	4.50%
	Number of Students	11,654	11,771	11,889	12,008	12,620	13,264	1.00%	1.00%
	student/faculty ratio	17.24	16.46	15.71	15.00	12.65	10.67		
FR	Total Budget (million won)	858,600	927.288	1,001,471	1,081,589	1,481,870	2,030,291	8.00%	6.50%
	Government contributions	212,004	228,964	247,281	267,064	401,573	603,827	8.00%	8.50%
	Research Fund	382,655	418,357	457,389	500,064	734,758	1,079,600	9.33%	8.00%
	Etc	263,941	279,967	296,800	314,461	345,540	346,863		

※ Assumptions

1. The number of professors will increase to 1,200 by 2031. Achieve economies of scale

2. The student/faculty ratio will decrease to 10 by 2031.

3. Budget will reach 1 trillion won in 2021 and 2 trillion won in 2031. The budget per professor will be about 1.6 billion won.

4. The proportion of government contributions to the total budget will be 25% by 2021 and 30% by 2031.

5. Category of "etc." includes royalty incentives and earnings from operation of the fund. The fund's target is 2 trillion won by 2031.

* The key to realizing the VISION 2031 is securing sufficient finance resources. Therefore, continuous efforts are needed to increase research funding and government contributions. A lot of donations are necessary, especially from alumni associations.

※ Note

Under Vision 2031, the goal is to have 1,200 faculty members and a two trillion won in budget by 2031. The annual quantitative goals serve as rough guidelines in working towards the final goals. The attainment or non-attainment of quantitative goals is not an indicator of success or failure of Vision 2031

○ Increase in faculty to 1,200 members by 2031, so as to compete with benchmark universities

○ Increase in number of students by 1% each year to reach a student faculty ratio of 10 by 2031

○ Budget goal of KRW 1 trillion by 2021, and KRW 2 trillion by 2031
  - Government funds cannot be significantly raised, but possible with increase in number of students
  - Average growth of 8 to 9% required for research funds. Target amount per faculty is 800 million to 1 billion.
  - Significant increase required in royalty and development fund profits.
  · Can be achieved through active fundraising efforts, centered on alumni.
  · **Target fundraising amount is KRW 2 trillion for 2031.**

○ Stable financing required to attain Vision 2031. Continuous monitoring and strategic acquisition of funds must be performed.

○ Essential to maintain strategic ties with alumni and philanthropists through the development fund.

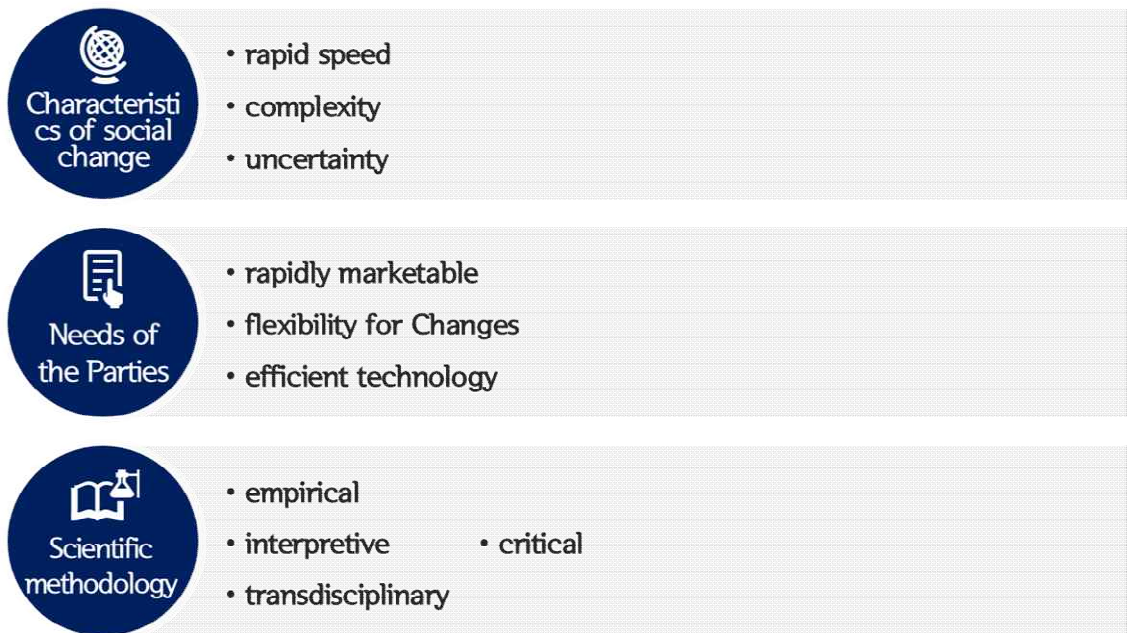## 6. Major Projects – Areas of Focus to Attain the Vision

☐ **large-scale projects must be carried out to successfully attain the KAIST Vision 2031.**

○ The driving force behind KAIST's development is the education and research capacity of individual faculty.

○ For KAIST to take the next leap forward as a global value-creative university and to maximize synergy from individual capacity, it must undertake large-scale research projects that deliver economic impact.

☐ **Enhancement of national competitiveness through active BT research BT (flagship projects of Research Innovation Division)**

○ Need to develop strategies to attract and foster medical scientists (MD/PhD)

 – Fostering emerging medical science talent by establishing programs that support MD/PhD or MD-degree holders in performing independent research for early-stage career development, and ultimately contributing to the advancement of medical science in Korea

○ Development of innovative bioengineering technology through convergence of basic biological sciences and engineering

○ Expansion of research in brain science and brain engineering

○ Strengthening of medical research

☐ **Research on renewable and alternative energy (flagship projects of Research Innovation Division)**

○ Research in underdeveloped areas (space, marine, medicine, etc.) of nuclear energy

○ Need to expand interest in solar energy, wind power, gas, etc.

☐ **Strengthening of cooperation with industry and providing multidisciplinary education to foster industrial leaders**

○ Development of non-departmental system (Department of transdisciplinary science and engineering)

- New education model needed in response to social changes and demands

- Establishment of highly sustainable education model

- Curriculum plan

● 4-2nd semester
● 4-1st semester
● 3rd year
● 2nd year
● 4-1st semester
● 3~4th year
● 3-1st semester
● 2~3rd year
● 2-1st semester
● 1~2nd year

Research
Fusion intensive
Fusion Basic
Liberal Arts Basic

Internships or Graduation Research
Team URP / Seminar / Basic Laboratory Practice / Choose freely considering subject and career.
Topics and career consulting
Environment | Energy | Big-Data | Healthcare | Nano ...
Tutoring lecture
Modern physics | Economics & Management | Molecular Biology | Advanced Programming | Organic/bio chemistry | Applied mathematical modeling
Guidance on Subject plan
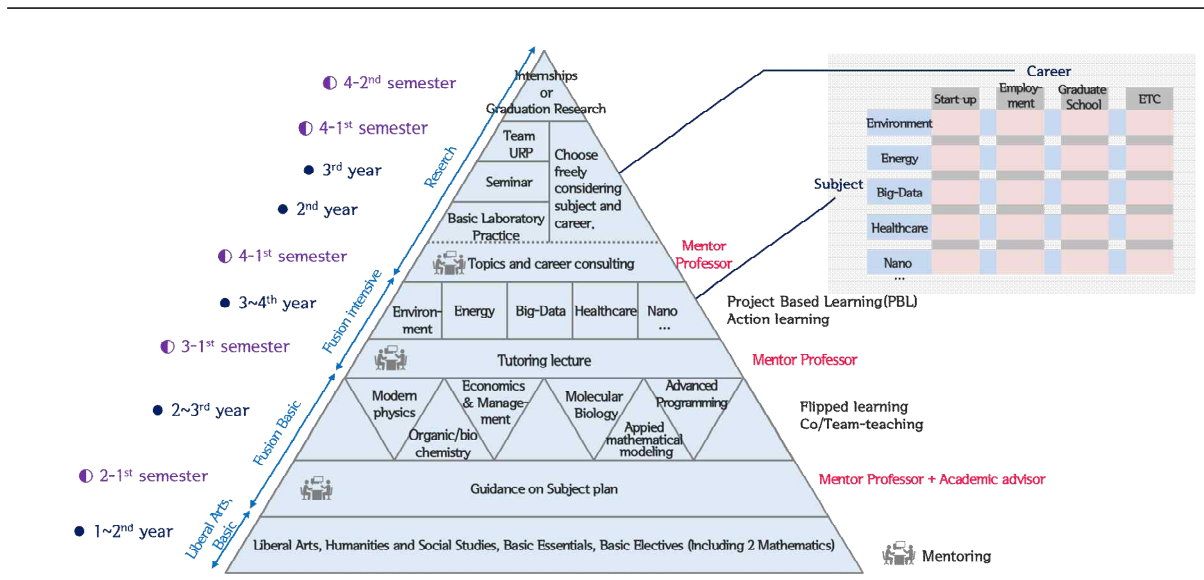Liberal Arts, Humanities and Social Studies, Basic Essentials, Basic Electives (Including 2 Mathematics)

Mentor Professor
Project Based Learning (PBL) Action learning
Mentor Professor
Flipped learning Co/Team-teaching
Mentor Professor + Academic advisor
Mentoring

	Career			
Subject	Start-up	Employ-ment	Graduate School	ETC
Environment				
Energy				
Big-Data				
Healthcare				
Nano ...				

· Advanced convergence: Integration with basic multidisciplinary courses

① Expanding basic scope of knowledge to improve student ability to understand and find solutions to real-world issues

② Comprised of theme-based course templates according to student's interest and career plan

③ Providing more exposure to society and improving competence in tackling real-world problems

· Team URP/internship

① Basic experiments in second year; enhancing practical understanding of basic courses

② Implementation of lab sessions, seminars, internships, and Team URP

③ Undergraduates in third or fourth year form a team of five students under Team URP

④ Comprised of multiple advisors and multiple students or one advisor, industry experts and multiple students

⑤ Cooperation between Team URP and companies to develop solutions to real-world problems

⑥ Fosters creative talent capable of identifying and defining problems

□ **Improvement of technical research personnel policy**

○ Need to develop improved measures on military exemption for new and emerging researchers

- The bridge model between science high schools and KAIST is regarded as having played a key role in "Samsung's catch-up with Sony."

- The technical research personnel policy, which laid the foundation for the model, has helped to prevent brain drain and ensure continuity in research.

- Further discussion needed on whether to continue with the current policy, given the decrease in population and other social changes

□ Revolutionary change needed for internationalization

○ Participation in international cultural exchange and efforts to instill a global outlook

○ Development of infrastructure for cultural exchange
  - International Restaurant
  - Greater exchange between local and international members

○ Special measures needed to increase number of international faculty and students

○ KAIST expected to achieve goal of becoming the world's top 10 if higher scores can be attained in the internationalization category

<Statistics on international faculty and students in major universities >

QS Rank	University	International faculty			International students		
		Percentage	Score	Rank	Percentage	Score	Rank
1	MIT (US)	56%	100	36	34%	96.1	70
2	Harvard (US)	48%	99.6	54	22%	72.7	177
3	U of Cambridge (UK)	30%	96.5	103	21%	75.2	165
4	Imperial College London (UK)	37%	93.4	126	29%	89.2	106
8	NTU (Singapore)	53%	100	42	35%	100	12
11	EPFL (Switzerland)	56%	100	19	31%	88.2	108
26	HKUST (Hong Kong)	73%	100	17	37%	93.0	87
41	KAIST (Republic of Korea)	12%	25.2	428	6%	-	-

※ See QS data for scores given to international faculty and students
fields marked with '-' fall below 500th place

○ Establishment of KAIST branch campuses in developing countries in Southeast Asia

□ **Promotion of national defense research**

○ Need to develop defense technology and foster talent in related fields to improve and utilize cutting-edge technology in national defense

- Utilization of KAIST's world-leading technology and research capacity; strengthening of KAIST National Security Convergence Research Center

- Development of multidisciplinary research by acquiring funds from national R&D budget and developing new weapons systems, development of spin-on technology by commercializing KAIST's research to meet demands in national security, serving as an anchor of the national security platform based on cooperation with key entities in security policies.

- Expansion of research and development in national defense by focusing on national defense among flagship research areas of Research Innovation Division

V

Conclusion

1. Leading Future Society Through Science and Technology

□ **Science and technology to lead future change and innovation**

○ Need to reflect on how science and technology can be utilized to drive change and innovation in future.

○ KAIST's role in the development of Korean society and economy should be defined.

□ **Fostering of female scientists**

○ According to the "Overview of Women's Status in Science" by Boston Consulting Group in 2016, the share of women among science researchers was 29%. In Korea, female students continue to avoid science and engineering, and women account for only 17% of science and technology researchers

○ Female faculty only account for 15% of faculty in national universities, lower than the share of 25% recorded by private universities. This is a striking gender gap even when compared to the number of female students, who account for about 40% of the student body

○ Need active support from government/universities to increase share of females in STEM (Science, Technology, Engineering, Mathematics): Female scientists have contributed to the development of science and technology based on traits more frequently associated with females such as emotion, intuition, and harmony. They are expected to play a larger role given the growing emphasis on multidisciplinary research, which encompasses a wide range of subjects from science and technology to the arts.

○ The lack of female scientists translates to economic loss, and fostering qualified researchers must be a priority in order to achieve developments in STEM fields, even more so when considering factors such as the rapidly decreasing population and subsequent changes in economic structure.

○ Efforts must be made at the society level to foster young generations of female scientists; the role of universities is to pass on knowledge and provide high-quality education to foster such talent.

□ Promotion of startups

○ Expansion/application of KAIST's science and technology knowhow and leading startup model via the Institute for Startup KAIST and K-School (e.g. contributing to startup culture through the establishment of an innovative startup hub in Seoul, organization of AI global innovation forum, incubation of innovative startups, offering educational and networking programs)

○ Supporting overseas market entry of science and technology ventures by fostering startups owned by Israel's Yozma group and utilizing the global network

□ Establishment of educational model for Korea

○ Acquisition of human resources considered necessary for Korea to gain competitiveness in the ever-changing world

○ Gaining reputation as an institute specializing in the fostering of talent in science and technology through innovative talent recruitment and educational policies, and establishing an educational model that represents Korea

□ Talent donation through MOOCs

○ Support for lifelong learning

- Offering of science and technology courses related to the fourth industrial revolution to the general public

- KAIST, as a knowledge-creating university, offers various courses aimed at advancing science and technology

·E.g.: Nuclear Energy Made Easy, Understanding the World with Materials Engineering, Fun Chemical Engineering, AI and Machine Learning, Biological Science and the World, etc.

○ KAIST is actively supporting teaching and learning through the learner-oriented Education 4.0 Program and Bridge Program, which is an online course for high school students who have been offered admission.

○ Under partnerships with companies and research centers, e-learning courses are offered to enhance professionalism and competence of employees and researchers.

○ The global educational consortium iPodia is being utilized to create knowledge together with world-leading universities, and high-quality lectures are made accessible to learners around the world through Massive Open Online Courses (MOOCs) and COURSERA.

○ To be utilized in emerging economies in Africa, Latin America, Southeast Asia, etc.

□ Expansion of student volunteer opportunities and social contributions

○ Providing students with opportunities to participate in social/education volunteer programs that utilize their knowledge to improve living conditions in not only local communities, but also socially neglected areas outside of Korea

· E.g.: Participation in science culture program in Daejeon, mentoring service for middle and high school students in cooperation with regional offices and partner schools, etc.

○ Promoting convergence of science and technology knowledge and social innovation in rural areas by expanding opportunities for students to participate in sixth industrialization of agricultural and fishing villages

□ Overcoming the problem of the aging Korean society

○ Korea is a rapidly aging society, and the convergence of medicine and engineering is seen as a possible solution to the emerging social issue of dementia

○ Technology innovation support, such as the KAIST-MBN 4th Industrial

Revolution Idea Competition for SME Venture Companies, needed to solve real-world problems faced by humanity

○ Research aimed at overcoming challenges faced by Korea and humanity has been proposed as a vision for the future by the Research Innovation Division of Vision 2031, and innovation in research system and planning is needed to attain the vision

☐ Leader of innovation in new paradigm of Korean economy – Important purpose of KAIST Vision 2031

○ KAIST must show leadership in the transition to the age of the fourth industrial revolution, that is, a shift from industrialization to science and technology innovation. This is a mission that can be undertaken only by KAIST among universities in Korea.

○ KAIST Vision 2031 serves as a blueprint for KAIST to fulfill its mission and respond to the needs of society.

2. Contribution to World Development

□ Contribution to humankind's happiness and prosperity

○ presenting directions for the future and developing novel technology

○ Contribution to bridging the gap between countries

□ Export of KAIST's education innovation model

○ Export-import Bank of Korea investing 94,697,000 dollars to support the establishment of a higher education institute in Kenya as part of government ODA efforts
  - If the above is successful, KAIST will provide consulting on the design of the science and technology curriculum and university operations

  - Kenya Vision 2030 emphasizes the importance of science and technology in economic development, and uses KAIST as a benchmark to establish a similar institute in Kenya

  - The Kenya Advanced Institute of Science and Technology will be the first attempt to localize the KAIST model, which has proved successful in fostering science and engineering talent and technology domestication

○ Providing education and research support at the level of individual faculty or university in Africa, Southeast Asia and Latin America, and encouraging student participation in such activities

○ Participation in joint research on educational policies under the Global Education Support Project of the National Research Foundation of Korea and projects aimed at improving educational ODA
  - Conducting of demand survey in 2015 to 2016, and participation in project on "Installation and Operation of Sustainable Living Lab"

□ Expansion of global volunteer opportunities for students

○ Operation of KAIST Global Student Volunteers
  - In 2016, KAIST students participated in World Friends IT Volunteers, an

overseas volunteer group focused on IT education and cultural exchange for students in developing countries.

· Main focus of volunteer group is programming education

· Education volunteers in Ethiopia: Teaching Windows, MS Office, Photoshop, and webpage-making to 350 students in Addis Ababa Institute of Technology

□ Redefining role and value of university in light of recent shift in global socioeconomic paradigm

○ Presenting directions for the future – serving as a role model for other universities by creating global value

○ Establishment of new roles as research-oriented/convergence/entrepreneurial university and development of measures to promote cooperation among global universities

3. Establishment of KAIST Strategic Research Center (TBD)

□ KAIST strategic research center

○ Establishment of strategic research center to develop creative ideas with consideration of nation-level factors and future trends

○ Opening of research center under the direct supervision of the president

○ Focused on creative research groups that can answer "WHAT" questions (e.g. What do we need? What should we make?) (multidisciplinary – includes humanities, social sciences, business, engineering, and science)

○ Utilization of Seoul Hongneung or Dogok-dong campus for close cooperation with industry (market/economy issues and education/research/commercialization)

○ Continuous monitoring of progress leading to Vision 2031
  – Need to establish separate organization for monitoring and analyze advantages/disadvantages of current implementation

4. From 2017 to 2071 – KAIST's 100th Year Anniversary

☐ Taking the next leap forward

○ Establishment of a long-term vision in preparation for KAIST's 100th year anniversary based on its achievements over the past 50 years

○ Need to prepare for a new chapter based on achievements as a young university with fewer than 50 years of history (KAIST ranked third for three consecutive years from 2014 to 2017 in QS Top 50 Under 50 Ranking)

○ Establishment of mid/long-term strategies under KAIST Vision 2031 with the goal of emerging as a top global university in 2031, i.e. 60th anniversary

  - Vision 2031 expected to lay the foundation for KAIST to fulfill its mission and meet future demands in preparation for its 100th year in 2071

☐ Innovative DNA + social responsibility, social entrepreneurship

○ Risks arising from lack of value judgement
  - Lack of value judgement may be used as a pretext for sociopolitical manipulation in the development or utilization of technology.
  ·E.g.: technology can be misused as a tool to attain political goals.

○ Direction and purpose of technology determined by values upheld by society
  - Nuclear weapons can destroy humans, but nuclear materials can be used to treat cancer and generate electricity. How technology is used depends on the values upheld by society. That is, nuclear material can be used to kill, or for socially beneficial purposes such as power generation and cancer diagnosis.

  - Artificial intelligence can have different effects depending on the values upheld by society. The direction of technology innovation is influenced by social priorities and values.

- The development of technology may not always be consistent with that of society. Continuous efforts must be made to ensure that the development and utilization of technology contribute to creating desirable values for society/economy/politics/culture.

○ Principles and a Philosophy
 - KAIST needs principles and a philosophy to enhance universal values while maintaining innovation in science and technology.

 - This can be achieved by adopting a global outlook, extending beyond the boundaries of KAIST and Korea.

○ New important mission of KAIST
 - One important mission of KAIST since its establishment was to "contribute to the nation's economic development through science and technology."

 - In the next fifty years, it should focus on deriving sustainable solutions to global issues and challenges faced by humanity.

 ·Generating economic value is an important aspect, but KAIST should place greater emphasis on using science and technology to derive "creative, ambitious, sociocultural" values, which may not necessarily be economically quantifiable. KAIST should adopt a global outlook and re-establish its mission.

 - Accordingly, KAIST's members have worked together and exerted tremendous efforts to establish the Vision 2031.

5. Action List

☐ **Action list of KAIST Vision 2031**

○ A list of clear, specific actions to be taken to execute the key innovation strategies defined above.

☐ **Short-term action items for 2021**

○ Education innovation

- Recruitment of talent with creative potential

· Additional criteria to evaluate social capacity including C³ (Challenge, Creativity, Caring)

Classification	Current	Improvement
Document screening (Stage 1)	**Comprehensive evaluation based on academic performance, school records, statement of purpose, and letters of recommendation**	- Emphasis on C³ in addition to existing method of evaluation • (Challenge, creativity) R&E, student clubs, experiential activities • (Caring spirit, sense of community) Volunteering, group activities, relationship with peers, filial piety, and exemplary performance •(Leadership) Performance as class leaders or student club leaders
Interview (Stage 2)	**Comprehensive evaluation based on academic competence(problem-solving in mathematics and science) and social capacities**	- In-depth evaluation with separate sessions for academic and social capacities • (Increase in interview preparation time) 20 min ('17)→35 min ('18)→55 min ('19) • (Additional evaluation by category) 20 min ('18)→40 min('19) ☞ Session 1 (20 min): In-depth academic evaluation of mathematics, science, English, etc. ☞ Session 2 (20 min): Comprehensive evaluation of social capacities, including core values such as "challenge," "creativity," and "caring"

· Recruitment of honorary alumni as admissions officers

· Adjustment of ratio to diversify high school type and increase proportion of students possessing C³

Classification	Current	Improvement
Undergraduate program	Higher proportion of students from gifted high schools and science high schools • Gifted/science high school: general high school = 7 : 3	- Selection of students who possess C³ with a more balanced distribution between gifted/science high schools and general high schools
	Higher proportion of male and Korean students • Male / female = 8 : 2 • Korean / foreigner = 94.1 : 5.9	- Increase in proportion of female students and socially challenged - Increase in proportion of international students from leading foreign high schools (80 students/year) ※ Improved assessment of scores obtained in international exams

· Policies to attract outstanding international students: Recommendation by embassies, expos for students on government scholarships, cooperation with current international faculty, visits to high schools of international students, support for promotional activities, etc.

- Strengthening of transdisciplinary programs for freshmen

· Establishment of College of Transdisciplinary and Fundamental Studies: Reorganization of academic units, curriculum development, and faculty recruitment (10 new faculty members by 2021)

· Convergence with humanities and social sciences: Meetings between natural sciences and humanities (two to three times per year); faculty exchange with universities specializing in science and technology to provide lectures on humanities and social sciences

· Innovation in social value orientation of education: Agreement with Korea Foundation for Advanced Studies (September 2018; goal of at least 10 billion over the next five years)

- Innovation in education methods to enhance competence of creative, multidisciplinary talent

· Establishment of Virtual University environment: Increase in network classrooms (20 classrooms) and teamwork rooms (50 rooms) by 2021

· Development and utilization of Massive Open Online Courses (MOOCs)

KOOC (KAIST MOOC), Coursera, K-MOOC		2017	2018	2019	2020	2021
	Developed	14	**20**	25	30	40
	Accumulated	41	**61**	86	116	156

· Expansion of Education 4.0 Program

	2017	2018	2019	2020	2021
Classes per year	138(5%)	**170**	200	250	**400(15%)**
No. of classrooms (accumulated)	3(21)	**5(26)**	5(31)	6(37)	8**(45)**

· STEAM (Science, Technology, Engineering, Arts, Mathematics) COLLEGE by Korea Foundation for the Advancement of Science & Creativity: Future-oriented science and engineering educational program that integrates elementary, middle and high school curricula to create jobs and resolve social issues; 40 courses selected across five universities specializing in science and technology

· Administration of unsupervised tests: Establishment of student honor code to instill sense of ethics among students

○ Research Innovation

－ Implementation of collaborative research lab system (designation of and support for at least 30 labs)

－ Establishment of research planning control tower and research planning system

· Planning and implementation of block funding for the fourth industrial revolution

· Prioritizing of seed projects

· Focus on 13 strategic projects of the Ministry of Science and ICT

· Creative, risk-taking research support

－ Sharing of latest research information

· RIMS＊ Discovery: Provides analysis of researchers, research achievements, and latest publications

＊RIMS (Researcher Information Management System)

· Sharing of knowledge with companies and research institutes based on archive of research reports

－ Improvement of research system: Improvement of policies on balance accumulation, recruitment of IP attorneys, shortening of contract process with companies, shortening of contract process for international joint research

－ Expansion of support for risk-taking research

·KC30+(KAIST Grand Challenge + seed money for Crazy but Grand Ideas):
  Equipment provided to KC 30 projects to break the mold of conventional
  research and make new discoveries

·Assisted Creativity multidisciplinary research project: Research on
  multidisciplinary technology to maximize human creativity and other
  skills irreplaceable by AI

 - Fostering of world-leading multidisciplinary research groups

·Establishment of three multidisciplinary research institutes by 2021

·Fostering of five KAIST flagship multidisciplinary research groups

· Opening of multidisciplinary building for the age of the fourth
  industrial revolution

· Support for research related to the fourth industrial revolution:
  National defense 4.0 research and education project, K-industry 4.0
  project, etc.

· Conversion of NExFIRE* multidisciplinary research projects to national
  projects: Integration of outstanding multidisciplinary research projects
  with Vision 2031 flagship projects to large-scale national projects
  * NExFIRE (Network of Excellence for the Fourth Industrial REvolution)

· World Leading AI Initiative: Identification of issues through AI World
  Cub, expansion of AI education, and selection of promising projects
  through the Venture Research Program for Graduate Students

○ Technology commercialization innovation
 - Entrepreneurship included as mandatory course for 50% of undergraduates
   by 2021

 - Reorganization of entrepreneurship curriculum

·Implementation of entrepreneurial curriculum platform for all MBA
  programs

·Implementation of business analytics (BA) curriculum platform for all
  MBA programs

·Introduction of advanced capstone design projects to regular courses
  in all departments: Recognition as basic elective in humanities,
  recognition as required/elective major, substitution for graduation
  research, etc.

·Recruitment of students for Master of Entrepreneurship &
  Innovation: Jointly operated with the K-School and 18 departments

·Launch of Graduate Minor Program in Entrepreneurship & Education: KAIST students on national scholarship

·Launch of CUop program with universities specializing in science and technology

- Establishment of entrepreneurial support infrastructure

·Reorganization of Institute for Startup KAIST: Reorganization to strengthen capacity for entrepreneurial support

·Amendment of regulations on faculty and student startups: Improvement of policies to promote and facilitate research-based startups by eliminating possible obstacles in the startup launching process for faculty and students

·(Improvement of faculty evaluation system) Acknowledging faculty contributions when advises launch startups based on research conducted under the supervision of advisors

- Creation of intellectual property and sophistication of management process

·Recruiting of experts to enhance investments, technology transfers, and professionalism: Establishment of technology investment companies and strengthening of capacity for technology transfers by cooperating with Israel's YEDA and other experts capable of identifying and commercializing outstanding technology

- Expand venture support for job creation at national level

·Open Venture Lab
① Providing a free space for business start-ups (Including office and internet infrastructure) to anyone who wants to start a venture during a certain period of time.
② KAIST faculty provide basic foundation training, consulting, and mentoring
③ Starting from Hongreung Campus of KAIST, it will be gradually expanded to the Munji Campus. KAIST will collaborate with related companies and government agencies to develop and spread this nationwide success model.

·K-Industry 4.0
① The core goal is to enhance national competitiveness and maximize job creation through the growth of SMEs.
② Establishment of 'SME 4.0' production innovation platform of small quantity batch production system by integrating manufacturing industry and ICT technology, such as cloud, AI, Big data.
③ Establishment and support of E-School* Control tower: Cultivate regional

people of talent to lead the 4th industrial revolution

    ＊ Employment, Entrepreneur, E-learning

·Start-up idea contest & supporting seed capital

  ① Supports a part of seed capital for start-up ideas contest winner

  ② Provide Open Venture Lab Space and Service Priority to Selected Best Idea Ventures

- Expansion of technology investments and establishment of university-industry cooperation clusters

·Establishment of technology investment companies

  ① Identification of promising technology and companies through investment council and external cooperation; diversification of investment type such as joint ventures, investment in existing company, investment in new startups, etc.

  ② Selection and management of investment companies based on pre-assessment of potential for success (technical, market validation)

·Expansion of technology transfers and commercialization through strategic creation of intellectual property

  ① Active response to infringement of rights including establishment of strategies for patent protection, royalty negotiations, and filing of lawsuits

  ② Strengthening of IP protection and funding through strategic cooperation with leading law firms and the Korean Intellectual Property Office

  ③ Enhancement of IP professionalism and efficiency through cooperation with local/international patent offices, and expansion of international technology transfers

· Active investments in incubating companies (KAIST startups, technology transfers)

  ① Strategic consulting to attract investments and cooperation with investment companies

  ② Active attraction of accelerators, VCs, and CVCs, and organization of IR forums

·Expansion of university-industry cooperation cluster: Expansion of KAIST's outstanding research achievements to small- and medium-sized enterprises in Seongnam through the K-GLOBAL project, and providing support to help companies attain world-class standards

·Fostering of technology-based startups with potential for growth in the age of the fourth industrial revolution: Used as criteria in selecting new incubating companies; active participation in projects related to the

fourth industrial revolution

· Launch of regional cooperation projects based on capacity of entrepreneurial innovation: Regional and national expansion of entrepreneurial education through MOOCs

- Establishment of startup support platforms in Asia - Installation of two overseas branches

○ Globalization innovation

- Recruitment of outstanding international faculty/students/researchers by 2021

· Enhancement of staff's linguistic skills: Customized education through diverse language programs (hours, type, content)

· Development of new student exchange programs: research student exchange, visiting student program (for-credit course)

· Cultural integration of international members: Cultural experience with Korean language learning, expansion of temple stay programs, promotion of KAIST ONE program, etc.

· Improved living conditions for international members: Educational subsidies at Daejeon Christian International School (TCIS), TCIS Lecture Series by KAIST Professors, expansion of KAIST Day Care Center, expansion of international food corner in school cafeterias, etc.

  ＊ TCIS (Taejon Christian International School)

· Global Leadership Activity (GLA) Southeast Asia Program: Providing opportunities for outstanding teams in Humanity/Leadership Ⅱ to visit Southeast Asia

·KGLC (KAIST Global Leadership Center) Fellow Program: Appointment of leadership experts (up to 10) to serve as mentors to students

- Overseas campuses

· Plan to establish a research institute with support from the Chongqing Municipal Government

·ELK＊ overseas training: Dispatching of 10 undergraduate students to Silicon Valley companies, research institutes, and universities in the United States

- KAIST-initiated global research

· Serving as an international hub by inviting world-leading researchers and organizing joint research and international symposiums

· More active exchange with strategic partner universities: Expansion of student exchange, joint research, seed fund for exchange programs, etc.

- Expansion of KAIST development model to developing countries

· Expansion of overseas volunteering activities

· Continued implementation of Kenya Advanced Institute of Science and Technology project

☐ Long-term action items for 2031

○ Education innovation

- Changes to be driven by science and technology in the age of the fourth industrial revolution

· "What kind of science and technology talent should we foster?" is an important issue in determining national competitiveness

· KAIST must exert efforts to foster creative multidisciplinary leaders who enhance the social value of science and technology

- Presenting a model of education to foster global leaders for the fourth industrial revolution under the College of Transdisciplinary and Fundamental Studies

· The non-departmental track of the College of Transdisciplinary and Fundamental Studies will contribute to fostering multidisciplinary talent with a strong foundation in basic science and engineering, and fast adaptability to the changing environment

· Formation of Steering Committee for Establishment of College of Transdisciplinary and Fundamental Studies; Committee will take charge of curriculum design and establishment of course development plans, and aim to launch the program in March 2019

· More diverse majors for students through the installation of College of Transdisciplinary and Fundamental Studies

- Strengthening of global competence

· Students encouraged to compete on the global stage

· Grand vision based on a global mindset
  ① Students taught to reflect on how to change the world as a Global Shaper,
  ② How to drive innovation in the world as a Global Innovator,
  ③ How to move the world as a Global Mover

· Expansion of opportunities to develop passion for volunteering, embrace challenges, make sacrifices, and take responsibility as leaders

① Promotion of global volunteering activities

② Invitation of Nobel laureates and other global leaders to serve as role models for students

– Development and utilization of innovative lecture model

· Student-centered education innovation including flip learning and MOOCs: Offering of degree programs that integrate smart learning infrastructure such as Edu 4.0 and KOOCs with educational knowhow

· Social contributions: Expansion of virtual campus for upskilling of businesspeople

-Retraining programs have become essential for companies to enhance competitiveness in the age of the fourth industrial revolution. KAIST to provide remote lectures for businesspeople to study and work at the same time.

· Expansion of flexible semesters and flexible credit system by 2031

· Expansion of Education 4.0 to 50% of courses (1,500 courses per year)

	2021	2026	2031
Classes per year	400(15%)	900(30%)	1,500(50%)
No. of classrooms (accumulated)	8(45)	15(60)	20(80)

· Acquisition of 50% of content modules for offered courses

○ Research innovation

– Opening of multidisciplinary building for the age of the fourth industrial revolution

· Multidisciplinary practices have accelerated in the age of digital transformation and the fourth industrial revolution. : Multidisciplinary research is not merely an option, but a must.

· Multidisciplinary research building to be built to support multidisciplinary research in the age of the fourth industrial revolution. Meta-multidisciplinary research platform to be established to combine "multidisciplinary research" with "multidisciplinary research."

· Establishment of 10 multidisciplinary research institutes by 2031

– 10 Flagship Research Areas

· Six research areas aimed at solving global issues in relation to the

fourth industrial revolution
① Quantum Technology
② Hyper-Connection Photonics
③ KAIST M3I3* Initiative
  * M3I3: Materials and Molecular Modeling, Imaging, Informatics and Integration
④ Super Intelligence Initiative
⑤ Development of Safety-Assured Smart City Platform based on Interconnected Cyber-Physical System
⑥ Innovation in space Access: Micro Launcher and CubeSat Cloud
·Two research areas in bio/medicine/medical science/healthcare
⑦ WISE Brain: Wires of Senses and Emotions
⑧ Technology Convergence for Precision Medicine
·One research area in energy/renewable energy/environment
⑨ Development of Cloud System for Energy Production, Storage & Distribution
·One research area in national defense technology
⑩ Intelligent Unmanned System

- Selection of cross-generation collaborative labs for sustainable development of disciplines

·First attempt in Korea to sustain academic success across generations based on cooperation between senior and junior faculty

·Designation of and support for at least 60 collaborative research laboratories by 2031

- Strengthening of cooperation among industries, universities, and research institutes

·Strengthening of open innovation and collaborative research
  ‐Establishment of triple helix model of cooperation among industries, universities, and research institutes
  ‐Development of KAIST into an open innovation hub, where institutes and talent from Daedeok Innopolis and beyond gather to collaborate in innovative pursuits

○ Technology commercialization innovation

- University's R&DB is important not only in expanding funds, but also in creating jobs for youth and improving national competitiveness

- KAIST's intellectual property and economic value must be maximized by

expanding technology investment companies and startups

- ·Fostering of experts in technology commercialization: Increase in number of experts capable of identifying promising technology and companies.
  - ·Entrepreneurship included as mandatory course for undergraduates (100%) by 2031
- ·Establishment of policies for technology commercialization: Development of various policies to support investments in selected technology and companies. Review of general startup-related regulations to accelerate startup cycle.
- ·Case studies of student startups: Promotion of entrepreneurial culture by inviting successful entrepreneurs to inspire student startups

- Establishment of cooperation infrastructure for startup promotion

- ·Expansion of startup supporting infrastructure from Institute of Startup KAIST to Pangyo and Gangnam through participation in the Yangjae R&CD Innovation Hub

- Promotion of investments in technology commercialization

- ·Cooperation with investors at home and abroad to accelerate commercialization of KAIST's outstanding technology
- ·Example: MOU for research cooperation and technology commercialization cooperation signed with Israel's Yozma Fund to attract investments

- Contribution to development of small- and medium-sized enterprises

- ·Business environment has changed rapidly with the advent of the fourth industrial revolution. Small- and medium-sized enterprises constitute a significant portion of national economy, accounting for 99.9% of local businesses and 87% of jobs.
- ·Launch of K-Industry 4.0 for smart transformation of small- and medium-sized enterprises: Launch of K-Industry 4.0 Promotion Committee to support smart transformation of small- and medium-sized enterprises in Korea based on KAIST's outstanding human resources and technology

○ Globalization innovation

- Globalization is not an option, but a must

- Establishment of Korean-English Bilingual Campus

- ·Expansion of opportunities to improve English proficiency

·Offering of Korean learning opportunities to international members. Development of cultural experience programs that integrate Korean language learning.

·Enforced bilingualism in information sharing media including the KAIST Portal

- Establishment of foreigner-friendly campus environment

·Identifying issues faced by international students, and finding solutions through counseling

·Gradual expansion of international food corner in school cafeterias

·Expansion of KAIST Daycare Center

·Providing international faculty with educational subsidies for their children through close cooperation with Taejon Christian International School

- Greater efforts to enhance international reputation

·Solidifying ties with WEF and other international organizations through joint organization of international events

·Active participation in international events organized by university ranking organizations, such as THE and QS, to promote KAIST's excellence in education, research and technology commercialization

·Establishment of research vision and strategies in KAIST-initiated fields of science and technology (fifth industrial revolution)

- Establishment and operation of one overseas campus by 2031

- Creation of economic growth engines for developing countries through the KAIST Spirit & Mind Foundation

○ Future strategy innovation

- "Establishment of "virtuous self-reinforcing system"

·Establishment of "virtuous self-reinforcing system" to provide infrastructure for effective implementation of innovation strategies in education, education, technology commercialization and globalization under Vision 2031, and to ensure sustainable growth based on transparent assessment and motivation

- Future strategies aimed at achieving the goal of becoming a "global value-creative leading university and one of the world's top 10"

· Organization, human resources, and funds – Must be optimized for effective attainment of vision

· Integration of innovation divisions – Future strategies serve as basic principles in establishing basic directions of four innovation divisions

– Principles of implementation of future strategies

· Efforts to fulfill KAIST's founding spirit, sense of duty to nation, and contributions to humankind

· Establishment of KAIST culture: Caring spirit added to core values of "challenge" and "creativity"

· Sustainability of strategies – Sharing among members, passing down to younger generations

· Holistic education and research through convergence of science and technology + cultural arts

– Establishment of KAIST Future Strategy Research Center (tentative)

· Think tank group that devises future strategies for KAIST and presents solutions to national issues in the age of uncertainty

· Transition from HOW−oriented research to WHAT−oriented research: Conducting research to set directions for the nation, humankind, and science and technology; identifying new issues instead of finding solutions to given problems

· Making predictions for future society based on science and technology innovation, and fostering of future strategy think tanks

· Long−term, continuous monitoring to ensure commitment to KAIST Vision 2031

– World Economic Forum (WEF): International forum on the fourth industrial revolution

· KAIST and WEF scheduled to hold international forum in Korea

· Event to be attended by Klaus Schwab, founder of WEF who created the concept of the fourth industrial revolution

· Forum to stimulate discussions on future strategies needed for the fourth industrial revolution

· KAIST will cooperate with WEF to become a global role model in the age of the fourth industrial revolution

Closing Remarks

If all members of KAIST do their best to attain the goals outlined in the KAIST Vision 2031, the institute will be able to achieve its grand vision of becoming a **global value-creative leading university** that contributes to the **happiness and prosperity of humankind through innovation in science and technology.** This holds great significance as a follow-up to the vision presented in the Terman Report, which served as the foundation of development in the years following KAIST's establishment in 1971, and provides momentum for the second great leap.

On the completion of the second Terman Report in the form of KAIST Vision 2031:

(By 2031) KAIST will have spearheaded the 4th industrial revolution via innovation in education, research, technology commercialization and globalization. Even more important, KAIST will have enhanced the pride of Koreans, and will have become a cornerstone in the establishment of an advanced country.

KAIST Vision 2031 Committee

Appendix

【Attachment 1】 Progress
【Attachment 2】 Vision 2031 Committee

Attachment 1. Progress

□ **Major Progress**

- 17. 04. 04.	Held 1st Vision 2031 Committee Meeting
- 17. 04. 05. ~ 08. 15.	Held Subcommittee Meetings (Establishment vision and action items for each division)
- 17. 05. 02.	Held the 2nd Vision 2031 Committee Meeting
- 17. 06. 13.	Held the 3rd Vision 2031 Committee Meeting
- 17. 07. 03.	Held the 4th Vision 2031 Committee Meeting
- 17. 08. 16.	Held the 5th Vision 2031 Committee Meeting (presenting vision and action items for each division)
- 17. 08. 16.	Held the 1st External Commissioner Meeting
- 17. 09. 15. ~ 09. 16.	VISION 2031 Draft presentation & discussion (Faculty Workshop)
- 17. 09. 17. ~ 11. 08.	Held Subcommittee Meetings (Review of opinions)
- 17. 11. 09	Vision 2031(draft) Presentation and discussion (Internal public hearing)
- 17. 11. 21.	Held the 2nd External Commissioner Meeting
- 17. 11. 22. ~ 12. 12.	Held the Subcommittee Meeting (Review of opinions)
- 17. 11. 29. ~ 12. 08.	KAIST VISION 2031 Slogan Contest
- 17. 12. 13.	Held the 6th Vision 2031 Committee Meeting
- 18. 1. 5.	Selecting KAIST VISION 2031 Slogan
- 18. 2. 6.	Deliberation of Faculty council
- 18. 2. 27.	Report to the Board
- 18. 3. 9.	Held the 3rd External Commissioner Meeting
- 18. 3. 20.	Vision 2031 Declaration Ceremony

☐ **KAIST VISION 2031 Committee** (143 persons)

President	**Sung-Chul Shin**

Co-Chairpersons	**Kwang-Hyung Lee**(Dean of Moon Soul Graduate School of Future Strategy) **O-Ok Park**(Provost & Executive Vice President)

Expert Committee	(Division Chairperson) - **Kwang-Hyung Lee** (Dean of Moon Soul Graduate School of Future Strategy) (Commissioner) - Internal(12 persons), External(19 persons)

Educational Innovation	(Division Chairperson) - **Dong-Soo Kwon** (Department of Mechanical Engineering) - **Tae-Eog Lee** (Director of Center for Excellence in Learning & Teaching) (Commissioner) - Internal(21 persons), External(5 persons)

Reserch Innovation	(Division Chairperson) - **Soon-Hyung Hong** (Department of Materials Science & Engineering) - **Hee-Kyung Park** (Vice President for Research) (Commissioner) - Internal(19 persons), External(5 persons)

Technology Commercialization Innovation	(Division Chairperson) - **Zong-Tae Bae** (School of Management Engineering) - **Byoung-Yoon Kim** (Dean of Institute for Startup KAIST) (Commissioner) - Internal(18 persons), External(6 persons)

Globalization Innovation	(Division Chairperson) - **Sun-Chang Kim** (Department of Biological Sciences) - **Soo-Hyun Kim** (Vice President for Planning & Budget) (Commissioner) - Internal(19 persons)

Secretary	**Bowon Kim** (Associate Vice President ,Office of Planning and Budget)