Creating Value through Innovation

Policy

Approach to R&D

In the field of ICT, the speed of technological evolution and globalization continues to accelerate, while trends in technology change at a more dizzying pace than ever.

In this environment, KDDI is making efforts to conduct practical, advanced, long-term R&D in important technical fields related to network infrastructure, platforms, devices, and applications. In addition to basic research, KDDI pursues R&D with a flexible approach ranging from applied research and development to the creation of practical applications, while monitoring global trends in technology and services and incorporating open innovation technology.
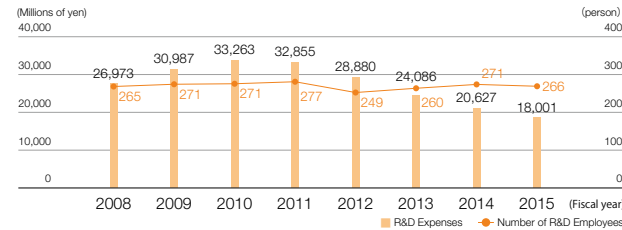
System

Research and Development Promotion System

A variety of processes are required in order to develop research results into practical applications, including the collection of information, development of individual technologies, evaluation, and design. For information collection in particular, KDDI deploys a staff of researchers specializing in each field in each country and region, and constantly gathers and analyzes the latest information from abroad by coordinating with KDDI Group overseas offices and other organizations such as external research institutions.

In addition, with respect to the use of open innovation technology, KDDI is proactively engaged in efforts through the KDDI Open Innovation Fund and KDDI ∞ Labo to facilitate cooperation and co-creation with many stakeholders.

■ Changes in R&D Expenses and Number of R&D Employees*

(Millions of yen) / (person)

Fiscal year	2008	2009	2010	2011	2012	2013	2014	2015
R&D Expenses	26,973	30,987	33,263	32,855	28,880	24,086	20,627	18,001
Number of R&D Employees	265	271	271	277	249	260	271	266

* KDDI R&D Laboratories, Inc.

Activity and Results

Promoting Open Innovation

■ KDDI Open Innovation Fund

KDDI Open Innovation Fund is a corporate venture fund operated by KDDI and Global Brain Corporation for investment in promising startups both domestically and internationally. We provide full-scale support for the growth of our partner startups through utilization of our business networks and marketing skills and collaboration with our services including au Smart Pass.

Based in San Francisco, USA, we are also looking to invest in startups with the latest technologies or innovative business models. We will provide wide-ranging support for business development, marketing and localization by companies looking to expand their business in Japan.

In FY2015, KDDI made a capital investment in Aoi.co, which operates the AOI-ZEMI smartphone tutoring school. AOI-ZEMI offers free high-quality lessons to junior high school and high school students who have access to a smartphone, tablet, or computer. As an online service, the lessons are not subject to the constraints of location.

In addition to the capital investment, KDDI provides sales and business support through activities such as distributing the AOI-ZEMI app via au Smart Pass. Moving forward, KDDI will continue providing new value to customers by investing capital in promising startups.

Furthermore, AOI-ZEMI participated in the fifth semester of the KDDI ∞ Labo startup incubator program, and went on to become the fourth KDDI ∞ Labo member to receive an investment from the KDDI Open Innovation Fund.

Link ▶ Website — KDDI Open Innovation Fund

■ KDDI ∞ Labo (Mugen Labo) Supporting the Growth of Venture Companies

In 2011, KDDI launched "KDDI ∞ Labo," a program designed to support young engineers who are passionate about created revolutionary Internet services for use around the world. This program provides total support to teams selected from a pool of applicants. This support ranges from service development support from the perspective of telecommunications companies to business support and promotion when they start up their business. In addition, KDDI provides a variety of other kinds of support such as communication space within its offices and free loans of terminals required for service development work. The Partners Association Program, which was launched in FY2014, enlists the cooperation of established companies from a wide variety of industries. In an effort to create new innovations, these established companies provide support to startup companies through the application of resources, such as their development environment and know-how, to facilitate new ideas and boost their development speed.

Creating Value through Innovation

In the ninth semester that began in October 2015, the first hardware program was launched, and six teams received support from KDDI and 18 established companies to develop their ideas into practical form. KDDI ∞ Labo has provided support to a total of 45 teams through the nine semesters of the program, and the tenth semester, which involves nine companies, is currently underway.

With the start of the tenth semester, KDDI changed the program's policy of operation, transitioning away from its function as an incubator program for new ideas that have not yet been publicly announced, to that of an accelerator program that supports the acceleration of business growth, even for services and products that have already been publicly announced. The program will continue to support startups using the assets and know-how of KDDI and the 30 participating companies from a wide range of industries.

In addition, through a regional partnership program that was launched in FY2015, KDDI is providing support to startups through four local governments (the cities of Osaka, Ishinomaki and Fukuoka, as well as Hiroshima prefecture).

KDDI ∞ Labo
Link Website

Activity and Results

Conducting R&D that Contributes to the Sustainable Development of Society

■ Development of "Benkyo Unagashi Home" app

In recent years, smartphone overuse among youth has become a social problem. In response, KDDI has developed the "Benkyo Unagashi Home" app to encourage limited smartphone use. Rather than imposing physical restrictions on smartphone use, the app promotes autonomous behavior change by applying the "nudge theory" developed by American economist Richard Thaler, which takes a psychological approach to behavior management. When installed, this app allows the user to switch between "Normal Mode" and "Study Mode" on the smartphone home screen. In "Normal Mode", nudges such as pop-up messages and an indicator that shows the smartphone usage time promote awareness about appropriate smartphone usage, prompting users to alter their behavior to prevent excessive use. In "Study Mode", only registered apps that are conducive to studying can be used, thereby helping the user concentrate on their studies, even when they are handling their smartphone.

■ Offering trial services that use HEMS technology

In May 2015, KDDI and the city of Kuwana began offering lifestyle support services designed to enrich and improve the convenience of daily life. The services make use of electricity-related big data obtained from approximately 14,000 participating households across Japan. Available through various providers, the services provide functions such as the visualization of electric power consumption, energy-saving advice, and remote monitoring of the elderly.

In addition, to ensure peace of mind in using these services, KDDI R&D Laboratories offers a privacy policy management function that lets users limit the type and amount of electricity-related data that they share. By allowing each user to configure their own privacy policy and limiting the sharing of electricity-related data based on the settings, the system ensures that user privacy is protected.

■ Dolphin observation using acoustic techniques for maintenance of underwater cables

The acoustic technology of KDDI's underwater robots, which were developed to inspect undersea cables, was used to study the behavior of endangered river dolphins inhabiting the Ganges river in India, in a joint research project conducted by The University of Tokyo and Kyushu Institute of Technology. The project contributes to biodiversity protection by providing a clear understanding of dolphin behavior, and it functions as a social contribution activity by educating the people involved so that they can perform the research independently.

Winner of the 25th Global Environment Awards (Fujisankei Group Award)
Link Page_18

Research on Behavior of Endangered River Dolphins
Link Page_104

Creating Value through Innovation

■ Using new environmental technology at London data center

TELEHOUSE EUROPE, a European subsidiary of KDDI, has equipped the TELEHOUSE LONDON Docklands North Two facility, which is scheduled to open in the summer of 2016, with an indirect external air cooling system that draws outdoor air in through equipment mounted on the exterior walls of the building. In addition, the air flow has been optimized by physically separating the air ducts that cool the racks from those that exhaust heat from the data center equipment. The use of this new environmental technology greatly reduces the power consumption of the air conditioning system, creating a significant improvement in the power usage effectiveness of the facility.

■ Introduction of Tribrid Base Stations in Indonesia

Since 2009, KDDI has installed and operated Tribrid Base Stations,[1] which are mobile phone base stations that effectively utilize normal commercial power, solar power, and rechargeable batteries. In June 2014, as part of its public Global Warming Countermeasure Proliferation Promotion Project to achieve Joint Crediting Mechanism (JCM),[2] the Ministry of Economy, Trade and Industry selected KDDI's research proposal for Indonesia, which proposes an aim for reducing greenhouse gas through the proliferation of Tribrid Base Stations.

KDDI will continue its efforts to consider the environment while utilizing the latest technology in order to contribute to the important responsibility entrusted to global companies of conserving the global environment.

[1] Tribrid Base Stations are mobile phone base stations that effectively use commercial power, power generated from solar panels, and power saved in rechargeable batteries in response to the time of day and the weather. Compared to base stations that only use commercial power, Tribrid Base Stations can be expected to reduce CO_2 emissions up to 30%. KDDI installed its first Tribrid Base Stations in December 2009, and as of March 31, 2016, has expanded to 100 base stations nationwide.
[2] A mechanism in which, through a bilateral agreement between two countries, the contributions to the reduction and absorption of greenhouse gas emissions by the spreading and transferring Japanese low-carbon technology, products, and infrastructure are recognized as Japanese contributions

■ International Cooperation for R&D on Cyber Attack Forecasting Technology

KDDI represents a research institution comprising six companies and organizations on a publicly subscribed R&D project tendered by the Ministry of Internal Affairs and Communications, "Proactive Response Against Cyber-attacks Through International Collaborative Exchange."

In recent years, unauthorized access, information exploitation, and other types of cyber attacks have grown in scale and become increasingly sophisticated. Through this project, the Ministry of Internal Affairs and Communications seeks to enhance information collection networks and international collaboration related to cyber attacks. To this end, the ministry is promoting cooperation among Internet service providers (ISP), universities, and other organizations on the promotion of "Proactive Response Against Cyber-attacks Through International Collaborative Exchange."

As part of the project, which KDDI conducted from FY2011 to FY2015, sensors were installed at several overseas locations to monitor for cyber attacks. KDDI worked with KDDI R&D Laboratories, the Institute of Systems, Information Technologies and Nanotechnologies (ISIT), Secure-Brain Corporation, Yokohama National University, and Japan Datacom Co., Ltd. to promote cutting-edge R&D related to the early detection and prevention of cyber attacks through international collaboration. Through this project, which is now being conducted by the non-profit organization Telecom-ISAC Japan and the National Institute of Information and Communications Technology (NICT), KDDI played a role in ensuring the safety of Japan's important network infrastructure, which is an essential part of the nation's business foundation and the lives of citizens.