

Research Development at Osaka University

The Mission of Research Universities

Research-intensive universities have three missions to fulfill in modern society: demonstrate academic excellence, bring innovation to society, and contribute to solving issues that affect all of humanity. To successfully perform these missions and meet the expectations of society, universities need to conduct wide-ranging interdisciplinary research and utilize a diverse range of research styles.

Promoting Research Diversity

As a Research University, Osaka University prioritizes fundamental (pure) research because it underlies all human endeavors and aims to meet the expectations of society.

It is important to remember the rapid progress in emergent technologies since the end of the 20th century, including biotechnology, nanotechnology, ICT, AI, big data, robotics, and light and quantum physics. In particular, advanced research in information science has established the concept of “information” as a key element to understand the world, along with matter and energy. It is no exaggeration to say that information science is now influencing all existing fields of research.

Accordingly, we must identify the fields of research at which Osaka University excels, understand the trends in scientific research around the world and the direction of Japan’s science and technology policy, and then select the research fields that need to be strategically promoted and strengthened.

Utilizing a Diverse Range of Research Styles

The outcomes of research conducted at universities are generally made public through published papers. However, to successfully meet the three missions noted above, it is important to examine the appropriate research styles and evaluation criteria for each of these missions.

1. Research for Academic Excellence

Achieving academic excellence is a fundamental goal of research-intensive universities. Research for this purpose usually focuses on themes set in respective interests of disciplines without a specific vision of how research results can be applied in practice. While such research can yield results that turn out to be useful for society, developing practical applications is not the original purpose. This type of research is known as fundamental research or pure research.

Today, various indices are used when evaluating research excellence, such as university rankings. These indices include the number of papers published, field-weighted citation impact, impact factor, number of international co-authored papers, and number of papers ranked among the top 1% or 10% in terms of citation impact. Generally, evaluation using these indices is based on peer review, which means that academic excellence is evaluated by groups of academic peer reviewers.

While such quantitative evaluation is taken for granted as the international standard in the natural sciences, this is not the case for the humanities and social sciences in Japan. Nevertheless, research excellence in the humanities and social sciences is basically evaluated by groups of academic peer reviewers, the same as in the natural sciences.

2. Research for Technical Innovation

The research conducted at Osaka University is highly regarded both in Japan and abroad for its academic excellence and for its technical innovation. There are high expectations for Osaka University to serve as an incubator of innovation which will benefit society and contribute to socioeconomic development through its research activities.

Unlike research for academic excellence, research for technical innovation is eventually evaluated by the users of those innovations (in most cases, companies), not necessarily based on an assessment of papers published or peer reviews. It is important to be aware that collaboration and co-creation with users of research results should be included in the indices used to evaluate research intended to develop technical innovations.

For research intended to develop technical innovations at Osaka University, therefore, we should establish appropriate support measures and evaluation criteria using methods that are different from those used to evaluate research intended to demonstrate academic excellence. For example, the indices used in Reuters World's Most Innovative Universities, which focuses on patents and academic-corporate co-authored papers, should be taken into account.

3. Research for Solving Social Issues

There is an increasing number of complex and challenging issues affecting all of humanity, including global environmental problems, and there is an urgent need for action such as initiatives for the Sustainable Development Goals and Society 5.0. Universities, with their wealth of knowledge, are expected to play an active role in solving these issues.

Unlike research for academic excellence, research for solving these issues aims to achieve goals set in response to the demands of society. In addition to using existing knowledge, solving these problems requires, among other things, integrating knowledge from different fields, encouraging cross-disciplinary collaboration, and leveraging local knowledge available in the community where the problem has arisen. Especially important is collaboration and co-creation among researchers in humanities and social sciences and those in medical, dental, pharmaceutical, science, and engineering fields. It is often the case that in the process of addressing social problems, new research themes are discovered, which in turn are relayed to specialists in the relevant field. Of course, writing papers is also important in this type of research, but the essence of research evaluation must become focused on whether or not the research contributes to solving social issues.

In recent years, research in information science and life science has made outstanding progress. One characteristic of such research is that it uses real-world big data and genomic information. The subject of this research is society itself, and the results are put to practical use in society. This indicates the necessity of addressing the ethical, legal, and social implications (ELSI) of such research and underscores the importance of collaboration and co-creation among researchers in humanities and social sciences as well as those in medical, dental, pharmaceutical, science, and engineering fields.

Needless to say, these three research styles are not mutually exclusive, but are often intermixed in research activities. However, it is important to still fully consider how to promote these diverse research styles and establish evaluation criteria appropriate for each one based on the standards that were set when policies were established upon becoming a Designated National University, that is, having a flexible and comprehensive approach to development.

Additionally, it is important to see the essential connection between the implementation of innovation and its effect on societal reform when showing the synergy between research styles.

We also focus on nurturing individuals that can respond to these kinds of diverse research styles, and promote education and research policies as one. This is the essence of our institution's goal for becoming an innovative university.

The following text is intended to explain to the public the principles under which Osaka University will promote research for solving social issues, one of the three research styles.