

The Reform Trends and Model Selection of University Scientific Research Organizations in the Post-College Era

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Abstract: In the post-college era, university research organizations are facing unprecedented changes in their structure and operational models. In terms of organizational form, these institutions are transitioning from single-discipline-based models to interdisciplinary and multidisciplinary collaboration models. This shift reflects the growing need to address complex, real-world problems that require expertise from multiple fields. From a management perspective, interdisciplinary research organizations face unique challenges. They must coordinate researchers from diverse disciplinary backgrounds, navigate potential conflicts between traditional departments and interdisciplinary units, and address differences in goals and organizational culture among members. These complexities make management more intricate and demanding. Simultaneously, the focus of university research organizations has become increasingly interest-driven, with research objectives, content, and participants reflecting specific areas of interest or societal demand. To adapt to these evolving trends, university research organizations must adopt flexible models tailored to their unique development needs. This approach will ensure the efficient execution of research activities and facilitate the effective transformation of research outcomes into practical applications.

Keywords: Post-college era; University scientific research organization; Interdisciplinary research

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1. Introduction

Since the introduction of the Humboldt model, universities have incorporated scientific research into their own responsibilities. The development of science continues to push forward human society. With the advent of the era of the knowledge economy, knowledge has been given a certain economic value. The university has also gradually moved from the edge of society to the center of society. In the post-college science era, the concept of “knowledge for knowledge” has been gradually replaced by the concept of “knowledge production with knowledge.” From college science to post-college science, the production mode of knowledge has undergone new changes, such as the diversification, application, and multi-subject of knowledge production demand.

Scientific research in the post-college era is not only pure scientific research hiding in the “ivory tower,” but also research that needs to go out of the sacred college hall for the development of the country and society.

2. Transformation of university research paradigm from college science to post-college science

The 17th century is the most critical century for the development of modern science. Initially, scientists explored knowledge for scientific research mainly based on “leisurely curiosity.” The research spirit of “knowledge for knowledge” supports their scientific research beliefs in this period. In the 1860s, the scientific mode of production has undergone significant changes. For example, scientific research pays more attention to social services and benefits. Scientific research institutions are no longer limited to universities, and scientific research management has become more complicated ^[1]. This revolution marks the emergence of post-college science. The emergence of college science also shows that the university’s scientific research paradigm is in transition.

2.1. Transformation of scientific research context from academic context to applied context

In the era of college science, university scientific research is mainly carried out in the academic context. The most primitive motivation for scientists to carry out scientific research is to enhance knowledge. In the era of science, the university’s knowledge production process mainly follows a single linear production model, that is, from basic research to applied research and then to development. After World War II, the rapid development of science and technology promoted the arrival of the era of the knowledge economy. In order to solve practical social problems, produce practical economic benefits, and serve the major strategic needs of the country, it is the main goal of scientific research activities in the post-college era. People are interested in science not only because it can stimulate intellectual interest but also because it can bring material benefits ^[2]. Therefore, in the post-college science era, university research is mainly carried out in the context of application.

2.2. Transformation of scientific research foundation from single discipline to interdisciplinary

Discipline is the result of knowledge accumulation to a certain extent in different professional fields. In the era of college science, scientists work mainly around a single discipline. There are strict academic boundaries between disciplines and the communication between disciplines is weak. Scientific research activities around a single discipline have their own academic norms, management reviews, and so on. There are isolated academic barriers between disciplines. Such a single discipline-based scientific research method can, to a certain extent, deepen the development of knowledge within the discipline. However, with the high degree of differentiation of disciplines, sub-disciplines have become more and more. Too refined single-disciplinary knowledge cannot be completed independently when solving complex social problems. At this time, it is necessary to carry out scientific research by forming an interdisciplinary research team. Therefore, in the post-college science era, university research and production are mainly carried out in an interdisciplinary context.

2.3. Transformation of scientific research review from peer review to multidimensional control

Due to the closed nature of knowledge in the scientific era of our college, the results of scientific research are mostly carried out in the form of peer internal review. The results of the review are generally to see whether the

research done by individuals has made outstanding contributions to the field of this discipline. The reviewers are experts in various disciplines and few outsiders are involved. After entering the post-college science era in the 1990s, globalization and informatization have led to increased competition among countries and have also had an impact on the development of research universities. The field of higher education is also involved in capital. On the one hand, research universities have set up many interdisciplinary research institutions based on their own development needs, and a variety of disciplines are interwoven in interdisciplinary research organizations, which makes the final evaluation not only in accordance with the evaluation criteria of one discipline. On the other hand, due to the limitation of funds and other factors, university scientific research cooperates with the government and enterprises, and its evaluation is bound to be reviewed by these investors. Therefore, in the post-college era, the main body of scientific research evaluation has increased, and the standards of scientific research evaluation have become broader. Scientific research review is changing from peer review to multidimensional control.

3. Transcending disciplinary boundaries: The changing trend of university scientific research organizations in the post-college era

Research organization refers to the organization that undertakes specific scientific research functions within the university. The main purpose of the research is to produce new knowledge to solve the needs of research topics^[3]. Under the condition of the change of research paradigm in the post-college era, the university scientific research organization with knowledge production and innovation as the primary task has also crossed the boundary of the discipline and is undergoing profound changes.

3.1. Diversified development of organizational forms

The earliest scientific research organizations in universities can be traced back to medieval universities. The medieval university mainly evolved from the spontaneous guild organization formed by one or more prestigious scholars and their followers in a certain field. These scholars' guilds generally focus on the interaction and exploration of knowledge centered on well-known scholars. However, they are not really scientific research organizations. Until the 17th century, with the proposal of the University of Berlin to unify teaching and scientific research, the scientific research organization of colleges and universities began to be institutionalized. In the era of college science, the way of university scientific research organization is mainly based on disciplines and departments. Typically, the tutor leads the students to carry out scientific research according to their own research topic, which is generally expressed in the form of a group or research team. The organization of scientific research is relatively simple. In the post-college science era, there are new changes in the organization of university scientific research. With the support of the "interdisciplinary" background, the organization of university scientific research is not confined to the research team around a single discipline but has changed in various forms. The most basic is the small-scale interdisciplinary team formed between the basic departments, institutes, or laboratories of the university. Secondly, there are school-level research institutes, research centers, and laboratories that cooperate with the government. In addition, research universities at home and abroad have begun to jointly establish collaborative innovation centers, high-tech industrial parks, or entrepreneurship centers with enterprises and scientific research institutes^[4].

3.2. Complexity challenges of organization management

In the post-college era, scientific research organizations in universities are mostly carried out in an

interdisciplinary way. These interdisciplinary organizations are different from previous scientific research organizations. The complexity of their research problems determines that they need researchers with different disciplinary backgrounds. The heterogeneity among members poses a greater challenge to organizational management. The first is how to balance the relationship between interdisciplinary research organizations and traditional departments. For example, the personnel working in interdisciplinary scientific research organizations generally implement the “dual employment system,” and it is inevitable that they will fall into a dilemma when managing such researchers. The second is how to coordinate and distribute the research objectives and interests of interdisciplinary organizations. The heterogeneity among members of interdisciplinary organizations will inevitably lead to differences in research objectives and the distribution of benefits.

3.3. Trend of organizational research interests

At the end of the 20th century, universities in Europe and the United States experienced the “second academic revolution.” Academic research and economic development were combined with industry and trade, and the economic development mission of universities was increasing ^[5]. Various research organizations working with third parties have been established in universities. These scientific research organizations cannot escape the orientation of interest from the beginning. The first is reflected in the interest of research objectives. The research goal determines the research direction of the whole scientific research organization. For instance, the “Manhattan Plan” with national interest-oriented research objectives, the school-enterprise laboratory with enterprise interest-oriented research objectives, and the scientific research organization created by research universities for their own interest development. Although these different types of scientific research organizations have varying research objectives, the final results will point to interest.

4. Organized research units: The model selection of university scientific research organizations in the post-college era

Interdisciplinary research has become the trend of the times when universities are required to change. The development of all interdisciplinary activities must have corresponding organizational carriers. Organized scientific research is a scientific research model that can efficiently integrate internal advantages and multidisciplinary resources to carry out task-oriented research ^[6]. Its essential attribute is a model of interdisciplinary organization. In today’s world, the developed countries led by the United States have already incorporated interdisciplinary research into the country’s major development plans, and the construction of organized research units has become more mature. At present, a new round of global scientific and technological revolution and industrial transformation is in the ascendant, disruptive technologies are constantly emerging, scientific and technological innovation is accelerating, and it is deeply integrated into and widely penetrated all aspects of human society, becoming the leading force to reshape the world pattern and create the future of mankind. If China wants to occupy a dominant position in international competition or if China’s universities want to obtain long-term development and occupy a place in world-class universities as soon as possible, it is necessary to choose a reasonable model based on its own situation. Organized research units conform to the trend of the reform of university research organizations in the post-college era and exhibit the following characteristics.

Clear task orientation: Exploring the development process of organized research units in the United States, it is not difficult to find that no matter what form of organized research units, such as laboratories in university escrow countries or independent research units in universities, they all have a common feature that they carry

out scientific research activities around specific research plans or research tasks. The emergence of organized research units is fundamentally a response of universities to the needs of external society^[7]. When some studies do not meet the department teachers' research interests or research plans, or the main purpose of the study is to achieve the interests of external sponsors, organized research units came into being. They often have a clear goal, that is, quantifiable actual output results. On the contrary, in the process of research, whether there is a corresponding contribution in the academic field is not very concerning. All the researchers only work for the common research task.

High flexibility: There has been a long-standing dispute between teaching and research in universities. Especially since entering the post-college era, although the university began to gradually maintain contact with the outside world, the boundary of this connection is still controversial. Based on the development needs, some departments are unable to participate in interdisciplinary research at the request of the school level, perhaps because of the interest dispute. Especially in the case of dual tasks of teaching and scientific research, departments have to share limited scientific research funds with interdisciplinary organizations, and departments also need to disperse personnel or equipment to interdisciplinary organizations. In addition, due to the comprehensiveness and intersectionality of the research content of interdisciplinary organizations, some teachers who are transferred from departments will also face problems such as being not interested in research or benefit distribution. The "foundation-application" axis of research is not collinear with the "selflessness-interest" axis, but it is the "selflessness-interest" axis that reveals the reasons for stimulating the expansion of organized research in universities^[8]. The organized research unit is a more flexible organizational model. If the two types of research organizations with pure academic interests are compared to the two ends of the straight line, the organized research unit is the product of the integration of the two ends of the straight line. He combines the interests of both sides, that is, the university and the outside world, which can respond to external needs and meet the needs of knowledge production.

Strong systematicity: Systematicity is a key factor in the successful operation of an organizational system. The more rigorous the systematic strong organization system is, the higher the efficiency is. On the contrary, if an organizational system is weak, its internal will be chaotic and inefficient, which will eventually lead to the collapse of the organization. Organized research units have clear research objectives, diverse scientific research organizations, solid scientific research foundations, and strong scientific research funds. Whether it is from basic application development or scientific research output, there is a relatively clear logical system. "Organized scientific research" pays more attention to the orientation of national strategic objectives, interdisciplinary integration, and the organization and implementation of big science programs^[9].

5. Conclusion

The choice of scientific research organization mode affects the scientific research level of universities, and the scientific research level of universities has a profound impact on the scientific and technological level of the country. The report of the 20th National Congress of the Communist Party of China pointed out that "education, science and technology, and talents are the basic and strategic support for building a modern socialist country in an all-round way"^[10]. At present, colleges and universities in China have made great achievements in the construction of scientific research organizations, but they still face some problems, such as inadequate resource allocation, confusion of power and responsibility between research platforms and departments, shortage of high-end talents, and imperfect evaluation systems and results. In the post-college era, we need to do far more than

just set up relevant scientific research organizations. It is necessary to make more reasonable model selection, set up organized research units, and formulate relevant supporting measures, so as to adapt to today's changing times.

Disclosure statement

The author declares no conflict of interest.

References

- [1] Ziman J, 2008, *True Science: What Is It? What Does It Mean?* [Trans., Zeng G, Kuang H, et al.], Shanghai Science and Technology Education Press, Shanghai.
- [2] Huang X, 2003, Post-Academic Science and Its Social Norms-After Reading Ziman's "True Science." *Science Research*, (05): 556–560.
- [3] Zhu H, 2015, Government Factors and Their Influencing Paths in the Change of Scientific Research Organizations in American Universities. *Journal of National School of Education Administration*, (07): 82–88.
- [4] Ru N, Yan G, 2018, Exploration on the Interdisciplinary Organizational Change and Operation Strategy of the University. *Higher Education Management*, 12(04): 58–65.
- [5] Li L, 2017, Changes in University Development Logic, Organizational Form and Governance Model. *Higher Education Research*, 38(06): 24–31.
- [6] Jiao L, 2022, Organized Scientific Research in Universities Needs to be Systematically Promoted, *Guangming Daily*, October 24, 2022, (015).
- [7] Yu R, 2011, The Development of Organized Research Units and Its Impact on American Research Universities. *Tsinghua University Education Research*, 32(04): 86–91.
- [8] Gage R, Gao X, 2023, On Organized Research Units in American Universities. *Higher Engineering Education Research*, (05): 171–180.
- [9] Pan Y, 2022, The Problem Deconstruction and Path Construction of the Implementation of Organized Scientific Research in Universities. *China Higher Education*, (Z3): 12–14.
- [10] Chen X, 2023, The Organizational Model, Experience Characteristics and Problem Countermeasures of Organized Scientific Research in Colleges and Universities. *Journal of the National Institute of Educational Administration*, (07): 78–87.

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