

Analysis on Specific Measures in Major National Scientific Research Projects Led by Universities

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Abstract: Undertaking major national scientific research projects is important presentation of the strategic demand for universities' serving the country and comes as a source carrier giving birth to major scientific innovations, an important channel of cultivating outstanding innovation talents, and effective means of improving teaching level. As the scientific revolution accelerates and evolves, national and defense scientific systems have changed tremendously. Establishment of "Double First Class" universities is being quickly boosted. Universities are faced with an unprecedented new situation, new challenge, and new opportunity in terms of scientific innovation. This article defines the major national scientific research projects in the first place and analyzes the reason of decrease of major national scientific research projects undertaken by partial universities in the aspect of actual scientific research management. In addition, through questionnaire investigation, we have understood the key focuses of undertaking such projects led by scientific researchers in universities and proposed relevant countermeasures.

Introduction

The General Secretary of CPC, Xi Jinping pointed out, in the speech in the forum between teachers and students in Peking University, "Universities should aim to the leading edge of science in the world, strengthen the ability of tackling key problems and innovating in critical generic technologies, leading-edge technologies, modern engineering technologies, and disruptive technologies.[1]" Premier Li Keqiang pointed out, "We should deepen the reform in scientific system and stimulate scientists' vigor in innovation and creation." in the speech in 2019 State Preeminent Science and Technology Award Conference on January. Human being is the most important role in scientific and technological innovation. We should deepen the reform of scientific and technological systems with greater determination and vigor focusing on arousing the enthusiasm of scientific and technical personnel. [2]" Universities are important sources for scientific and technological innovation, especially for primary innovations; are critical bases for cultivating high-level scientific and technical talents; and are important thrust for promoting the state and regional innovation power [3]. Undertaking major scientific and technological projects has already become an important index of measuring the research level and the academic status of a university. How to incent the innovation vigor of scientific and technological personnel, to reinforce their sense of gain, to actively and positively undertake state major scientific and technological projects, to generate major innovative achievements, and to make preeminent contributions, have turned into a strategic challenge facing the universities.

1. Definition of Major Scientific Research Project

The major scientific research project described herein refers to those key projects, major projects, major development projects on scientific research apparatuses of National Natural Science Foundation of China, projects of science fund of innovation research group, special projects of

national key R&D plan, the scientific and technological innovation 2030 project, national scientific and technological major special projects, special scientific research projects of ministries and commissions, scientific and technological plans of provinces and cities, etc.

2. Analysis on Reason of Decrease in Major National Scientific Research Projects Led by Several Universities

With the change in innovation mode, innovation subject and management mode of the national scientific and technological system reform, some researchers do not fully understand the new situation of scientific research, and are not adaptable to the reform, thus not motivated to undertake major national scientific research projects. As a result, the number of major national scientific research projects undertaken led by some universities is decreasing. The details are as follows:

2.1 Insufficient Intervention at Earlier Stage, and Less Seminal Projects. The universities do not fully participate in the preliminary planning, demonstration, deployment and guideline preparation for major national scientific research projects. Although the major projects concerning advantageous fields and disciplines of the universities are arranged, less special projects and seminal projects are involved. Upon release of the guideline, the best timing of applying for special projects that the universities did not intervene at earlier stage may be missed, resulting in poor competitiveness.

2.2 Lack of Enthusiasm for Scientific Research Projects, and Less Participants and Projects. Some researchers are timid about the project application and dare not make a breakthrough in the existing research field. They are satisfied with the status quo, and are unwilling to go out of their comfort zone and to put effort into organizing and leading projects. At the same time, they have weak sense of gain and identity, bringing difficulty in coordination and management. The university researchers are not motivated to undertake major national scientific research projects as these projects feature long duration of implementation, numerous research units, heavy workload of coordination, and difficulty in management.

2.3 High Threshold Plus Restrictions, and Occupation of Quota for Talents. The major national scientific research projects have higher requirements on the academic level, industry influence and industry-university-research integration ability of project leaders. In general, young teachers or even professors do not have strong strength to lead the project application. Even if they apply for the projects, they are less competitive. In addition, there are restrictions on project leaders for most major national scientific research projects.

2.4 Provision on Leading by Enterprises & Supporting Funds for Several Major Projects. As the fundamental research, application development, achievement transformation, industrial development and other links are required to be planned as a whole and connected for major national research scientific research projects, a "threshold" is set for the intervention of universities in special work due to the organization and implementation modes of the projects. In terms of several projects, high supporting funds or self-raised funds are required, increasing the difficulty in projects undertaking by universities.

3. Focuses on Major National Scientific Research Projects Led by University Researchers

In order to know more about the university researchers' willingness and demand to undertake major national scientific research projects, arouse the enthusiasm of university researchers to undertake major national scientific research projects, and provide better support and service for teams undertaking major national scientific research tasks, we have distributed 300 questionnaires on "Willingness to Undertake Major National Scientific Research Projects" and have took back 288 effective questionnaires.

3.1 Age and Title of Respondent. The ages of the respondents are divided into four levels, among which 4.86% are aged 56 or above, 29.86% are aged 46-55, 45.14% are aged 36-45, and 20.14% are aged 26-35. In terms of the title, professors or researchers account for 42.01%, associate professors or associate researchers account for 37.15%, and lecturers or assistant researchers

account for 20.83%.

3.2 University Researchers' Willingness to Act as Project Leaders and Undertake Major National Scientific Research Projects. The university researchers to undertake the major national scientific research projects are of great importance for universities. Therefore, it is necessary to know whether the university researchers are willing to act as project leaders and undertake major national scientific research projects. According to the questionnaire, 271 people, accounting for 94% of all respondents, are willing to take the lead in applying for major national scientific research projects, while 17 people are unwilling to take the lead in applying for major national scientific research projects.

3.3 Driving Force for Researchers to Take the Lead in Applying for Major National Scientific Research Projects. The researchers aim to meet the major strategic needs of the country, serve the society, solve the bottleneck technology, and increase the academic influence in the industry by applying for major national scientific research projects. According to the questionnaire, 92.99% of the researchers hope to make "great achievements" and meet the major strategic needs of the country by relying on "major projects". 72.32% of the researchers hope to increase the academic influence in the industry. 42.8% of the researchers aim to pass the title assessment. 29.89% of the researchers aim to pass the annual review. 3.32% of the researchers are willing to take the lead in applying for major national scientific research projects for other reasons.

3.4 Demands for Support from Universities in Taking the Lead in Applying for Major National Scientific Research Projects. It is not necessary for researchers to take the lead in applying for major national scientific research projects alone. Instead, research under the organization of universities is required. According to the questionnaire, 84.5% of the researchers hope that the universities can carry out the talents cultivation for major national scientific research projects in advance and provide certain financial support. 67.53% of the researchers hope that the universities can provide certain incentive fees for organization and implementation of project application. 59.41% of the researchers hope that the universities can organize experts in relevant field to provide guidance on project review, so as to improve the quality of the declaration. 5.54% of the researchers that the universities can provide support in other aspects.

3.5 Analysis on Unwillingness to Take the Lead in Applying for Major National Scientific Research Projects. According to the questionnaire, 70.59% of the researchers prefer to participate in the projects as leaders of the subjects (subsidiary subjects). 52.94% of the researchers think that the projects are difficult to organize and coordinate, and cost too much energy. 47.06% of the researchers are unable to take the lead in project application due to qualification restrictions. 41.18% of the researchers think that their teams are less competitive. 11.76% of the researchers think that they do not have appropriate guide or direction in terms of project application. 11.76% of the researchers are too exhausted to take the lead in project application due to other scientific research tasks. 5.88% of the researchers are unwilling to take the lead in applying for major national scientific research projects for other reasons.

3.6 Demands for Support or Incentives from Universities in Undertaking Major National Scientific Research Projects upon Approval. The researchers who have undertaken the major national scientific research project upon approval also hope that the universities can introduce some incentive measures. According to the questionnaire, 86.81% of the researchers hope to increase the quota of postgraduates and support the talents cultivation. 79.51% of the researchers hope that the universities can give the benefits to the project leader or team in the allocation of indirect funds, so as to improve the proportion of performance-based expenditure. 69.79% of the researchers hope that their departments can provide certain support. 46.88% of the researchers hope that they can be provided with bonuses for project approval. 2.78% of the researchers hope that they can be provided with support in other aspects.

4. Countermeasures for Universities to Take the Lead in Undertaking Major National Scientific Research Projects

4.1 Actively Participating in Demonstration of and Preparation for Planning on Major

National Scientific Research Projects. The university scientific research management department should further improve the ability of planning, project generation and strategic penetration, and actively recommend influential academic leaders to participate in the planning demonstration and guideline preparation for major national scientific research projects. At the same time, the department should set up the office for major national scientific research projects in universities to create favorable working conditions for experts, and ensure the normal planning and guideline preparation.

4.2 Strengthening the Mechanism for Organizing and Promoting Major National Scientific Research Projects. The university scientific research management department should, at the stage of project application, organize the projects to be applied elaborately, maintain strict standards subtly, follow up the projects accurately, hold mobilization meeting, review meeting and open reply, and organize experts to review and modify the declaration repeatedly, so as to improve the quality of the declarations for major national scientific research projects undertaken by the universities.

4.3 Attaching Importance to Process Management of Major National Scientific Research Projects and Reducing Project Execution Risks. The project research progress, existing problems and obstacles, risks and other issues should be supervised and managed thoroughly in the whole process of project execution. The university scientific research management department should set up WeChat groups for leaders of research projects (subjects), give notices, reminders and relevant system documents the first time, add SMS reminder module in the scientific research management information system, and send SMS reminders to the leaders of research projects (subjects) at important time nodes, such as annual execution report submission, final account report submission, mid-term inspection, and performance evaluation reminder. The department should also regularly communicate with the leaders of research projects (subjects) by telephone, know the project progress, and provide on-site services when necessary. As the leading units of project, the department should ensure that smooth communication and coordination among research units during project execution, clarify the task division, strengthen the responsibilities, improve work quality and efficiency, take precautions and try to reduce project execution risks.

4.4 Joint Effort and Cooperation of Management and Service Departments under the University Institutions. The management and service departments under the university institutions should, during the project implementation, provide the project team with support in terms of labor, financial resources and materials. The Scientific and Technological Management Department, Financial Management Department, Audit Management Department, Bidding and Purchasing Management Department and other concerned departments should cooperate closely to promote the project implementation, control the project quality assurance, process tracking and supervision, financial performance and risk, so as to make significant innovation for the project.

4.5 Perfecting System Construction and Improving Researchers' Satisfaction. According to the management measures of major national scientific research projects, corresponding management procedures of universities should be improved and timely publicized to teachers in universities. Meanwhile, policies concerning indirect fee incentive, enrollment preference, supporting conditions, cultivation of major achievements, and cultivation incentives should be issued to arouse the enthusiasm of researchers for applying for major national scientific research projects.

4.6 Strengthening Guidance on Major Scientific and Technological Innovations and Establishing KPIs for Scientific Research Assessment. The number of major national scientific research projects applied, the number of approved projects, and the amount of funds received should be listed as the KPIs of researchers, and linked with the annual performance assessment of the researchers' departments, so as to arouse the enthusiasm of the departments and researchers for organizing and planning major projects.

4.7 Industry-University-Research Integration Strengthening, and Full Participation in Project Application. Under the situation with enterprises as the main body of innovation, university researchers can actively strengthen cooperation with enterprises and institutes. On the basis of giving full play to the advantages of the university, the university researchers can make full

use of the superior resources nationwide, and unite the internal and organizations with strong scientific research strength in various fields to apply for major scientific research jointly. The experts and resources from various enterprises and institutes, through cooperative research, can be gathered to give full play to the comprehensive effect. In addition, the problem of supporting funds can be solved through enterprises concerned.

Conclusion

The report made at the 19th National Congress of CPC affirms the great achievements that China has made in scientific and technological innovation, and highlight the roles of fundamental research and applied fundamental research in building an innovation-originated nation. The universities are the main force of fundamental research and applied fundamental research and the main battlefield for making breakthroughs in core technology. Performing organized scientific research and arousing the enthusiasm of researchers for undertaking major national scientific research projects are the foundations for sustainable development of scientific research in universities.

Reference

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