Original Article

Analysis of projects funded by the National Natural Science Foundation of China during the years of 2014–2018

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Background: The National Natural Science Foundation of China (NSFC) plays an important role in supporting scientific research. And numerous scientists and researchers are concerned about the applications and funding.

Methods: Annual reports of 2014–2018 were searched respectively from the NSFC official website. Further analysis was made to discover the regularity and trend of projects funded by NSFC.

Results: The funding by NSFC continuously increased rapidly since its establishment. Recently, the annual amount, which is still on the rise, has reached more than 20 billion CNY. From the year 2014 to 2018 multifarious projects types were set up by NSFC to support scientific research of different level and multiple dimensions.

Conclusions: In the past years, NSFC had provides strong support to basic scientific research in all fronts and provided a mechanism for fair competition.

Keywords: National Natural Science Foundation of China (NSFC); fund

Submitted May 03, 2019. Accepted for publication May 16, 2019.
doi: 10.21037/atm.2019.05.63
View this article at: http://dx.doi.org/10.21037/atm.2019.05.63

Introduction

The National Natural Science Foundation of China (NSFC) was established on February 14, 1986. It is an institution managed by the Ministry of Science and Technology of China, tasked with the administration of the National Natural Science Fund from the Central Government. Since its establishment, NSFC has comprehensively introduced and implemented a rigorous and objective merit-review system to fulfill its mission of supporting basic research, fostering talented researchers, developing international cooperation and promoting socioeconomic development (1). With the support from NSFC and other scientific programs, remarkable growth has been registered in different scientific fields. In 2017, 64.54% of SCI papers published by Chinese researches noted the statement of funding from NSFC.

Due to the important role of NSFC for the support of scientific research, it is widely concerned and focused by numerous scientists and researchers. Therefore, we conducted this study to analyze the projects funded by NSFC during the past 5 years of 2014–2018.

Methods

The annual reports of 2014–2018 were respectively searched from the NSFC official website (2-6). Further analysis was made to discover the regularity and tendency.

Results

Overall condition

The funding by NSFC continuously increased rapidly since its establishment, owing to the allocation mainly from the Central Government budget, as well as partly form the local governments and large state-owned enterprises (7). Recently, the annual amount has reached more than 20 billion CNY which is still on the rise (*Figure 1*).

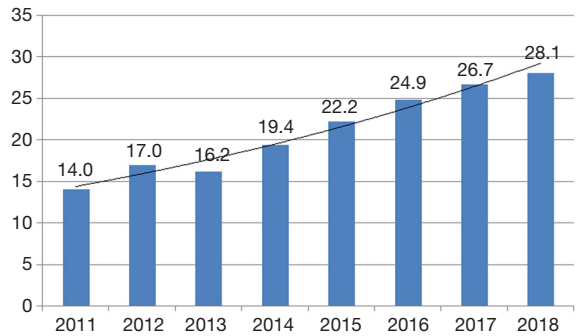

Figure 1 The annual amount of funding by NSFC from 2011 to 2018 (billion CNY). NSFC, The National Natural Science Foundation of China.

Projects types and proportions

From 2014 to 2018, multifarious projects types were set up by NSFC to support scientific researches of different level and multiple dimensions. The proportions of each project type is shown in *Figure 2*.

Detailed information of project types

General Program

The General Program supports scientists to do basic research on bottom-up based topics within the funding scope of NSFC to conduct innovative research and promote a balanced, coordinated and sustained development of all disciplines.

From 2014 to 2018, NSFC received 379,156 applications and funded 85,726 General Program projects. The detailed

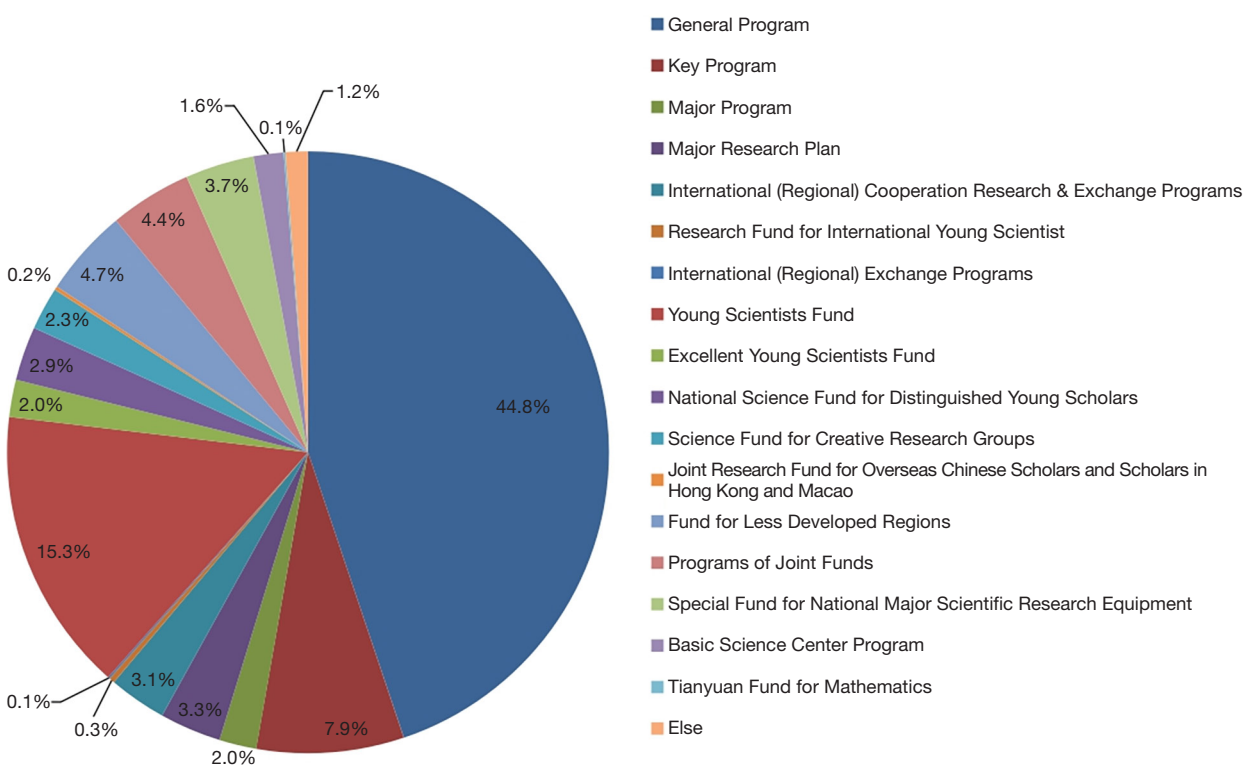

Figure 2 The proportions of each project type funded by NSFC during 2014–2018. NSFC, The National Natural Science Foundation of China.

Table 1 Detailed information of General Program project

Year	Numbers of applications	Numbers of awards	Average funding (thousand CNY)	Success rate (%)
2014	59,170	15,000	796	25.4
2015	73,025	16,709	613	22.9
2016	74,048	16,934	601	22.9
2017	80,291	18,136	589	22.6
2018	92,622	18,947	589	20.5
Total	379,156	85,726	632	22.6

Table 2 Detailed information of Young Scientists Fund projects

Year	Numbers of applications	Numbers of awards	Average funding (thousand CNY)	Success rate (%)
2014	65,016	16,421	243	25.3
2015	65,722	16,155	198	24.6
2016	70,399	16,112	193	22.9
2017	78,195	17,523	228	22.4
2018	86,042	17,671	236	20.5
Total	365,374	83,882	220	23.0

information of each year is shown in *Table 1*.

Young Scientists Fund

The Young Scientists Fund supports young scientists to freely choose their research topics within the funding scope of NSFC to conduct basic research, fosters the ability of young scientists to independently undertake research projects and conduct creative research, stimulates young scientists' creative thinking and trains backup talents for basic research.

From 2014 to 2018, NSFC received 365,374 applications and funded 83,882 projects. The detailed information of each year is shown in *Table 2*.

Fund for Less Developed Regions

The Fund for Less Developed Regions supports scientists in specified regions of China to conduct creative research within the funding scope of NSFC, so as to foster and support researchers in the regions, to stabilize and gather outstanding talents to facilitate the construction of the regional innovation system as well as the social and economic development of the regions.

From 2014 to 2018, NSFC received 74,191 applications and funded 14,406 projects. The detailed information of each year is shown in *Table 3*.

Excellent Young Scientists Fund

The Excellent Young Scientists Fund supports young scholars with good achievements in basic research to conduct innovative research in areas on their own choice, so as to promote fast growth of creative young talents and foster a number of outstanding talents on the international science frontiers.

From 2014 to 2018, NSFC received 21,535 applications and funded 1,999 projects. The detailed information of each year is shown in *Table 4*.

National Science Fund for Distinguished Young Scholars

The National Science Fund for Distinguished Young Scholars supports young scholars who have made outstanding achievements in basic research to select their own research directions and conduct creative research, so as to speed up the growth of young scientific talents, attract overseas talents and foster a group of prominent academic pacemakers in the forefront of international science and technology.

From 2014 to 2018, NSFC received 12,271 applications

Table 3 Detailed information of Fund for Less Developed Regions projects

Year	Numbers of applications	Numbers of awards	Average funding (thousand CNY)	Success rate (%)
2014	13,030	2,751	475	21.1
2015	13,170	2,829	387	21.5
2016	14,156	2,872	380	20.3
2017	15,935	3,017	363	18.9
2018	17,900	2,937	376	16.4
Total	74,191	14,406	395	19.4

Table 4 Detailed information of Excellent Young Scientists Fund projects

Year	Numbers of applications	Numbers of awards	Success rate (%)
2014	3,314	400	12.1
2015	3,520	400	11.4
2016	4,413	400	9.1
2017	4,867	399	8.2
2018	5,421	400	7.4
Total	21,535	1,999	9.3

Table 5 Detailed information of National Science Fund for Distinguished Young Scholars projects

Year	Numbers of applications	Numbers of awards	Success rate (%)
2014	2,032	198	9.7
2015	2,148	198	9.2
2016	2,433	198	8.1
2017	2,684	198	7.4
2018	2,974	199	6.7
Total	12,271	991	8.1

and funded 991 projects. The detailed information of each year is shown in *Table 5*.

Key Program

The Key Program supports researchers to conduct in-depth, systematic and innovative research in directions with sound research basis or where new growth points of scientific disciplines might emerge, so as to promote disciplinary development and breakthroughs in important areas or scientific frontiers. Key Program projects should follow the principle of limited objectives, limited research scope and focused goals, pay attention to inter-crossing disciplines, make effective use of existing major scientific research bases at national and ministerial levels, and conduct substantive international cooperation and exchange.

From 2014 to 2018, NSFC received 14,988 applications and funded 3,210 projects. The detailed information of each year is shown in *Table 6*.

Major Program

Major Program serves the major needs of the scientific frontiers, national economic, social and S&T development and national security, deploys in advance, conducts multidisciplinary research, and plays the supporting and guiding role of improving the capability of indigenous innovation in China's basic research.

From 2014 to 2018, NSFC received 242 applications and funded 142 projects. The detailed information of each year is shown in *Table 7*.

Projects of Major Research Plan

The Major Research Plan focuses on key basic scientific issues with strategic importance to the nation and major frontier areas and gives high priority identified on the basis of the capability and advantages in the country. Rather than individual project, the Major Research Plan is designed to be a program cluster which contains a number of projects with relatively identical objectives for innovative research resources integrity in order to explore the possible breakthroughs in the identified areas.

From 2014 to 2018, NSFC received 13,212 applications and funded 2,515 projects. The detailed information of each year is shown in *Table 8*.

Table 6 Detailed information of each year about Key Program projects

Year	Numbers of applications	Numbers of awards	Average funding (thousand CNY)	Success rate (%)
2014	3,025	605	3,382	20.0
2015	2,805	625	2,861	22.3
2016	2,782	612	2,803	22.0
2017	3,012	667	2,979	22.1
2018	3,364	701	2,931	20.8
Total	14,988	3,210	2,988	21.4

Table 7 Detailed information of Major Program projects

Year	Numbers of applications	Numbers of awards	Average funding (thousand CNY)	Success rate (%)
2014	46	23	16,957	50.0
2015	29	20	15,907	69.0
2016	45	23	15,251	51.1
2017	63	40	16,353	63.5
2018	59	36	19,090	61.0
Total	242	142	16,903	58.7

Table 8 Detailed information of Major Research Plan projects

Year	Numbers of applications	Numbers of awards	Success rate (%)
2014	1,925	453	23.5
2015	2,515	512	20.4
2016	2,569	502	19.5
2017	2,856	535	18.7
2018	3,347	513	15.3
Total	13,212	2,515	19.0

Table 9 Detailed information of Science Fund for Creative Research Groups projects

Year	Numbers of applications	Numbers of awards	Success rate (%)
2014	262	78	29.8
2015	249	79	31.7
2016	294	77	26.2
2017	265	47	17.7
2018	262	48	18.3
Total	1,332	329	24.7

Science Fund for Creative Research Groups

The Science Fund for Creative Research Groups supports prominent middle-aged and young scientists to work as academic leaders and PIs on creative research focusing on key research issues, and fosters research groups with international influence.

From 2014 to 2018, NSFC received 1,332 applications and funded 329 projects. The detailed information of each year is shown in *Table 9*.

Basic Science Center Program

The Basic Science Center Program expects to concentrate and integrate domestic excellent scientific research teams. Aiming at the international forefront of science, this project will give long-term and stable support for those high-level academic leaders to do concentrated research and exploration. With the advanced deployment, this project is expected to reach scientific frontier breakthrough and harvest a series of outstanding original achievements with

Table 10 Detailed information of Basic Science Center Program projects

Year	Numbers of applications	Numbers of awards	Average funding (thousand CNY)	Success rate (%)
2016	7	3	170,567	42.9
2017	15	4	182,500	26.7
2018	8	4	187,500	50.0
Total	30	11	181,064	36.7

Table 11 Detailed information of Joint Funds projects

Year	Numbers of applications	Numbers of awards	Average funding (thousand CNY)	Success rate (%)
2014	3,598	574	1,277	16.0
2015	4,128	716	1,201	17.3
2016	4,869	739	1,527	15.2
2017	4,451	793	1,554	17.8
2018	5,044	822	1,710	16.3
Total	22,090	3,644	1,471	16.5

Table 12 Detailed information of Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao

Year	Numbers of applications	Numbers of awards	Success rate (%)
2014	461	143	31.0
2015	399	136	34.1
2016	386	135	35.0
2017	411	142	34.5
2018	336	102	30.4
Total	1,993	658	33.0

significant influence in the world.

From 2016 to 2018, NSFC received 30 applications and funded 11 projects. The detailed information of each year is shown in *Table 10*.

Joint Funds

The Joint Funds set up by NSFC and other relevant government departments, provincial governments and industrial sectors aim at supporting basic research in agreed scientific areas. The joint funds are designed to play a guiding role of the National Natural Science Fund, guide and integrate social resources in basic research, promote cooperation of relevant departments, industries and regions with universities and research institutions, foster scientific and technological talents and enhance China's indigenous innovation capabilities in relevant research areas, industries and regions.

From 2014 to 2018, NSFC received 22,090 applications and funded 3,644 projects. The detailed information of each year is shown in *Table 11*.

Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao

In order to take advantage of the overseas (including Hong Kong and Macao) resources in science and technology and encourage overseas excellent young scholars to contribute to the development of basic research in mainland China, NSFC sets up the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao to support excellent overseas (including Hong Kong and Macao) Chinese scholars under the age of 50 to conduct high-level joint research with scientists in mainland China.

From 2014 to 2018, NSFC received 1,993 applications and funded 658 projects. The detailed information of each year is shown in *Table 12*.

International (Regional) Cooperation and Exchange Programs

In order to improve the quality of China's scientific research and its international competitiveness, the International

Table 13 International (Regional) Cooperation Research Programs projects

Year	Numbers of applications	Numbers of awards	Average funding (thousand CNY)	Success rate (%)
2014	1,124	225	2,360	20.0
2015	1,288	276	2,168	21.4
2016	2,118	356	2,222	16.8
2017	2,733	489	1,984	17.9
2018	3,198	430	1,940	13.4
Total	10,461	1,776	2,098	17.0

Table 14 International (Regional) Exchange Programs projects

Year	Numbers of applications	Numbers of awards	Average funding (thousand CNY)	Success rate (%)
2014	1,538	746	90	48.5
2015	1,207	384	129	31.8
2016	1,472	583	130	39.6
2017	1,585	531	94	33.5
2018	1,807	601	118	33.3
Total	7,609	2,845	110	37.4

Table 15 Research Fund for International Young Scientist

Year	Numbers of applications	Numbers of awards	Average funding (thousand CNY)	Success rate (%)
2014	154	107	187	69.5
2015	205	107	262	52.2
2016	250	117	256	46.8
2017	413	155	290	37.5
2018	652	140	321	21.5
Total	1,674	626	268	37.4

(Regional) Cooperation and Exchange Programs aim at funding Chinese scientists to conduct substantial cooperation with their international collaborators in science frontiers and leverage international scientific and technological resources on the basis of "equal cooperation, mutual benefits, and equal sharing of research results". This program consists of three subtypes: International (Regional) Cooperation Research Program, International (Regional) Exchange Programs, and Research Fund for International Young Scientist.

The detailed information of each subtypes is shown in *Tables 13-15*.

Special Fund for Research on National Major Research Instruments

The Special Fund for Research on National Major Research Instruments aims to encourage and foster the exploratory research and development of instruments with creative ideas, and major research instruments and equipment with original creative ideas, which should be based on frontiers of science and national needs and guided by scientific targets, so as to provide new means and tools for scientific research and enhance indigenous innovation in China. This program could be applied independent or by the recommendation of scientific administrative departments.

Table 16 Detailed information of Special Fund for Research on National Major Research Instruments

Year	Numbers of applications	Numbers of awards	Success rate (%)
2014	750	71	9.5
2015	665	86	12.9
2016	647	89	13.8
2017	643	88	13.7
2018	652	89	13.7
Total	3,357	423	12.6

Table 17 Detailed information of Tianyuan Fund for mathematics projects

Year	Numbers of applications	Numbers of awards	Average funding (thousand CNY)	Success rate (%)
2014	975	321	147	32.9
2015	760	215	116	28.3
2016	723	253	99	35.0
2017	277	82	305	29.6
2018	181	62	565	34.3
Total	2,916	933	168	32.0

From 2014 to 2018, NSFC received 3,357 applications and funded 423 projects. The detailed information of each year is shown in *Table 16*.

Tianyuan Fund for mathematics

Tianyuan Fund for mathematics is a special fund designed to integrate collective wisdom of mathematicians, explore funding method that suits the unique features of mathematics, and make China strong in mathematics. This fund supports researchers to conduct research according to the features and need of mathematics department, foster young talents, promote academic exchange, optimize research environment, disseminate mathematical culture and thus strengthening innovation for China in mathematics.

From 2014 to 2018, NSFC received 2,916 applications and funded 933 projects. The detailed information of each year is shown in *Table 17*.

Conclusions

In the past years, NSFC had provided strong support to basic scientific research in all fronts and provided a mechanism for fair competition. In the future, NSFC will stress on the development of the following aspects including innovative research, talents cultivation, international cooperation and management of excellence. NSFC expects to be a key contributor to the progress and prosperity of the basic research of China, and meanwhile to grow along with it.

Acknowledgments

None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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Cite this article as: Liu Y, Gao Z, Wang H, Wang J, Shen J, Wang C. Analysis of projects funded by the National Natural Science Foundation of China during the years of 2014–2018. Ann Transl Med 2019;7(12):267. doi: 10.21037/atm.2019.05.63

