



Advance EU Access to Financial Incentives for Innovation in China

**Guide for EU Stakeholders on
Chinese national STI funding programmes**

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About DEVELOPMENT Solutions

DEVELOPMENT Solutions (DS) is a European consultancy with its primary focus on supporting EU external policies and cooperation strategies towards third countries, in particular strategic partner countries. DS designs and delivers projects in the areas of economic and trade policy and business internationalisation in support of sustainable development and sustainable investment objectives, world-wide. Our expertise is built on our strong grounding in project design and management, research, policy and regulatory analysis, and the management of capacity strengthening programmes.



Executive summary

China has become a major global player and one of the EU's key international partners in research and innovation. In 2016, China spent around 1.57 trillion RMB (around 200 billion EUR) in Research and Development (R&D), corresponding to 2.11% of its GDP. China is rapidly closing the gap with the EU and the US in terms of number of scientific publications, as well as in terms of quality of scientific outputs. In recent years, there is an upward trend in terms of number of European research and innovation stakeholders, including enterprises, operating R&D activities in China and wanting to tap into this great potential. The number of joint research structures between EU Member States and China has also multiplied: a total of 144 operating structures were identified in a recent study by EURAXESS.¹

Access to R&D funding programmes is a fundamental framework condition for innovation. China is currently undergoing an ambitious reform of its national funding system for science, technology and innovation (STI) as well as its institutional setup. The reform, combined with an increasing national budget allocated for research and innovation (an average annual increase of 10% in the last three years), aims to fully unleash China's innovation-driven development strategy. The newly-reformed national funding programmes are expected to offer more opportunities to European entities to collaborate with their Chinese partners: on the one hand, the reform has led to proliferation of a large number of programmes dedicated exclusively to international exchange and cooperation; on the other, more openness and transparency results in increased opportunities for China-based European actors to access national funding resources and innovation incentives directly.

China's environment for STI funding programmes, however, still appears rigid, fragmented and complicated for EU actors. Firstly, the system is still undergoing structural reforms, and numerous funding programmes still lag behind in achieving the objectives set forth by the country's leadership. Secondly, with only very few exceptions, information on Chinese national funding programmes is provided entirely in Chinese language, resulting mostly inaccessible for the majority of EU researchers and innovators. Thirdly, even resources in Chinese language are thinly scattered among different channels and platforms, are extremely heavy reading, and often outdated: getting well-acquainted with and connecting such sparse information requires a great deal of time even for Chinese nationals, and not all European research entities can afford to hire the required dedicated human resources. This has directly resulted in the lack of awareness of the real situation of Chinese national STI funding programmes and the opportunities it offers, and consequently in very limited resource allocated to such funding programmes, and ultimately in a very low number of applications submitted by EU actors.

It is in this context that this ***Guide for EU stakeholders on Chinese national STI funding programmes*** was formulated. Grounded on eighteen months of daily monitoring, data collection and analysis, this Guide provides a comprehensive overview of the current status and opportunities provided by newly-reformed Chinese national funding programmes for science, technology and innovation. It does so by introducing the main changes brought by the reform unveiled in December 2014 by the State Council, focusing in particular on the new institutional layout and management structure, where a newly-emerged inter-ministerial joint council acts as general coordinator among tens of government bodies, and where the daily operations of funding programmes are delegated to a series of professional agencies, through a unified and comprehensive information management system. It then focuses on the five major funding pillars that have emerged as a result of a re-organisation and re-optimisation work of previously-existing national STI funding programmes:

¹ Europe-China Joint Research Structures Platform: <https://euraxess.ec.europa.eu/worldwide-china/platform-europe-china-joint-research-structures>

- The **National Natural Science Fund**, administered by the **Natural Science Foundation of China** and focusing on basic and applied research in natural sciences;
- **National S&T Major Projects**, focusing on major key products, technologies and engineering of strategic importance for the country's economy and industrial competitiveness;
- **National Key R&D Programmes**, actively supporting well-defined and well-targeted R&D in areas of social welfare and people's livelihood;
- The **Technology Innovation Guidance Fund**, stimulating the transfer and commercialisation of key results by investing in innovative start-ups and SMEs through venture capital funds, private equity, and risk compensations; and
- The **Bases and Talents Programme**, aiming to establish top-notch innovation bases and foster talents and teams with global competitiveness.

The legal framework, impact, and the rules and requirements for participation will be introduced in detail for each of the five pillars. Particular attention will be given to introducing figures related to international participation, to identifying areas which appear more open and welcoming for international actors, and to providing recommendations to EU stakeholders for increasing their chances of participation.

The core proposition of this Guide is that concrete opportunities for:

- China-based affiliates of European universities, research structures, and enterprises;
- EU-China joint universities, research structures or ventures;
- European scientists and innovators working in European or Chinese institutions in China.

Such actors should identify and dedicate their resources to the **most easily accessible** of the above programmes, and gradually expand from there to other more difficult programmes according to a well-planned long-term strategy – in other words, “**proceed in an orderly way and step by step**”, as the Chinese idiom goes (*xun xu jian jin*). The most easily accessible programmes might vary depending on different factors, e.g. one's conditions, sector, nature as well as type of funding needed. This document will guide the reader in identifying them.

In conclusion, this Guide also highlights seven **general remarks** on the STI funding environment that should always be kept in mind by any EU actors, namely:

- Access to funding in China generally follows strategic industrial goals, reflecting a strong **top-down design**;
- Chinese decision-makers still tend to stress the importance of ‘**hardware**’ conditions for research, i.e. equipment, products, facilities and infrastructures;
- European actors should put more efforts in showing stronger **commitment** to the Chinese innovation ecosystem;
- At the same time, European actors should increase their **dialogue** with Chinese authorities to get themselves more known;
- Make sure that China is **acknowledged** in any results and success generated with its assistance, thus contributing to its efforts to enhance its global image of innovative country;
- Ad hoc **resources** should be allocated to the monitoring and preparation of applications, especially in view of the rapidity at which new changes are introduced;
- Last, but not least, one should also keep in mind that applying to Chinese funding is a complex process that takes time, energy and resources. Rejected applications are frequent at the beginning. The key is to persist and be **resilient**.

Directly addressing the needs and feedback received from numerous China-based EU research and innovation stakeholders, mainly related to the absence of any official reference points for systematically understanding Chinese national STI programmes, this Guide aims to represent an authoritative, comprehensive, and up-to-date resource providing guidance and insights to EU stakeholders on what

opportunities are presented by the newly-reformed national funding system for science, technology, and innovation.

It is hoped that, in the short- and medium-term, this Guide will result in an increased number of applications submitted by EU stakeholders, and of national funding being granted to them.

The Guide was produced as part of the EU-funded project ***Advance EU Access to Financial Incentives for Innovation in China***. The project is a key action initiated by the European Commission as part of a monitoring of the effective implementation of the *EU-China Joint Roadmap on Ensuring Reciprocal Access to Respective Research and Innovation Funding*. Through daily monitoring and analysis of Chinese *de jure* developments within the S&T and R&I sector, and of *de facto* figures of participation under Chinese national STI funding programmes, the action provides significant factual evidence and technical input to the Innovation Cooperation Dialogue and to EU efforts to improve the innovation framework conditions and to levelling the playing field for European research and innovation stakeholders in China, by advocating for enhanced EU access to financial funding incentives for innovation in China.

The eighteen-month study was conducted in close consultation with the European Union Member States, the European Union Chamber of Commerce in China, and EURAXESS China. Specifically, through one-to-one consultations with R&D stakeholders as well as two workshops conducted in Shanghai and Beijing, the project team captured data on the subject of accessibility and reciprocity, while ensuring confidentiality and anonymity of the information be collected.

The project was funded by the **European Union**, and was implemented by **DEVELOPMENT Solutions Europe, Ltd.**

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List of abbreviations

AI: Artificial Intelligence
CAE: Chinese Academy of Engineering
CAS: Chinese Academy of Sciences
CERN: Conseil Européen pour la Recherche Nucléaire (European Organisation for Nuclear Research)
EI: Emerging Industries
ERC: European Research Council
EUR: Euro (currency)
FOF: Fund-of-funds
GAC: General Administration of Customs
HK: Hong Kong (Special Autonomous Region)
HNTZ(s): High- and New-Technology Zone(s)
ICT: Information and Communication Technologies
IP: Intellectual Property
ISISN: Internet-based Science Information System (of the Natural Science Foundation of China)
JV(s): Joint Venture(s)
KPI: Key Performance Indicator
MIC2025: Made in China 2025 (national plan)
MIIT: Ministry of Industry and Information Technology
MOE: Ministry of Education
MOEP: Ministry of Environmental Protection
MOF: Ministry of Finance
MOHURD: Ministry of Housing and Urban-Rural Development
MOST: Ministry of Science & Technology
NDRC: National Development and Reform Commission
NFTTC: National Fund for Technology Transfer and Commercialisation
NKP(s): National Key R&D Programme(s)
NSFC: Natural Science Foundation of China
PI: Principal Investigator
R&D: Research & Development
RMB: *Renminbi* (Chinese Yuan, currency)
S&T: Science and Technology
SAIC: State Administration of Industry and Commerce
SASAC: State-owned Assets Supervision and Administration Committee
SASTIND: State Administration of Science, Technology and Industry for National Defense
SAT: State Administration of Taxation
SCI: Science Citation Index
SKL: State Key Laboratory
SME(s): Small- and Medium-sized Enterprise(s)
SoE(s): State-owned Enterprise(s)
STI: Science, Technology and Innovation
VC: Venture Capital

Glossary

Project leading unit: (occasionally also referred to as “project leaders”) refers to the unit (enterprise, university, research institute, etc.) which is leading the project consortium (if any). Project leading units are responsible for preparing applications to new tenders, and to ensure the smooth implementation of project deliverables. An individual must be selected as coordinator of the project leading unit, and in this study is usually referred to as “Principal Investigator (PI)”.

Main responsible bodies: refer to bodies with jurisdiction over one applicant, e.g. the State-owned Asset Supervision and Administration Committee is the responsible body of most state-owned enterprises; the Ministry of Education is the main responsible body of centrally-administered universities; provincial governments are the main responsible bodies of universities, research structures and enterprises not administered at the central level, etc. They are responsible for collecting, reviewing, selecting and finally endorsing proposals from applicants within their jurisdiction, before forwarding them to the central government.

Line (government) agencies: refer to government agencies responsible for a specific Mega Project in line with their area of competence, for instance the Ministry of Environmental Protection and Ministry of Housing and Urban-Rural Development are the line agencies of the “Water Pollution Control and Treatment Technologies” Mega Project. They are recommended by MOST, NDRC, and MOF. One line agency can also be responsible for two or more Mega Projects (e.g. MIIT is the line agency for three Mega Projects).

Professional management agencies: agencies empowered for the daily management and operation of central STI funding programmes, on behalf of the ministries and other bodies. They usually organise and collect applications, organise evaluations, and organise funding allocation. A total of seven agencies belonging to different ministries have been selected so far (all of them being *shiye danwei* – not-for-profit public institutions).

Host unit/institution: from the Chinese *yituo danwei*, refers to those legal entities to which certain research facilities or teams are affiliated. Host units/institutions are responsible for endorsing or approving the proposals of candidates affiliated to them, as well as to support them financially and through any necessary means. In the context of this study, host units include: universities; research structures; and enterprises (state-owned and privately-held) within the Natural Science Foundation of China (first funding pillar) and the Bases and Talents Programme (fifth funding pillar).

1. The reform of the Chinese national STI funding system

In December 2014, the State Council of the People's Republic of China issued the “**Notice on Deepening the Reform of the Management of Central Finance S&T Projects (Programmes, Funds)**”, commonly referred to as the “*Guo Fa [2014] No. 64*”.² The *Notice* outlined an ambitious reform plan that would, gradually yet systematically, re-shape the structure of the entire Chinese national funding system for science, technology, and innovation (STI). This followed ten years of exponential growth during which China's research intensity surpassed that of the European Union, and its gross national R&D expenditure rose to third in the world, right after the EU and US.³

The *Notice* directly addressed the inefficiencies that emerged from the rapid expansion of the Chinese STI system – high decentralisation and fragmentation across tens of disconnected agencies, resulting in overlaps and low-efficiency in allocation of government resources. It did so by reforming the institutional and management structure of national government-funded STI programmes, and by reorganising the distributional layout of over one hundred previously-existing and overlapping funding programmes. The main driver of the reform was the need to reshape the entire STI funding system to become more coordinated, integrated, focused, and effective.

The reform mainly resulted in two structural changes, on the institutional and on the operational level:

Establishment of an open and unified national management platform

The first major change was made on the overall institutional and management platform of the central funding system.



An **Inter-Ministerial Joint Council** was introduced to coordinate interagency priorities and budgeting, and to prevent overlaps across and within ministries. The joint council represents the ultimate and highest authority of the new national STI funding system. It is formed by a total of 31 government bodies, led by the Ministry of Science and Technology (MOST), and including the Ministry of Finance (MOF) and the National Development and Reform Commission (NDRC). It is mainly responsible for approving the overall development strategy of central government STI funding, as well as the layout,

² The full document is available in Chinese at: http://www.gov.cn/zhengce/content/2015-01/12/content_9383.htm

³ More statistics and figures on this period can be found on OECD's database for main Science and Technology indicators: http://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB

setting, major tasks, implementation schemes and management regulations for specific funding programmes.

The Inter-Ministerial Joint Council is also responsible for:

- Approving the composition of a **Strategic Advisory and Comprehensive Review Committee**: formed by senior technology, industry, and management experts, it is responsible for providing technical advice and support to the Joint Council, so as to improve the quality of decision-making;
- Approving the selection of **project management professional agencies**: agencies empowered for the daily management and operation of central STI funding programmes, on behalf of the ministries and other bodies in the Joint Council. They organise and collect applications, organise evaluations, and organise funding allocation. A total of seven agencies belonging to different ministries have been selected so far (all of them being *shiyew danwei*); in the next years, efforts will be put into encouraging non-governmental professional service organisations to apply as project management professional agencies.⁴
- Establishing a **unified evaluation, inspection, and dynamic adjustment mechanism**: MOST and MOF will supervise, evaluate and inspect the results and performance of all national STI programmes to ensure that the expected outputs are met. A dynamic adjustment mechanism will be triggered in case changes need to be adopted to ensure the project's delivery, or to respond to unexpected circumstances; it will also determine whether certain funded projects need to be extended or terminated. A scientific credit rating system is also created.

These three mechanisms will drive the operation of the new management platform, under the overall guidance and supervision of the Joint Council. Finally, a **unified and comprehensive information management system** was developed to centralise fragmented and scattered information on national STI funding programmes. This will be done through two main pillars:

- The **National Science and Technology Information System, Public Service Platform** (commonly referred to as "National Service Platform"): i.e. the hub of all information on national STI funding programmes, including calls for comments on draft tenders, official tender guidelines, application and evaluation procedures, as well as list of winners and demographics data.⁵ Applications to several funding programmes must be submitted online through this Platform;
- The **National S&T Report Service**, namely the platform through which reports on ongoing or concluded projects are published and made available to the public.⁶

Re-organisation of national STI funding programmes into five new funding pillars

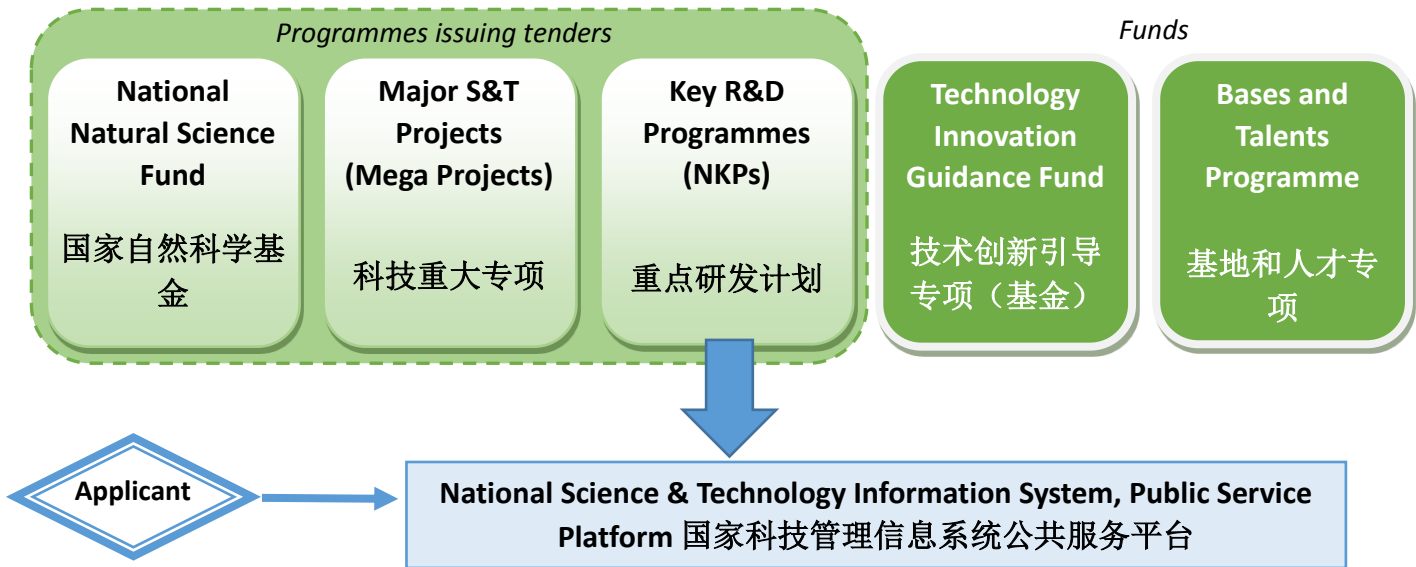
The *Notice* outlined **five major funding pillars** into which the over one hundred then existing STI funding programmes would be channelled and re-organised. By merging and reducing the total number

⁴ The seven agencies currently selected are: 1) MOST's [China National Center for Biotechnology Development](#) (中国生物技术发展中心); 2) MOST's [High-Tech Research Development Center](#) (科技部高技术研究发展中心); 3) MOST's [Administrative Center for China's Agenda 21](#) (中国 21 世纪议程管理中心); 4) MOST's [China Rural Technology Development Center](#) (中国农村技术开发中心); 5) [MIIT Industry Development Promotion Center](#) (工业和信息化部产业发展促进中心); 6) [Ministry of Agriculture Science and Technology Development Center](#) (农业部科技发展中心); 7) [NHFPC's Development Center for Medical Science and Technology](#) (国家卫生计生委医药卫生科技发展研究中心). All of them were reformed to have a standardised structure and management mechanisms, each with legal personality, an executive council and supervisory board, institutional chart, etc. It is commonly believed that this delegation of the daily management and operations from central government to professional agencies should increase fairness and transparency. **These Project Management Professional Agencies will be referred to in this guide as "professional management agencies"**.

⁵ In Chinese: 国家科技管理信息系统公共服务平台: <http://service.most.gov.cn/index/>

⁶ In Chinese: 国家科技报告服务系统: <http://www.nstrs.cn/>

of programmes, inefficiencies and overlaps would consequentially be reduced, leading to an increased and more channelled focus on key strategic and priority areas:



- **National Natural Science Fund:** focusing on basic research and applied research in natural sciences, particularly in: physics and mathematics; chemistry; life sciences; earth sciences; engineering and materials; information sciences; and management sciences. The Fund is administered by the **Natural Science Foundation of China** (“NSFC”), the largest Chinese research funding agency in natural sciences directly affiliated to the State Council, and with a strong reputation of fairness and rigor in the management of its projects and grants.
- **National S&T Major Projects** (“Mega Projects”): 16 vanguard programmes addressing major key products, technologies and engineering of strategic importance for the country’s economy and industrial competitiveness. Characterised by a strong top-down design and a sharp distinction between “civilian” and “military” application, as well as massive investments, the Mega Projects’ quest is to support and fulfil some of China’s most ambitious R&D tasks over the mid- and long-term, e.g. development of the country’s first domestically-designed passenger aircraft and third-generation nuclear reactor, commercialisation of 5G technologies and vaccines, moon exploration, earth observation, etc. Introduced in 2006, the current 16 Mega Projects will be replaced by 2020 by 16 other new “2030 Innovation Mega Projects” reflecting new trends and priorities in global science and technology development.
- **National Key R&D Programmes** (“NKPs”): newly-created category of programmes. It incorporates several previously-existing programmes such as the “863 Programme” for R&D, and the “Program 973” for basic research. It supports R&D in areas of social welfare and people’s livelihood, such as agriculture, energy and resources, environment, health, etc. They feature several well-targeted and defined objectives and deliverables to be achieved in a period ranging from three to five years, reflecting a top-down and industry-university-research cooperation design which integrates basic research, technology application, demonstration and commercialisation. It is currently the most active of the five pillars, with a total of 48 NKPs established, each funding every year tens of projects from diversified sources.
- **Technology Innovation Guidance Fund:** consisting of three major funds emerged from a structural re-organisation, re-classification and merging of previously-existing national funds from different government departments. These funds are in turn organised into several sub-funds or funds-of-funds, which invest in priority and strategic areas through venture capital funds, private equity, and risk compensations. The aim is to stimulate the transfer and

commercialisation of scientific technology results by supporting the growth and activities of innovative start-ups and SMEs. They are currently very active, with an average of 70 new investments concluded every month.

- **Bases and Talents Programme:** incorporating several previously-existing programmes from MOST (State Key Laboratories, National Engineering Technology Centres, Innovation Talents Promotion Programme) and NDRC (National Engineering Centres/Labs, National Enterprise Technology Centres, etc). It aims to promote the establishment of scientific bases, and the fostering of top-notch innovative talents and teams by supporting their research activities. Support generally includes: subsidies; priority in applying to national and local STI projects; or tax deductions/exemptions on imports of R&D equipment. It is currently the most inactive among the five pillars, and currently undergoing deep structural reforms.

It should be noted that long-term funding for research institutions and for higher educational institutions that are directly managed by the central government, including funds from the Ministry of Education, are not included in this reform. Other ministries also have additional specific programmes within their areas – e.g. the Pilot Demonstration Programme for Big Data Industry Development, from the Ministry of Industry and Information Technology (MIIT) – which do not fall under the scope of this reform.

In the next sections, the five funding pillars will be introduced in detail, focusing in particular on their legal framework, the rules and requirements for participation, figures on international participation, and recommendations to EU stakeholders for participating in them.

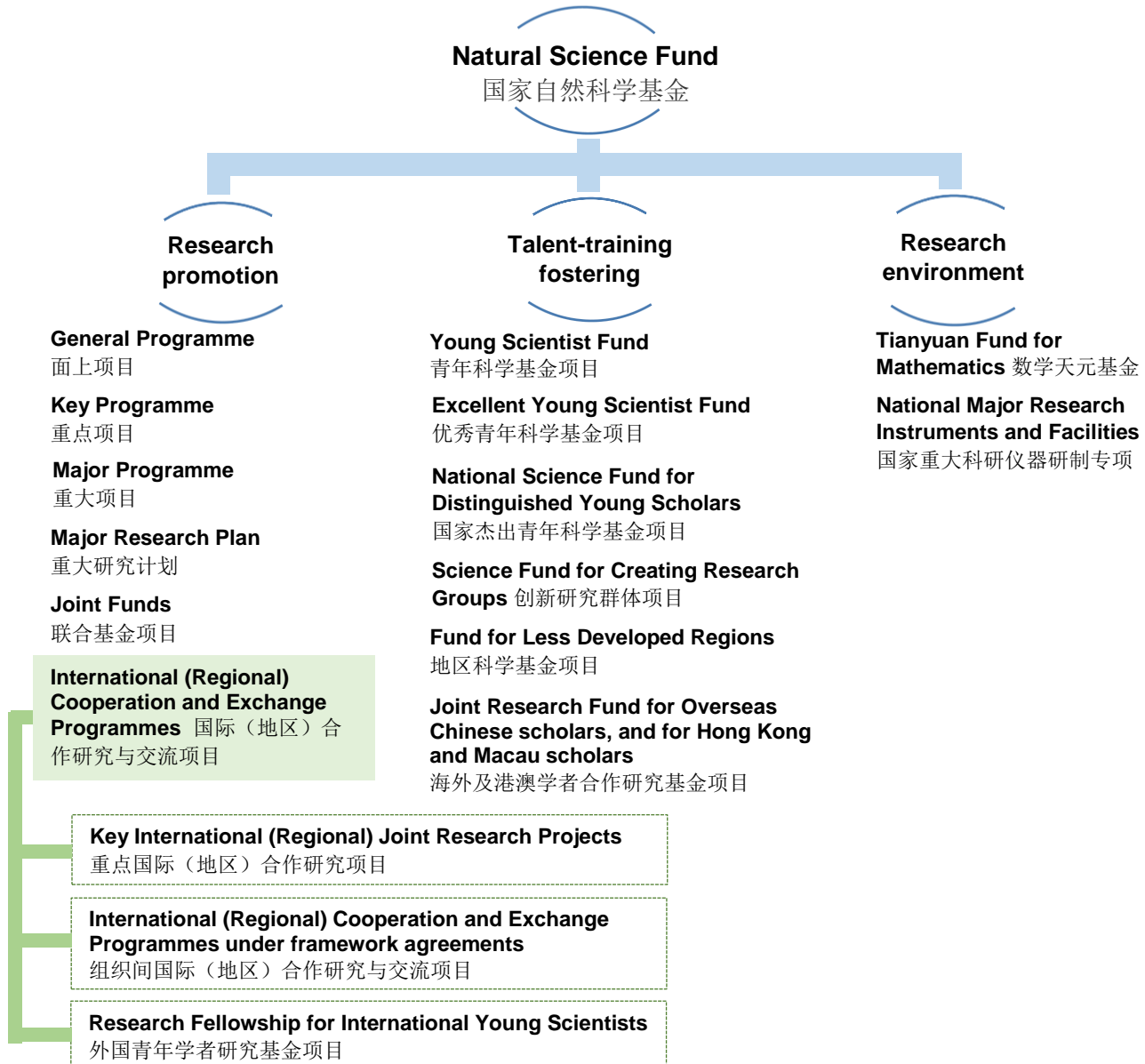
It is important to note that this major overhaul of the national funding system for innovation is unfolding within the **broader context of sweeping reforms** across all areas of Chinese economy and society initiated by the leadership of President Xi Jinping. It recognises the role of science and technology as a main driver of economic development, and builds on the success and position of China as an aspiring global leader, rather than a follower in innovation.

2. National Natural Science Fund

The **National Natural Science Fund** is China's largest fund for supporting basic research and applied research in natural sciences, particularly in the fields of physics and mathematics; chemistry; life sciences; earth sciences; engineering and materials; information sciences; and management sciences.

The Fund is administered by the **Natural Science Foundation of China** ("NSFC"), which was founded in 1986 and is directly affiliated with the State Council. The NSFC is responsible for directing, coordinating and making effective use of the National Natural Science Fund while stimulating free exploration, identifying and fostering scientific talents and teams, and promoting science and technology development in line with the country's strategies and needs.

The NSFC's funding system is divided into **14 different programmes**, grouped under three categories: research promotion; talents fostering; and research environment. One of these programmes is exclusively directed to **international joint research**, the remaining target China-based actors, meaning that **China-based affiliates of European institutes** and **European scientists working in China** can apply too.

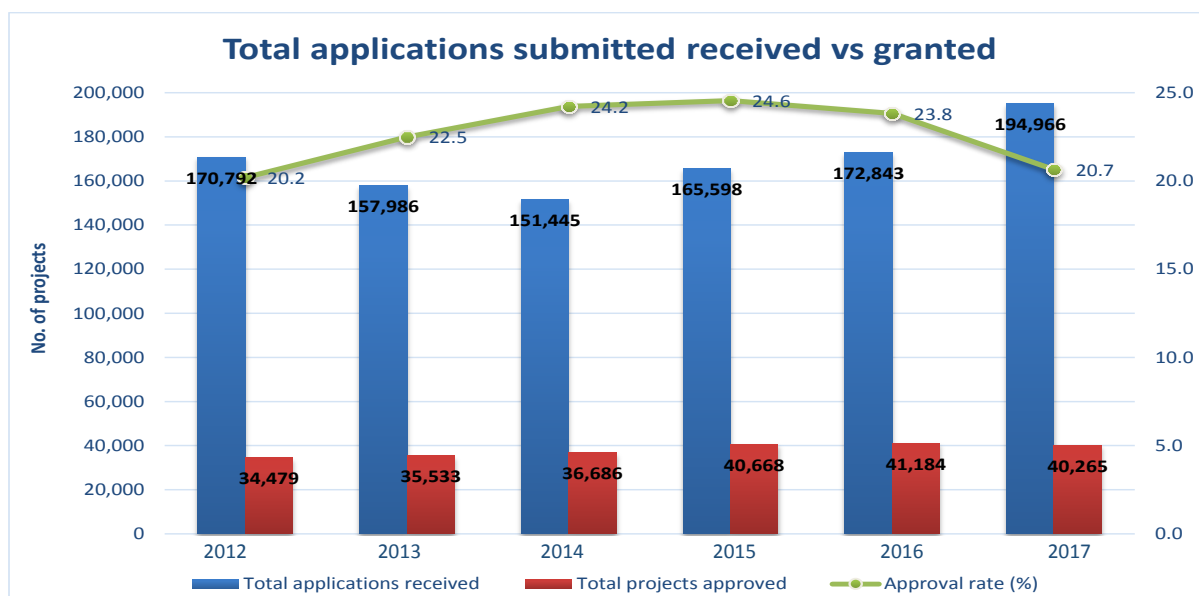


Among these, the most significant for European actors are:

- **General Programme:** supporting researchers to conduct innovative explorative research on open topics within certain areas. The average funding per project is 500k-600k RMB.
- **Young Scientist Fund:** similar to the General Programme, but exclusively targeting young scientists. The average funding per project is 200k-250k RMB per project.
- **Key Programme:** medium-sized projects supporting prospective and frontier studies to achieve major breakthroughs in priority industries and technologies. The average funding per project is 2.5-3 million RMB.
- **Major Research Plan:** medium- and large-sized projects of strategic value to economic and social development in national priority areas, featuring a strong top-down design.
- **International (Regional) Cooperation and Exchange Programmes:** supporting joint research with top researchers and institutions world-wide. It is divided into three sub-groups of projects, one of which targets exclusively international young scientists.

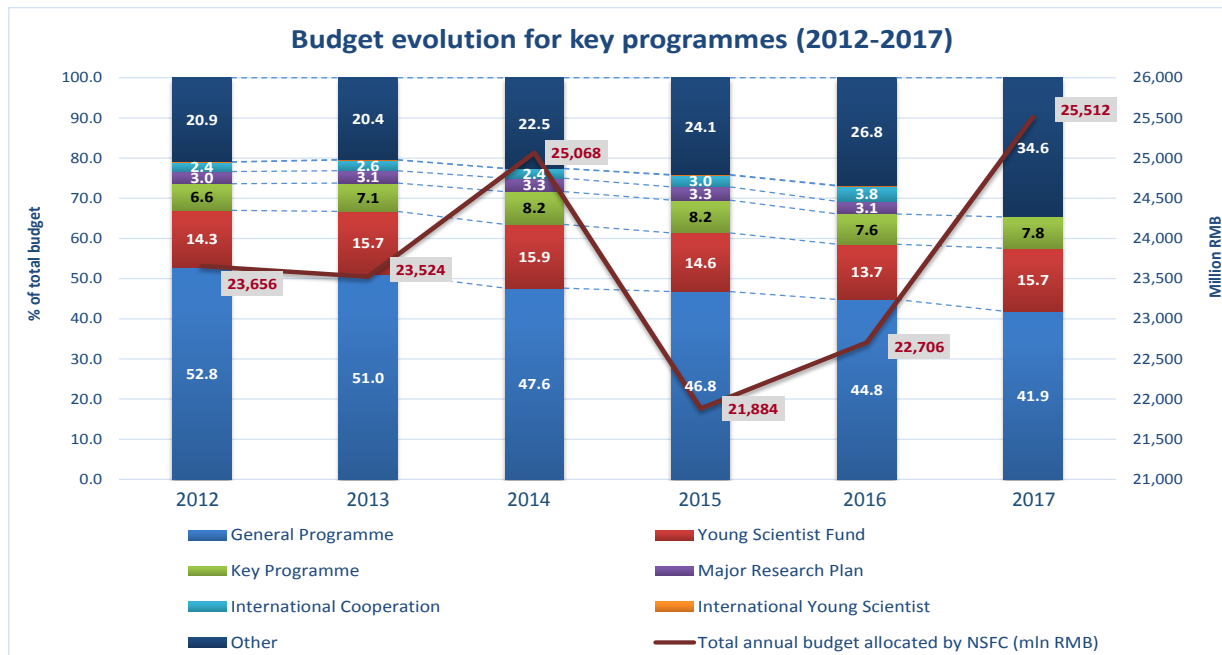
These programmes will be introduced in detail in the next sections, including areas to be funded in 2018, eligibility requirements, as well as figures on winners and on international participation.⁷

The NSFC over the past decades has earned a strong reputation of **fairness** and **rigor** in the management of its programmes. This is reflected in the large and increasing **number of applications** received every year – over 194,000 in 2017, nearly a +30% increase compared to 2014. This translates into **fiercer competition**, as demonstrated by the decreasing approval rate in the same period – only 20.7% in 2017, down from 24.6% in 2015:



The total budget allocated to fund such a large number of projects has also been on the rise in the past few years, reaching **25.2 billion RMB** (around 3.2 billion EUR) in 2017. The General Programme and the Young Scientist Fund are the largest beneficiaries every year (41.9% and 15.7% in 2017, respectively). A noteworthy increase in the past few years was registered in funds allocated to **international (regional) cooperation and exchange programmes** (866.8 million RMB in 2016, +55% on 2012), and to the **international young scientists** (45 million RMB in 2017, +186% in 2012).

⁷ A short introduction to the other programmes not included here can be found on NSFC's English website: <http://www.nsf.gov.cn/Portals/1/fj/pdf/09-01.pdf>.



Note: detailed figures on budget allocated in 2017 to the Major Research Plan and International Cooperation categories of projects are not available at the time of writing.

Projects funded by the NSFC have a high impact on the development and internationalisation of the Chinese innovation ecosystem, with thousands of invention patents granted and international papers published every year.⁸ Chinese world-renowned scientists such as Tu Youyou and Zhao Zhongxian are also actively leading NSFC projects.

The NSFC's strong reputation of fairness mainly derives from the transparent and standardised management mechanisms that the agency has developed throughout the past three decades. The agency's fundamental principles and mechanisms are embedded within its **Constitution**, adopted in 2005 and revised in 2008.⁹ These are further detailed in the **Regulations of the Natural Science Foundation of China**, which stipulate in detail the mechanisms and procedures through which funds are granted and implemented; applications are evaluated; and projects supervised and administered.¹⁰ Several additional ad hoc regulations were also published, regulating other aspects such as scientific results management; fund management; requests for re-examination; code of conduct and anti-conflict of interest for evaluators; management guidelines for universities and research institutions, etc. A list summarising all relevant regulations in force is included in Annex 2.1.

It should be noted that ad hoc Five-year Plans are also formulated for the Natural Science Fund. These provide indications on the key priority areas to be funded in each corresponding five-year period by the NSFC, as well as major pilot reforms or new mechanisms to be introduced.

⁸ A total of over 13,000 invention patents were granted and over 110k international papers were published under the General Programmes in 2016. A full list of S&T achievements can be found in NSFC annual reports: <http://www.nsf.gov.cn/nsfc/cen/ndbg/2016ndbg/06/index.html>

⁹ In Chinese: 国家自然科学基金规章. An English version of the Constitution is available on the NSFC's website: <http://www.nsf.gov.cn/publish/portal1/tab282/>

¹⁰ In Chinese: 国家自然科学基金条例. An English version of the Regulations is available on the NSFC's website: <http://www.nsf.gov.cn/publish/portal1/tab283/>

Annual project guidelines, application cycle, and eligibility requirements

Unlike most of the other funding pillars, **guidelines on new programmes and projects to be funded** by the NSFC are published on the NSFC website on an annual basis, **every year in December**. The latest annual project guidelines were **published on the NSFC website on 29 December 2017**: these **introduce in detail what areas will be funded under each specific programme in 2018**, as well as the corresponding requirements that applicants must possess.¹¹

The programmes included in the NSFC annual guidelines follow a “centralised application” mechanism, namely all applications **must be submitted by March of the following year** (20 March in 2018). Applications must be submitted by the Principal Investigator (PI) through the NSFC’s system, but must be pre-examined and pre-approved by the institution to which the PI is affiliated (“host institution”, or *yituo danwei*).¹² In reality, this means that applications must be completed by the PI way before the deadline indicated by NSFC, as host institutions often stipulate their own internal deadlines to which any affiliated PIs must abide to.¹³ Hardcopy versions of the application materials will also need to be shipped to the line NSFC department within the deadline.

The programmes not listed in the NSFC annual guidelines do not follow the “centralised application” mechanism, but rather specific procedures which are outlined in individual tender guidelines published throughout the year.¹⁴ These also specify the requirements that applicants must possess.

The **selection and evaluation process** is standard, well-documented and relatively transparent. It applies to all categories of projects, and can be summarised as follows:



The **first screening** is an administrative process to check that eligibility requirements are met, and that paperwork is complete. Usually around 98% of applications pass this stage.

¹¹ Link: <http://www.nsf.gov.cn/nsfc/cen/xmzn/2018xmzn/index.html>

¹² An **official account** must be created by the applicant PI on the NSFC’s **Internet-based Science Information System** (ISISN, <https://isisn.nsf.gov.cn/egrantweb/>) through his/her host institution. The host institution will however be able to generate for the PI an username and activation link only if it has previously registered on the same system (*if not, any PIs affiliated to this institution will not be able to create an account, and consequentially to submit any applications: instructions in Chinese for the registration of host institutions can be found here and here*). PIs who have successfully created an account on the ISISN can refer to the following **official user handbook on how to fill applications**: https://isisn.nsf.gov.cn/egrantres/miniiris/prp_t_usr.pdf. The **application form must be written in Chinese** (with only one brief abstract in English), and be composed of different sections including an introduction to the chosen topic, an assessment of the research problem to be solved, methodology to be applied, innovative aspects of the research plan, timetable, opportunities for international exchanges, the PI’s history and suitability to lead the proposal, the facilities available at the proposed host institution, and a CV of the PI and co-applicants (if any).

¹³ One example of such internal deadlines is: http://lsi.zju.edu.cn/redir.php?catalog_id=38341&object_id=55584. Some host institutions may also have their own rules regarding the research budget to be claimed: e.g. some departments might expect PIs to choose projects which utilise the maximum amount of funding available or set their own limits on certain funding categories (e.g., overseas travel).

¹⁴ **Major Research Plans** usually belong to this category. Details will be provided below.

The **experts** who evaluate the proposals are randomly selected from the National S&T Experts Pool,¹⁵ and do not know the identity of other experts taking part in the evaluation of the same proposals. Experts are also excluded to review applications from colleagues working in their same institution. This evaluation mechanism has contributed to the NSFC's reputation as a just, fair and independent institution.

Evaluation criteria of proposals generally include:

- **Scientific value; innovativeness; impact on society; feasibility** of the proposal; and
- The PI's research experience; composition and research conditions of the team; rationality of the requested funding.

The results of the NSFC applications are usually conveyed by email in September of the same year. Top-ranked proposals generally receive the funding requested in the application process; low-ranked ones might be cut.

It is also noteworthy that the NSFC allows **rejected applicants to submit a request for a re-examination** of their proposals, although these cases are very limited and related to procedural issues, rather than disagreement with the scientific evaluation judgement of the evaluators.¹⁶

The following sections will introduce in detail the programmes presenting more opportunities to European actors. Any information on the number of applications received, the number of projects assigned, international actors or foreign PIs participating in these projects are extracted from the NSFC's internet-based science information system (ISISN), or from the NSFC annual statistical reports.¹⁷

Programmes targeting China-based actors

The following programmes target China-based actors. **China-based affiliates of European entities** can apply, as long as they possess **legal personality** in mainland China and are registered on the NSFC's internet-based system (footnote no. 12). **European researchers working in China** (either in China-based affiliates of European entities or in Chinese institutions) can also apply as PIs. Those programmes presenting more opportunities for European actors are:

¹⁵ The ***Trial Measures for the Management of the National S&T Expert Pool*** published in April 2017 ([link](#)) regulate the processes through which relevant experts are (i) inserted into the national experts' pool (new CAS and CAE Academicians; Yangtze River Scholars; new PIs of national-level STI projects; winners of national S&T awards, etc); (ii) selected for evaluating proposals (automatically generated by an internet-based system utilising big data and artificial intelligence methods), as well as their conditions and requirements. The *Measures* also allow international experts (winners of the "Thousand Talents Plan" and other meeting certain criteria) to be included in the pool and participate in the evaluation processes.

¹⁶ According to the ***Measures for the Management of Re-examination of National Natural Science Fund Projects*** ([link](#)), a request for re-examination cannot be submitted in presence of one or more of the following circumstances: (i) request not advanced by the PI; (ii) request submitted after 15 days have passed since the notification of the rejection; (iii) materials or information missing; (iv) disagreement with the scientific evaluation judgement of the evaluators. Re-examination procedures are usually concluded within 60 days.

¹⁷ All projects granted by the NSFC, including project title, budget figures and PI, can be browsed on a specific section of the ISISN: <https://isisn.nsf.gov.cn/egrantindex/funcindex/prjsearch-list>. The NSFC's annual statistical reports (国家自然科学基金资助项目统计) can be downloaded from: <http://www.nsf.gov.cn/publish/portal0/tab104/>

1. General Programme

The **General Programme** (面上项目) is the largest receiver of NSFC budget, with 10.68 billion RMB (around 1.28 billion EUR) received in 2017 only. The programme supports researchers in conducting innovative and free-exploratory research on open topics within the priority areas indicated every year in the NSFC annual guidelines.

Priority areas and past figures

Priority areas and deadline for applications are indicated **every year in December** in the NSFC annual project guidelines. Proposals in 2018 can be submitted in the fields of mathematics; chemistry; life sciences; earth sciences; engineering and materials; information and communication sciences; management sciences; and medical sciences. Each of these fields includes a detailed list of specific topics and areas to be funded ([link](#)).

In 2017, 18,136 projects were granted out of 80,921 applications received, corresponding to an **approval rate of 22.4%**. The average funding allocated per project amounted to 589k RMB (around 75.4k EUR).

The largest receivers of General Programmes in 2017 were mainly China's 985 universities, with Shanghai Jiaotong University, Sun Yat-sen University, and Zhejiang University topping the list (with 573, 419, and 418 projects granted, respectively). Mainland China-based **Hong Kong universities** were also very active, led by the Shenzhen campuses of the City University of Hong Kong and the Hong Kong Polytechnic University (19 and 14 projects granted, respectively).

International participation

Among the list there also were several **China-based international universities or structures**, including:

- Institut Pasteur Shanghai (8 projects)
- New York University Shanghai (3 projects)
- Xi'an Jiaotong-Liverpool Universities (3 projects)
- Duke Kunshan Universities
- University of Nottingham Ningbo (1 project)
- China-US Hormel (Henan) Cancer Institute (1 project)

76 projects (0.4% of the total) were also **led by foreign PIs**.

Eligibility requirements for PIs

- Possess experience in implementing basic research projects or similar related activities
- Have a senior professional title or PhD degree. Alternatively, the applicant can be recommended by two researchers with senior professional titles and PhD degree in the same research field
- Full-time postgraduate students cannot apply; part-time postgraduate students can apply under approval of their supervisor and through their employer
- The application form should highlight the proposal's scientific value, should feature clear objectives, and should be rational, specific, and feasible
- For each project, a maximum of two cooperation institutes are allowed in a consortium
- The duration of the project is generally 4 years

How to apply

Applications are submitted through the NSFC's **Internet-based Science Information System** (ISISN). An **official account** should be created on the system in order to submit applications. Each PI should apply for an account number and password to his/her host institution, provided that the latter has previously registered on the same system. More information on footnote no. 12.

2. Young Scientist Fund

The **Young Scientist Fund** (青年科学基金项目) is the second largest receiver of NSFC's annual budget, with 4 billion RMB (around 511 million EUR) received in 2017 only (almost 1 billion RMB more than the previous year). The programme is similar to the General Programme – supporting innovative exploratory research on open topics within priority areas indicated by NSFC – but exclusively targets young PIs.

Priority areas and past figures

Priority areas and deadline for applications are indicated **every year in December** in the NSFC annual project guidelines. Applications in 2018 can be submitted in the fields of mathematics; chemistry; life sciences; earth sciences; engineering and materials; information and communication sciences; management sciences; and medical sciences. Each of these fields includes a detailed list of specific topics and areas to be funded ([link](#)).

In 2017, 17,523 projects were granted out of 78,195 applications received, corresponding to an **approval rate of 22.4%**. The average funding allocated per project amounted to 228k RMB (around 29k EUR).

The top receivers of the Young Scientist Fund in 2017 were mainly young researchers affiliated to China's 985 universities, with Shanghai Jiaotong University, Sun Yat-sen University, and Huazhong University of Science and Technology topping the list (with 373, 368, and 304 projects granted, respectively).

Eligibility requirements for PIs

- Possess experience in conducting basic research
- Have a senior professional title or PhD degree. Alternatively, the applicant can be recommended by two researchers with senior professional titles or PhD degree in the same research field
- Male applicants should not have reached 35 years of age by 1 January of the year of application; or 40 years of age for female applicants
- Part-time PhD students can apply under approval of their supervisor and through their employer; part-time master's degree students cannot apply
- PIs currently implementing other Young Scientist Fund projects cannot apply
- For each project, a maximum of two cooperation institutes are allowed in a consortium
- The duration of the project is generally 3 years

International participation

Among the list there also were several **China-based international universities or structures**, including:

- Xi'an Jiaotong-Liverpool Universities (5 projects)
- University of Nottingham Ningbo (4 projects)
- Institut Pasteur Shanghai (2 projects)
- New York University Shanghai (1 project)
- Wenzhou Kean University (1 project)
- And all mainland China campuses of Hong Kong universities

20 projects (0.1% of the total) were also **led by young foreign PIs**.

How to apply

Applications are submitted through the NSFC's **Internet-based Science Information System**, and follow the same procedure of the General Programme (see p. 20).

3. Key Programme

The **Key Programme** (重点项目) funds medium-sized projects supporting prospective and frontier studies to achieve major breakthroughs in new industries and technologies, within the areas indicated in the NSFC annual project guidelines.

Priority areas and past figures

Priority areas and deadline for applications are indicated **every year in December** in the NSFC annual project guidelines. Applications in 2018 can be submitted in the fields of mathematics; chemistry; life sciences; earth sciences; engineering and materials; information and communication sciences; management sciences; and medical sciences. Each of these fields includes a detailed list of specific topics and areas to be funded ([link](#)).

In 2017, 667 projects were granted out of 3,012 applications received, corresponding to an **approval rate of 22.1%**. The average funding allocated per project amounted to 2.97 million RMB (around 380k EUR).

The largest receivers of Key Programmes in 2017 were mainly China's 985 universities, with Peking University, Tsinghua University and Shanghai Jiaotong University topping the list.

International participation

Among the list there also were several **China-based international universities or structures**, including:

- Xi'an Jiaotong-Liverpool Universities (1 project)
- Institut Pasteur Shanghai (1 project)
- Chinese University of Hong Kong (Shenzhen campus) (1 project)
- Hong Kong Polytechnic University (Shenzhen campus) (1 project)

Three projects were also **led by foreign nationals ethnic Chinese PIs**.

Eligibility requirements for PIs

- Possess experience in implementing basic research projects
- Have a senior professional title
- Researchers in postdoctoral stations, full-time students, scientists not currently working in any institution, or scientists working in institutions different from those through which the application is submitted cannot apply as PIs
- The application form should highlight the proposal's scientific value, should feature clear objectives, and should be rational, specific, and feasible
- Each project is usually implemented by one institution alone. Only in very limited cases a project can be implemented by maximum of two cooperation institutes in consortium
- The duration of the project is generally 5 years.

How to apply

Applications are submitted through the NSFC's **Internet-based Science Information System**, and follow the same procedure as the General Programme (see p. 20).

4. Major Research Plan

The **Major Research Plan** (重大研究计划) consists of projects providing scientific support and realising breakthroughs in priority areas of strategic value to the country's economic and social development. They are characterised by a strong top-down design.

Priority areas and past figures

Unlike the General Programme, the Young Scientist Fund and Key Programmes, only a **limited amount of Major Research Plan projects** are included in the NSFC annual project guidelines (thus following the “centralised application” mechanism) – only three in 2018.¹⁸ The vast majority of calls are **published individually throughout the year**, in a specific section on the NSFC's website.¹⁹ Each Major Research Plan supports one or more of the following categories of projects:

- **Fostering projects** (培育项目): refer to proposals with evident innovativeness but which still have not developed the conditions necessary for realising major breakthroughs. Their duration usually last 3 years, and the average funding per project is 600k to 800k RMB. A maximum of two cooperation institutes can be allowed in a consortium.
- **Key support projects** (重点支持项目): refer to strongly innovative proposals at the frontiers of international science, with already assembled solid team and conditions for research, and which are expected to achieve major research results in the short-medium term. Their duration usually last 4 years, and the average funding per project is 2.5 to 4 million RMB. A maximum of two cooperation institutes can be allowed in a consortium
- **Integration projects** (集成项目): refer to proposals which, on the basis of previous funding projects, are expected to realise major breakthroughs and leapfrog development, allowing China's research level to reach the world's highest in the corresponding area. Their duration is not specified but usually last 3-5 years, and the average funding per project generally ranges from 4 to over 10 million RMB. A maximum of four cooperation institutes and 9 scientists can be allowed in a consortium.

In 2016, a total of 502 projects were funded under 39 different Major Research Plans, for a total of 714 million RMB (around 91.3 million EUR) allocated.

The largest beneficiaries of Major Research Plans in the same year were, again, China's 985 universities, with Tsinghua University, Huazhong University of Science and Technology, and Fudan University topping the list (36, 20, and 19 projects granted, respectively). Due to well-defined and ambitious targets, as well as stricter requirements and criteria for final project acceptance, Major

International participation

The only successful cases in 2016 were registered for “Fostering Projects” by

- New York University Shanghai (1 project)
- Chinese University of Hong Kong (Shenzhen campus) (1 project)
- Hong Kong Polytechnic University (Shenzhen campus) (1 project)

Two projects were also **led by foreign PIs from the University of Electronic Science and Technology of China**, and from the **CAS Institute of Genetics and Development Biology**.

¹⁸ These are: new optical fields' control physics and application; generation and evolution mechanisms of turbulent structures; and research on basic theories and key technologies on integrated robots. Link: <http://www.nsf.gov.cn/nsfc/cen/xmzn/2018xmzn/04/index.html>

¹⁹ <http://www.nsf.gov.cn/publish/portal0/zdyjih/>. A total of 47 individual calls were published every month throughout 2017, with a peak publication period registered in July (25 calls). Areas covered included: robotics, high-performance computing; big data; space information networks; optical fields; engines turbulent combustion; carbon-based energy conversion; energy and atmospheric pollution; molecular biology; genetic crops; genetic information transmission, etc.

Research Plans appear slightly **harder to obtain for China-based affiliates of European institutions.**

Eligibility requirements for PIs

- Possess experience in implementing basic research projects
- Have senior professional title
- Researchers in postdoctoral stations, full-time students, scientists not currently working in any institution, or scientists working in institutions different from those through which the application is submitted cannot apply as PIs
- Only one application to Major Research Plans can be submitted in the same year; applicants who were granted a Major Research Plan project in the year before the call of application is published are also excluded from applying (with the exception of “integration projects”)
- The application form should highlight the proposal’s objectives and key breakthroughs to be achieved, should feature cross-discipline research, and should clearly explain the contribution it would give to achieving the Major Research Plan’s objectives and in solving its core scientific question
- PIs who receive funding must promise to abide by relevant regulations with respect to data and material management and sharing
- In order to encourage cross-disciplinary research, PIs who receive funding must agree to attend an annual conference organised by NSFC, as well as other workshops and seminars.

How to apply

Applications are submitted through the NSFC’s **Internet-based Science Information System**, and follow the same procedure of the General Programme (see p. 20).

Evaluation criteria

Depending on the specific Major Research Plan, slightly different criteria will be adopted during the evaluation of proposals, but these generally highly consider the following:

- Conformance with the objectives outlined in the call for application.
- Original innovation proposals focusing on new concepts, principles and methods.
- Proposals featuring cross-disciplinary research (e.g. medical sciences with information, mathematic and materials sciences), integration of theory and application, etc.
- Proposals featuring international cooperation activities.

Programmes targeting international cooperation

The **International (Regional) Cooperation and Exchange Programme** is specifically designed to support joint research and exchanges between Chinese scientists and top researchers and institutions around the world. The Programme is divided into three main sub-programmes, each targeting different actors and serving different purposes:

1. Key International (Regional) Joint Research Project

The **Key International (Regional) Joint Research Projects** encourage and support innovative China-based researchers to conduct basic research in priority areas in cooperation with international research structures and scientists based abroad.

Such projects can be launched with **any scientists not located in China and conducting basic research abroad**, as long as their cooperation with the Chinese partner is perceived as being complementary and necessary, and grounded on already-established foundations for cooperation (for instance the two partners should have already jointly published academic papers, or should have been involved in mutual exchange or visiting programmes for some time). Relevant regulations particularly encourage cooperation involving large international research infrastructures. **Two opportunities therefore exist for European actors:**

- **European researchers** not based in China, to cooperate with a China-based entity;
- **China-based affiliates** of European research institutes, or EU-China joint research structures to apply as Chinese party, in cooperation with researchers based abroad. Legal personality in China is in this case required.²⁰

Calls for applications

New calls for applications are published every year in the NSFC annual project guidelines. A total of 127 priority fields will be supported in 2018 annual calls ([link](#)), for a total of 100 projects to be funded and 250 million RMB to be allocated (average of 2.5 million RMB per project).

Eligibility requirements

The Chinese party should possess at least one of the following requirements:

- Hold a senior technology position, and be a PI currently implementing (or has implemented) a NSFC project with a duration of over 3 years; or
- Winner of the “1000 Talents Plan”, category of “long-term innovation talent” or “young talent”

Requirements for the foreign partner:

- Holds a position equivalent to the title of associate professor in his/her country
- Conducts scientific research under projects abroad, and leads independently a laboratory or major research projects

How to apply

In addition to filling the application form in Chinese on the Internet-based Science Information System (see footnote no. 12), applicants must also submit the following materials:

- English application form (downloadable from [here](#))
- Partnership agreement, signed by both parties: it must cover (i) content and objectives of the research; (ii) list of PIs and other members of the research team from both parties; (iii) duration, method of implementation and plan of the research; (iv) intention of ownership, utilisation and transfer of IP rights (v) budget proposals and division of funds

²⁰ Only one of such cases however has been identified in recent years: Institut Pasteur of Shanghai in 2017.

- Certificates attesting that the foreign partner is implementing or applying to research projects abroad on relevant topics, or relevant papers published in the last 3 years
- A confirmation letter in English from the foreign partner's host institution confirming the content of the application, and including the institution's name, logo, location, and contact details.

More information can be found in the ***Measures on the Management of Key International (Regional) Joint Research Projects***.²¹

2. International (Regional) Cooperation and Exchange Programmes under framework agreements

Similarly to the previous programme, the **International (Regional) Cooperation and Exchange Programmes under framework agreements** is oriented to encouraging and supporting excellent Chinese scientists to conduct joint research in the partner's country and facility, or to organise international conferences in China or abroad.

The NSFC currently has framework agreements with 86 institutions in 44 countries worldwide, including with **17 EU member states**, the **EU Commission's** Directorate-General for Research, the **European Research Council, CERN**, as well as international organisations based in Europe. A full list of agreements with European partners is included in Annex 2.2.

Under these framework agreements, the NSFC will support expenses related to the Chinese scientist' travel fees, or to logistical arrangements in China; the partner institution should cover expenses related to the Chinese scientist' subsistence in the country.

New calls for applications are not published in the NSFC annual project guidelines, but are published throughout the year according to bilateral/multilateral agreements ([link](#) to corresponding web page). A one-year calendar indicating the milestones of each agreement's application process is usually published at the beginning of any new year on NSFC website ([link](#) to latest example).

This programme is **directed exclusively to Chinese scientists**. Eligibility requirements and methods of applications vary according to each specific agreement signed with the partner institution. European-based institutions should contact the relevant authorities in their country to see whether they are **included in the joint cooperation and exchange programme**.

More information can be found at all times on the NSFC international cooperation bureau's website ([link](#)), and in the NSFC annual guidelines ([link](#) to latest example).

3. Research Fellowship for International Young Scientists

The **Research Fellowship for International Young Scientists** is oriented to encouraging excellent **international young scientists** based abroad to come to mainland China to conduct basic research in natural sciences. The aim is to promote sustainable academic collaboration and exchanges between Chinese scholars and foreign young scientists.

Calls for applications

New calls for applications are published every year in the NSFC annual project guidelines. An **English version of the guidelines** is also usually published.²² Similarly to the General Programme and the Young Scientist Fund targeting China-based actors, the Research Fellowship for

²¹ In Chinese: 国家自然科学基金国际（地区）合作研究项目管理办法，

<http://www.nsf.gov.cn/publish/portal2/tab193/info24527.htm>

²² Link to the calls for 2018 applications: <http://www.nsf.gov.cn/publish/portal0/tab434/info72624.htm>

International Young Scientists also encourages applicants to conduct explorative research on open topics chosen freely. An average of 200k to 400k RMB is allocated for projects lasting 1 to 2 years.

Around 150 projects will be funded in 2018, for a total of 45 million RMB (average of 300k RMB per project), in line with the previous year.

Eligibility requirements

Candidates should possess the following requirements:

- Be less than 40 years of age by 1 January of the year of application
- Have a Ph.D. degree
- Have experience in conducting basic research or postdoctoral research
- Guarantee full-time work at the Chinese host institutions during the entire project duration
- Abide by Chinese laws and relevant NSFC regulations while doing research in China.

How to apply

Applicants must first contact a host institution in China, and sign a written cooperation agreement. The host institution will then generate an official account number and password for the candidate to log-in on the ISISN system (see footnote no. 12). An ad hoc **application system in English** was created to facilitate applications ([link](#)). The application form can be submitted in English.

In addition to filling the research proposal, the following materials must also be submitted as part of the application materials:

- Signed agreement between the applicant and the host institution in China
- Notarised copy of the applicant's PhD degree
- The first page of a maximum of five publications written by the applicant

Evaluation criteria

The evaluation process follows the same procedure as the other NSFC programmes. Research proposals will be evaluated on the basis of the following criteria:

- The applicant's education background and his/her ability to conduct basic research
- The applicant's career records and achievements in conducting basic research
- The originality, scientific value and expected outcomes of the proposed research
- The feasibility of the proposed research plan and rationality of the budget

Besides, it is commonly agreed that the more the research topic is in line with Chinese national or regional needs and values, the higher the chances of being approved will be.

Publication of results

A preliminary evaluation will be completed within 45 days after the submission deadline. Results of proposals which passed the preliminary evaluation are published online ([link](#) to latest example). The final approval notification to proposals which passed the second panel evaluation are usually published on NSFC's website in September every year ([link](#) to latest example). Scientists interested to apply to this category of funds in the future are encouraged to contact winners of previous editions to obtain a deeper knowledge and application tips.

More information can be found in the ***Measures on the Management of the Research Fellowship for International Young Scientists*** ([link](#) in English).

Recommendations for EU stakeholders

As one of the oldest funding source available in China, at the same time featuring the highest degree of participation, a large number of articles and blogs providing tips and recommendations on different aspects of the NSFC application process can easily be found online or on public Wechat accounts. Inspiring articles written by current or former PIs or evaluation experts on how to enhance the quality and effectiveness of proposals are also frequently published on the NSFC's official publication, "*Science Foundation in China*".²³ Significant feedback from European experts with experience in NSFC projects was also collected by the project team during consultations and workshops.

All the above can be summarised in a few key recommendations grouped under different aspects of the application process:

Research topic

- The candidate should possess solid research foundations on the proposed topic (online articles suggest at least 3 SCI papers on the subject). One's own published papers should be cited in the application form.
- The more aligned the research proposal is with local or national needs, or the more international competitiveness it has, then the higher the chances of approval will be.
- Focus on three to five research results to achieve. Each of them should be clear, very well-defined, and **measurable** (e.g. patents filed; standard formulated; new technology developed, etc).
- As innovativeness and originality are important criteria on which proposals are evaluated, it is recommended to identify new research trends, methodologies or angles, and avoiding repetitions and duplications. Moreover, numerous areas and NSFC departments feature very fierce competition, compared to others where only a limited number of applications are submitted every year and thus may feature higher success rates. The NSFC's official database of granted projects is an efficient tool through which new trends and less competitive areas can be identified, thanks to its efficient browsing system allowing searches by programme, topic, or achievements realised.²⁴

Filling the application proposal

- When filling information on the research team, make sure that the team composition is rational and suitable. For instance:
 - Do not include renowned experts just because of their image if they are not strictly relevant to the proposed research topic
 - It is better to not include any participant with current or previous work experience in government organisations
 - If applying to the Young Scientist Fund, do not include the mentor professor or supervisor, otherwise the latter might be considered to be the real PI, and not the applying young scientist
 - Highlight how each scientist in the team complements each other
 - Gender-balanced teams are generally not considered essential, but indeed might represent a good asset

²³ A few examples in Chinese can be found on the journal's latest volume in 2017: <http://pub.nsf.gov.cn/sficc/ch/currentissue.aspx>

²⁴ Link to the NSFC's database of granted projects: <http://nfd.nsf.gov.cn/#>

- Pay attention to budgetary calculations:
 - Make sure the scope of each item included in the budget proposal is in line with the official definition provided for it in the *NSFC Fund Management Measures* ([link](#));
 - Make sure that the amount of each item included in the budget proposal is in line with relevant expenditure standards and guidelines outlined by relevant national guidelines and regulations (for instance, travel and accommodation fees); other fees such as purchase of equipment or materials should be strictly in line with real market costs.
- The “personal resume” section in the application form should not include the applicant’s past funded projects, publications, patents and awards; these must be included in the “research results” section of the application form
- An attachment indicating a maximum of three experts that must be excluded from evaluating one’s proposal can be submitted (for instance experts with whom the applicant has a negative personal relationship). These experts will automatically be excluded by the NSFC system.

Writing style

- Make sure to make good use of illustrations and graphics, as these are generally well-appreciated by evaluation experts
- Highlight four main questions: ‘what’ (research subject), ‘why’ (significance of the research, goals and key problems to be solved), ‘how’ (methodology), and ‘why me’ (research foundations, experience in the subject, and innovativeness of the proposed approach, etc).

Annexes

The following annexes are included in this section:

- Annex 2.1 – List of additional regulations of the Natural Science Foundation of China
- Annex 2.2 – List of framework agreements between the NSFC and European Union Member States or multilateral bodies

Annex 2.1 – List of additional regulations of the Natural Science Foundation of China

In addition to the NSFC Constitution, which incorporate the agency's fundamental principles and mechanisms, and to the **Regulations of the Natural Science Foundation of China**, which stipulate in detail the mechanisms and procedures through which funds are granted and implemented; applications are evaluated; and projects supervised and administered, several additional ad hoc regulations outlining numerous other aspects of NSFC projects were also formulated throughout the years. These are mainly summarised as follows:

Name	Date published and serial code	Description
Working Measures for NSFC Science Departments' Expert Advisory Committee 国家自然科学基金委员会科学部专家咨询委员会工作办法	Published on 4 December 2006 Modified on 8 July 2008 Link	Illustrating the requirements, organisation, responsibilities, and consulting procedures through which relevant science departments within the NSFC consult with the Expert Advisory Committee about the Major Programmes, Major Research Plans, funding priorities, annual work plans, subject strategic reports, and evaluation committee formation.
Management Measures for the Information Disclosure of NSFC 国家自然科学基金委员会信息公开管理办法	4 November 2008 Link	Illustrating the information disclosure requirements for NSFC, including the content and methods of publication as well as the responsibilities and liabilities.
Constitution of the NSFC Supervisory Committee 国家自然科学基金委员会监督委员会章程	11 May 2010 Link	Illustrating the eligibility, responsibility, and organisation of the NSFC Supervisory Committee.
Management Measures for NSFC's Host Institutions 国家自然科学基金依托单位基金工作管理办法	14 October 2014 Link	Illustrating the eligibility and the registration process of the host institution, their tasks and responsibilities, and NSFC's requirements for their institutional management.
Code of Conduct for the Project Evaluation Experts of the National Natural Science Fund 国家自然科学基金项目评审专家行为规范	2 December 2014 Link	Ensuring unbiased evaluation by regulating the work of the project evaluation experts such as self-checked evaluator exemptions.
Fund Management Measures for NSFC-funded Projects 国家自然科学基金资助项目资金管理办法	15 May 2015 财教(2015)15号 Link	Illustrating the payment structure of NSFC's projects: fixed-amount subsidies or cost compensations (for large projects). They also illustrate the procedures through which relevant budget proposals are evaluated, approved, and supervised.
Management Measures for the Evaluator Exemptions and Evaluation Confidentiality of the Projects Funded by the National Natural Science Fund 国家自然科学基金项目评审回避与保密管理办法	30 June 2015 国科金发计(2015)号 Link	Ensuring the integrity of the project evaluation process through evaluator exemptions and evaluation confidentiality measures. The specific requirements, measures, and legal liabilities for NSFC personnel and experts are illustrated.
Management Measures for the Re-evaluation of Projects Funded by the National Natural Science Fund 国家自然科学基金项目复审管理办法	30 June 2015 国科金发计(2015)号 Link	Illustrating the requirements, procedures and methods through which project applications are re-evaluated upon request.

Name	Date published and serial code	Description
Implementation Schemes for the Management of Host Institution Registration 国家自然科学基金依托单位注册管理实施细则	7 July 2015 Link	Supplementing the <i>Management Measures for NSFC's Host Institutions</i> by regulating the registration process as well as the procedures for the change of information, the termination of registration, and the punishment for illegal practices.
Implementation Schemes for the Management of the NSFC Regional Networks 国家自然科学基金地区联联网管理实施细则	7 July 2015 Link	Illustrating the responsibility and organisation of the six regional networks in relation to the NSFC, as well as the procedures through which the regional networks organise activities such as trainings, seminars, and exchanges.
Management Measures for the work of NSFC's Project Evaluation Experts 国家自然科学基金项目评审专家工作管理办法	7 July 2015 Link	Illustrating the responsibility of the NSFC to select and manage qualified project evaluation experts through direct selection and the recommendations of the host institution. It also defines the experts' responsibility, evaluation process, and liability.
Management Measures for Research Results under Projects Funded by NSFC 国家自然科学基金资助项目研究成果管理办法	8 September 2015 Link	Regulating the reporting, sharing, utilisation, transfer and commercialisation of the research results of NSFC funded projects, including papers, software, standards, reports, patents, databases, and S&T instruments etc.

In addition, specific regulations for each of the 14 NSFC programmes were also formulated and published on NSFC's website.²⁵

Annex 2.2 – List of framework agreements between the NSFC and European Union Member States or multilateral bodies

The NSFC currently has framework agreements with 86 institutions in 44 countries worldwide. These includes agreements with **17 EU member states**, the **EU Commission's** Directorate-General for Research, the **European Research Council, CERN**, as well as international organisations based in Europe.

	Country	Institution		Country	Institution
1	Ireland	The Science Foundation Ireland (SFI)	25	Netherlands	The Netherlands Organization for Scientific Research (NWO)
2	Austria	Austrian Industrial Research Promotion Fund (FFF)	26	Norway	The Research Council of Norway (NRC)
3	Austria	Austrian Science Fund (FWF)	27	Poland	Foundation for Polish Science (PSF)
4	Belgium	Fonds de la Recherche Scientifique (FNRS)	28	Portugal	Council for Scientific and Technological Research (JNICT)
5	Belgium	Fonds Wetenschappelijk Onderzoek (FWO)	29	Portugal	Portuguese Foundation for Science and Technology (FCT)
6	Czech Republic	Academy of Sciences of the Czech Republic (ASCR)	30	Slovenia	Slovenian Science Foundation (SSF)
7	Czech Republic	Czech Science Foundation (GACR)	31	Spain	Council for Scientific Research (CSIC)
8	Denmark	The Danish Research Councils (DRC)	32	Sweden	Swedish Toundation for International Cooperation in Research and Higher Education (STINT)
9	Denmark	Danish National Research Foundation (DNRF)	33	Switzerland	Swiss National Science Foundation (SNSF)

²⁵ A full list can be found at: <http://www.nsf.gov.cn/publish/portal0/tab38/module503/more.htm>

	Country	Institution		Country	Institution
10	EU	European Research Council (ERC)	34	Ukraine	National Academy of Sciences of Ukraine (NASU)
11	EU	EU Commission DG-RTD	35	United Kingdom	The Royal Society (RS)
12	Europe	European Organization for Nuclear Research (CERN)	36	United Kingdom	The Engineering and Physical Sciences Research Council, United Kingdom (EPSRC)
13	Finland	The Academy of Finland (AF)	37	United Kingdom	Biotechnology and Biological Sciences Research Council, United Kingdom (BBSRC)
14	France	Centre Nationale de la Recherche Scientifique (CNRS)	38	United Kingdom	The Natural Environment Research Council of the United Kingdom of Great Britain and Northern Ireland (NERC)
15	France	Commissariat a l'Energie Atomique (CEA)	39	United Kingdom	The Medical Research Council of the United Kingdom of Great Britain and Northern Ireland (MRC)
16	France	L'Institut National de la Recherche Agronomique de France (INRA)	40	United Kingdom	The Royal Society of Edinburgh (RSE)
17	France	L'Institut Francais de Recherche pour l'Exploitation de la Mer (IFREMER)	41	United Kingdom	The Economic and Social Research Council of the United Kingdom of Great Britain and Northern Ireland (RCUK)
18	France	Agence Nationale de la Recherche (ANR)	42	United Kingdom	Science & Technology Facilities Council
19	Germany	Deutsche Forschungsgemeinschaft (DFG)	43	United Kingdom	British Council
20	Greece	The National Hellenic Research Foundation (NHRF)	44	International Organisation	The International Institute for Applied Systems Analysis (IIASA)
21	Island	The Icelandic Centre for Research (RANNIS)	45	International Organisation	Consortium of International Agricultural Research Centers (CGIAR)
22	Italy	National Research Council (CNR)	46	International Organisation	International Centre for Theoretical Physics (ICTP)
23	Italy	Istituto Nazionale di Alta Matematica "F. Severi" (INdAM)	47	International Organisation	United Nations Environment Program (UNEP)
24	Italy	Ministry of Foreign Affairs and International Cooperation of Italy (MAECI)	48	International Organisation	The International Center for Integrated Mountain Development (ICIMOD)

3. National S&T Major Projects

National S&T Major Projects (hereinafter referred to as “Mega Projects”) are considered to be the largest and most ambitious R&D tasks for China’s mid- and long-term development.²⁶ They were introduced by the *Outline of the National Medium- and Long-term Programme on Science and Technology Development (2006-2020)*, the manifesto for science and technology development guiding the country towards becoming an effective “Innovative Country” by 2020.²⁷ These Mega Projects were then integrated into the State Council’s 2014 reform of the national STI funding system, a move that contributed to a higher the degree of standardisation and transparency of their tender cycles.

Mega Projects address major key products, technologies and engineering tasks of **strategic importance for the country’s economy and competitiveness**. These range from the development of China’s first domestically-designed passenger aircraft and third-generation nuclear reactor, to the commercialisation of 5G technologies, internationally-recognised vaccines, and semiconductors, to moon exploration and earth observation, etc. The ultimate aim is to solve bottlenecks for technology breakthroughs, and to fill strategic blanks.

In particular, under a strict top-down design and supervision, Mega Projects abide by the following principles, in line with the country’s major socio-economic development needs:

- Fostering of a series of **strategic industries** which might lead to the realisation of **indigenously-generated intellectual property (IP)**, at the same time stimulating the indigenous innovation capabilities of enterprises;
- Realisation of **breakthroughs in key generic technologies** which might substantially increase the country’s **industrial competitiveness**;
- Solving major **issues** and **bottlenecks** inhibiting socio-economic development;
- Promoting and intensifying **civil-military integration** to further strengthen **national security**.

A total of 16 vanguard Mega Projects were established. Ten belong to **civilian application** (“Civilian Mega Projects”); the remaining six belong to **civil-military integration** or pure **military application** (“Military Mega Project”). These are listed in the table on the next page. Among the six Military Mega Projects, three have never been publicly announced by relevant authorities and currently **remain classified for national security concerns**.²⁸

MOST leads the overall management, implementation and supervision of Civilian Mega Projects, together with NDRC and MOF. The **State Administration of Science, Technology and Industry for National Defence (SASTIND)**, and the **Central Military Commission’s Equipment Development Department** are the managing authorities for the Military Mega Projects.

²⁶ In Chinese: 国家科技重大专项。The Mega Projects also have their own website: <http://www.nmp.gov.cn/>

²⁷ An English version of the *Outline* is available here: www.cistc.gov.cn/oa/file/download.asp?id=6298

²⁸ Online resources suggest that these are likely to be: (i) the Shenguang Laser Project for Inertial Confinement Fusion, exploring inertial confinement fusion as an alternative approach to attain inertial fusion energy; (ii) the Second Generation BeiDou Satellite Navigation System, which will permanently eliminate China’s dependency on foreign satellite navigation systems, and decrease China’s vulnerability against electromagnetic interferences; and the (iii) Hypersonic Vehicle Technology Project, a conceptual and experimental hypersonic flight vehicle technology capable of manoeuvring at Mach 5 speeds (6,150 km/h) and flying in near-space altitudes. See: <https://thediplomat.com/2013/09/scientific-innovation-and-chinas-military-modernization/>; <http://bbs.meyet.com/thread-240454-1-1.html>

N.	Mega Project	Description
Civilian Mega Projects		
1	Core Electronic Devices, High-end General Chips and Fundamental Software 核心电子器件、高端通用芯片及基础软件产品	Focusing on research & development of First Floor Software (FFS) core products related to microwave and millimetre wave devices, high-end universal chips, operating systems, database management systems and middleware
2	Extremely large-scale Integrated Circuit Manufacturing Equipment and Technologies 极大规模集成电路制造装备及成套工艺	Focusing on the (i) production of 90-nanometer manufacturing equipment and localisation of key technologies and components; (ii) R&D of 65-nanometer manufacturing equipment prototypes; (iii) breakthrough of key technologies below 45-nanometer; (iv) core manufacturing technology of ULSI, and (v) generic technologies to establish an initial innovative system for integrated circuit manufacturing in China.
3	Next-Generation Broadband Wireless Mobile Communication Networks 新一代宽带无线移动通信网	Focusing on R&D of new broadband mobile communication systems with a large communication capacity, broadband wireless access systems with low cost and broad coverage, and short wireless interconnection systems and sensor networks. <i>Annex 3.2 of this Guide will be specifically dedicated to this Mega Project.</i>
4	Advanced CNC machines and Fundamental Manufacturing Equipment 高档数控机床与基础制造装备	Focusing on research of two to three varieties of large numerical control mother ships with high precision, and development of key digital control machine tools with high precision and basic equipment required in the industries of aviation, aerospace, ship craft, automobile, energy equipment, etc.
5	Development of Large-scale Oil and Gas Fields and Coalbed Methane 大型油气田及煤层气开发	Focusing on R&D of high-precision seismic prospecting and mining technology for oil gas, coal-bed methane and deep ocean oil gas resources under complicated geological conditions in western China, with the aim to increase resource recovery efficiency and developing new forms of unconventional gas.
6	Large-scale advanced Pressurised Water Reactors and High-temperature Gas-cooled Reactors for Nuclear Power Plants (*) 大型先进压水堆及高温气冷堆核电站	Focusing on realising breakthroughs in key technologies and the validation of: (i) canned-motor pumps, control systems and fuel assembly for the pressurised water reactor CAP1400; and (ii) steam generator, fuel system and nuclear-grade graphite for high-temperature reactors.
7	Water Pollution Control and treatment 水体污染控制与治理	Through demonstrations in China's major water basins, it aims at realising major breakthroughs in key technologies for the control and treatment of industrial and agricultural nonpoint source pollution, urban wastewater treatment and recovering, water purification, drinking water safety, and water quality monitoring and early warning. <i>Annex 3.3 of this Guide will be specifically dedicated to this Mega Project.</i>

N.	Mega Project	Description
Civilian Mega Projects		
8	Breeding of new varieties of Genetically Modified Organisms 转基因生物新品种培育	Aiming to (i) breed new varieties of major genetically modified organisms with significant application, and characterised by disease resistance, insect resistance, herbicide resistance, good quality, and high-yield and high efficiency; and to (ii) improving the overall level of research and industrialisation of genetically-modified agricultural organisms.
9	Development of major new drugs 重大新药创制	Focusing on researching and developing new targets and certifications of Chinese-made chemicals and biopharmaceutical products, by designing new drugs and developing key technologies of large-scale and highly-efficient drug selection, drug potency and drug safety evaluation.
10	Prevention and treatment of HIV/AIDS, viral hepatitis and other major communicable diseases 艾滋病和病毒性肝炎等重大传染病防治	Focusing on realising breakthroughs in: (i) prevention and control technologies for emergent acute infectious diseases; (ii) diagnosis, prevention and treatment technologies and products for HIV/AIDS, hepatitis B and tuberculosis; (iii) vaccine research; (iv) R&D of a series of advanced detection diagnostic products; (v) formulation of traditional Chinese medicine-based treatment plans. The aim will be to reduce or control the spreading of HIV/AIDS, hepatitis B and tuberculosis to low epidemic levels.
Military / Civil-Military integration Mega Projects		
11	Large Aircrafts 大型飞机	Aiming at developing China's first domestically-produced large aircraft – the single-aisle C919 – mainly by realising breakthroughs in core technologies for the design, development, and manufacturing of the C919's (i) system integration, power systems, and test system; and (ii) the C919's Changjiang-1000 (CJ-1000) high-bypass turbofan jet engine.
12	High-Resolution Earth Observation Systems 高分辨率对地观测系统	Focally developing high-resolution advanced observation systems based on satellite, aircrafts and stratospheric airship platforms, aiming at establishing time-space regulated, all-weather and all-day earth observation systems. Establishment of earth observation data centres and other ground support and operation systems in order to increase China's self-sufficiency of spatial data and to form a spatial information industry chain.
13	Manned Spaceflight and Lunar Exploration 载人航天与探月工程	Aiming at (i) realising breakthroughs in major technologies for astronauts' extravehicular activities and spacecraft rendezvous and docking; (ii) establishing a space lab capable of conducting long-term on-orbit autonomous flight, with a certain application scale and with limited human assistance; (iii) developing lunar exploration satellites and achieving breakthroughs in relevant exploration key technologies, laying the foundations for lunar exploration projects.

(*) Note: this Mega Project was originally considered to belong to the military category, but in recent years it has shifted to the Civilian side (but still appears very closed).

Note 2: more detailed information on each Mega Project, including the achievements realised under each of them, can be found on the Mega Projects' official website (in Chinese): <http://www.nmp.gov.cn/>

Over the past decade, a total of **127.4 billion RMB** (around 16.5 billion EUR) was **allocated by the central government** alone, more than half of which was for the 10 Civilian Mega Projects during the 12th Five-year period (2011-2015). These were coupled by an additional **208 billion RMB** (around 26.9 billion EUR) of **extra funds provided by various enterprises and local governments** implementing specific research activities. Such massive investments have generated an **output value of over 1.4 trillion RMB** (around 181 billion EUR), and have mobilised over 240,000 scientists and personnel in total, contributing to over 11,000 patents obtained by enterprises and universities, and 8,478 technology standards formulated.²⁹ No figures on Military Mega Projects are available.

Under the firm leadership of the Communist Party and the State Council, MOST, NDRC and MOF have therefore forged a synergic cooperation chain coordinating the efforts of several other ministries and departments, local governments, State-owned Enterprises (SOEs), private enterprises, universities and research structures. The most significant achievements realised include:

Area	Description
Information and communication technologies	Establishment of the world's largest 4G network, with 2.5 million 4G base stations covering 734 million users; China-led TD-LTE-Advanced has become an international 4G standard
Integrated circuits, advanced CNC machines, manufacturing equipment	Domestically-developed advanced encapsulated lithography machines have reached 90% of the domestic market share; The MK8220/SD double stand CNC grinding machine became the first domestically-produced grinding machine to enter automobile engine production line (SAIC-GM, Jinqiao)
Water pollution control and treatment	Significant reduction of industrial and agricultural water pollutants discharge, rehabilitated millions of cubic meters of water; Establishment of urban water supply safety systems in northern China, and provision of safe drinking water to over 3.4 million people in Jiangsu province
HIV/AIDS, Hepatitis	HIV/AIDS mortality rate dropped from 17.9% to 5.6%; Hepatitis B surface antigen (HBsAg) carrying rate among nation-wide children under 5 years of age dropped to less than 1%
Other communicable diseases	Licensing of domestically-developed inactivated EV71 vaccines for children's hand, foot, and mouth disease (HFMD); Effective control and treatment of seasonal Avian influenza A (H5N1) virus; Chinese-manufactured antibody agent MIL77 successfully healed a British Ebola patient
Nuclear power plants	China's self-developed and updated version of third-generation nuclear technology – CAP1400 nuclear plant – successfully passed IAEA's Generic Reactor safety review; Hydraulic pressure tests on the reactor pressure vessel successfully completed
Aviation and aircraft	The domestically-developed single-aisle C919 aircraft concluded its maiden flight in Shanghai, and its first flight between Shanghai and Xi'an; The domestically-developed four-engine Yun-20 jumbo air freighter completed its maiden flight
Aerospace	Successful launch of a duo of BeiDou-3 navigation satellites on a single carrier rocket, representing the third phase of China's BeiDou satellite system. They will reside in a medium-Earth orbit at an altitude of 21,500 km, inclined at 55.5 degrees Successful launch of Tiangong-2 space-lab; successful docking of Tianzhou-1 unmanned cargo spacecraft with Tiangong-2; Chang'e-3 successfully landed on the moon, preparation for Chang'e-5 mission to return lunar samples to Earth

²⁹ Sources: http://www.most.gov.cn/xinwzx/xwzx/twzb/fbh17031101/twbbwzsl/201703/t20170309_131791.htm;
http://www.most.gov.cn/kjbgz/201706/t20170627_133751.htm

The main legal framework governing Civilian Mega Projects is the ***Management Regulations of (Civilian) National S&T Mega Projects***, jointly issued by MOST, NDRC and MOF at the end of June 2017.³⁰ No regulations have ever been published online for Military Mega Projects. The *Management Regulations* outline the Civilian Mega Projects' management structure, the division of responsibilities among different government bodies (see chart at the next page). They also specify the processes and procedures for:

- Application to new tenders (see next section below)
- Evaluation of application proposals: a preliminary list of selected proposals is submitted by the professional management agencies to MOST, NDRC and MOF for final approval. The final lists of approved proposals should be published online;
- Supervision and evaluation of project implementation: MOST, NDRC and MOF can conduct a selective examination and inspection of ongoing projects, independently or through third-party agencies; units applying to or implementing Mega Projects are managed by a **credit rating system**;
- Management of project results, IP, and technology transfer: intangible assets generated during the implementation of Mega Projects are managed and utilised by the project leading units. Agreements on intended IP ownership and utilisation among the consortium members should be submitted as part of the application materials (*note: other relevant regulations included in Annex 3.1 state that any IP can be unconditionally used by the State – or by other actors on the State's behalf – in case of major national needs; those IPs involving national security belong directly to the State*).

Several additional ad hoc regulations were also published for Civilian Mega Projects, regulating other aspects such as IP management; fund management; reporting and archives management; the procedures through which experts evaluating application proposals are selected; project conclusion procedures; etc. A list summarising all relevant regulations in force is included in Annex 3.1, together with detailed abstracts of the *Management Regulations of (Civilian) National S&T Mega Projects*, and other key regulations such as *Fund Management Measures*.

Rules of participation and eligibility requirements

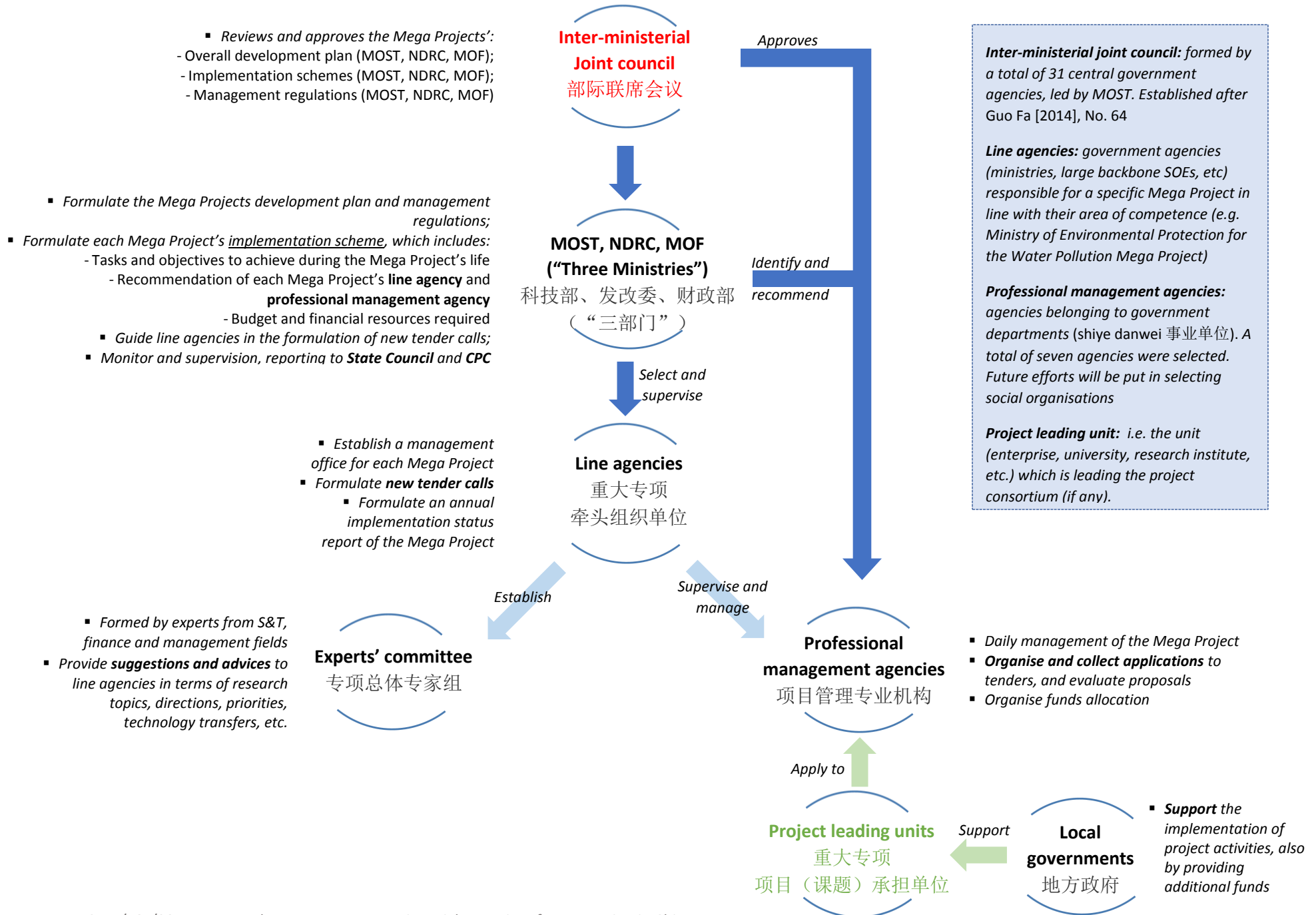
Each Mega Project tender usually includes several project activities to be funded, each in turn targeting different areas and aspects.³¹ Applications can only be submitted to single project activities. According to the *Management Regulations of (Civilian) National S&T Mega Projects*, each single project activity will feature one of the following **three modalities of application**:

- **“Directionally-entrusted”** applications (定向委托): project leading units are already decided and specified in the tender. Usually being *shiye danwei* belonging to Chinese ministries, they are entrusted by line agencies to identify and recruit consortium members. The final composition of the consortium and of the specific R&D tasks to be implemented must be approved by the Mega Project's expert committee after different rounds of evaluation. This category of application aims to strengthen top-down design and coordination. Units interested in this category of project activities should contact and coordinate with the “directionally-entrusted” unit.

³⁰ In Chinese: 《国家科技重大专项（民口）管理规定》(国科发专〔2017〕145号)
http://www.most.gov.cn/mostinfo/xinxifenlei/fqzc/gfxwj/gfxwj2017/201706/t20170627_133757.htm.

³¹ For instance, the *New Generation Broadband Wireless Mobile Communication Networks* Mega Project (“ICT Mega Project”) funds different areas (e.g. R&D of 5G; R&D and industrialisation of LTE-A; etc); several tasks targeting different aspects of each of these areas are in turn funded (e.g. 5G wireless technologies; 5G networks; 5G applications; 5G devices; 5G modules and platforms, etc., under “R&D of 5G”).

Management structure of Civilian Mega Projects



- **“Directionally-selected”** applications (定向择优): units interested in this category of project activities can apply independently. After a first evaluation of all applications, the Mega Project’s evaluation committee forms different consortiums, selecting a project leading unit and putting together different and complementary units according to their strengths and weaknesses. The selected project leading unit will then coordinate with the consortium and draft a detailed project implementation proposal, which must be approved by the expert committee after different rounds of evaluation. This category of application aims to strengthen top-down design and coordination.
- **“Openly-selected”** applications (公开择优): already-formed consortiums apply as a whole to particular activities. Detailed technical and financial proposals must be submitted. After two rounds of evaluation, the most competitive proposals are approved. *Note: in some cases, some applicants can be included into consortiums of project activities belonging to the “directionally-selected” modality of application.*

Applications, therefore, can only be submitted to those project activities which feature the latter two modalities of application. **Eligibility requirements** applicants must possess are specified in individual tenders published and in each specific project activity, but generally include:

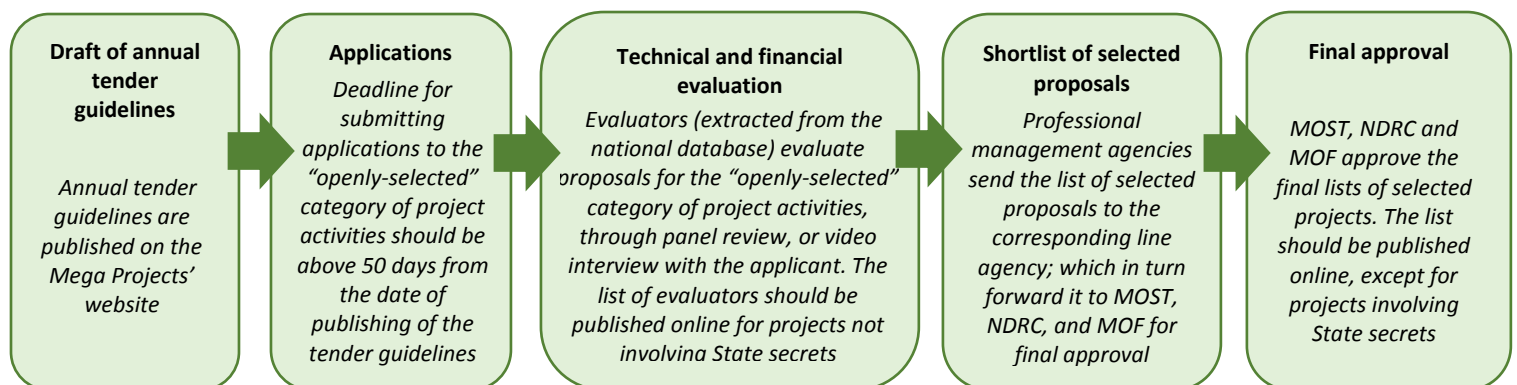
- Requirement to possess **legal personality in mainland China**;
- Official **endorsement** and support **from local government departments** which have jurisdiction over the applicant.³² These shall also provide additional funding;
- **Additional funding** provided by applicants, and possession of good financial capabilities;
- **Previous experience** in implementing major research projects;
- “Industry-University-Research cooperation” is often particularly encouraged.

Other requirements on the nature of the project leading unit might also be present for specific Mega Projects (e.g. third-grade class A hospital or clinical research centres for the Major New Drugs Mega Project, etc.).

In some cases, **international cooperation** is also explicitly encouraged (more details below).

Tender cycles, past calls, and transparency

Tender guidelines are generally formulated on a yearly basis, and are published on the Mega Projects’ website ([link](#)). The tender cycle can be summarised as:

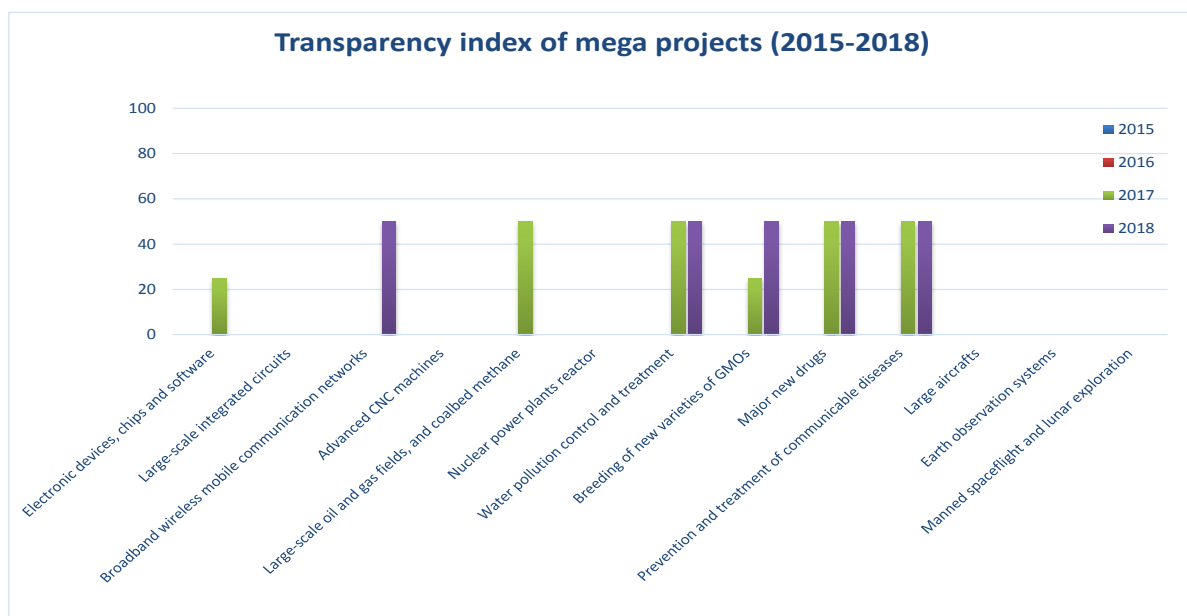


The **application deadline** is, in principle, no less than 50 days from the date of publishing of tender guidelines. Unlike the National Key R&D Programmes to be introduced in the next chapter of this

³² For instance, applications to the ICT Mega Project must be endorsed and supported by local industry and information technology departments in the province or municipality where the applicants are registered.

guide, Mega Projects do not follow the practice of publishing previous calls for comments on draft versions of the tender a few months in advance, so do not allow potential applicants to start preparing applications in advance.

The content and criteria for the evaluation of proposals are not specified in the *Management Regulations*, and currently remain unclear. Furthermore, the cycle of Mega Projects remains relatively **non-transparent**: Civilian Mega Projects tenders are not published according to a regular cycle; previous calls for comments are not published in advance; lists of evaluators and winners have only been published in two cases ([link for evaluators](#); [link for winners](#)). Although **gradual improvements** started to be registered after the Mega Projects' integration within the post-reform Chinese national STI funding system, especially at the end of 2016, these are yet to be implemented as systematically as it was done for other national funding programmes (e.g. the Natural Science Foundation and the National Key Programmes), plus do not apply to all Mega Projects, as depicted in the below chart:



Relevant information also remains relatively fragmented and still scarce – although improving – as it is becoming integrated within the “**National Science and Technology Information System, Public Service Platform**”.³³

Lastly, it is noteworthy that trainings or various information sessions on specific Mega Projects, or on Mega Projects in general, are occasionally organised by MOST or relevant departments.³⁴ The procedures for participating in such events are usually published in relevant public announcements, but it is not clear whether foreign entities are welcome to participate or not.

³³ The **National Science and Technology Information System, Public Service Platform** (in Chinese 国家科技管理信息系统公共服务平台), is the hub of all national funding programmes, where official information on tenders, policies, procedures, outcomes and demographics data are published: <http://service.most.gov.cn/>

³⁴ One example is a recent project management training class on Mega Project, organised by MOST: http://www.nmp.gov.cn/tztg/201711/t20171110_5473.htm; another example is an ad hoc half-day conference on the 2018 call for applications for the ICT Mega Project, focusing on explaining different aspects of the project activities to be funded, which was announced together with the release of the tender: http://www.nmp.gov.cn/tztg/201709/t20170918_5398.htm

International participation: figures, challenges, and opportunities

The *Management Regulations of (Civilian) National S&T Mega Projects* also explicitly encourage project leading units to launch **international cooperation and exchange activities**, under the supervision and after the approval of the Mega Project's line agency. These should be based on equality and mutual benefit, emphasising secondary innovation (i.e. introducing, digesting, absorbing and re-innovation), and should strictly abide to relevant foreign affairs and confidentiality provisions. Several **individual tenders** or **project activities** under different Mega Projects also **actively encourage international actors to participate** in consortiums, as long as these have **legal personality in mainland China**. These are:

- *Prevention and treatment of HIV/AIDS, viral hepatitis and other major communicable diseases* ([link](#));
- *Development of major new drugs* ([link](#));
- *New generation broadband wireless mobile communication networks* ([link](#));
- *Water pollution control and treatment technologies* ([link](#)) – its legal framework encourages:
 - High-level **foreign talents** to participate in relevant R&D tasks;
 - Joint applications with German partners.³⁵

It is no coincidence that these four Mega Projects are also those with the highest degree of transparency and standardisation, as shown in the chart on the previous page.

Although informal consultations with the project team or general media resources highlighted the existence of a limited number of international (including EU) actors currently participating under some Mega Project activities, **no concrete instances of international participation** have nevertheless been identified.³⁶ In any case, the participation of China-based international actors is expected to be limited to **minor roles** only as consortium participants rather than as project leading units, and is also likely to depend on the provision of **additional funding**. The nature and the purpose of Mega Projects – intense R&D to enhance China's indigenous innovation capabilities – also result in strict requirements related to IP ownership and utilisation (a clear, written agreement on IP ownership and utilisation among the consortium members should be submitted as part of the application materials).

International participation

No concrete instances of international participation have been identified.

In any case, the participation of China-based international actors is expected to be only limited to **minor roles** as **consortium participants** rather than as project leading units, and is also likely to depend on the provision of **additional funding**.

EU actors interested in participating in Mega Projects are recommended to identify the **key major players within each respective Mega Project**. As demonstrated by the fact that applications and consortiums for numerous project activities under different Mega Projects needs to be organised by key influential actors in the field (i.e. “directionally-entrusted” and “directionally-selected” methods of application), these often have large influence in deciding the final composition of their consortium. In

³⁵ A series of recently-signed bilateral agreements (e.g. art. 53 and 54 of the 2014 **China-Germany Cooperation Action Plan**; MOST-BMBF Joint Declaration of Intent on Initiating the S&T Cooperation for the Water Mega Project; China-Germany MoU on Cooperation in the Field of Water Resources; etc) resulted in the **explicit requirement to involve at least one German partner** in some of the Mega Project's specific project activities in 2017 and 2018 (the German partner should, however, provide additional funding). It is not clear whether **partners from other European countries** are also encouraged to participate, but there are no indicators suggesting they are not.

³⁶ During a press conference on the status of implementation of the ICT Mega Project held in January 2017, the Director of MIIT's Communication Development Department stated that several foreign enterprises have participated within the R&D activities under the ICT Mega Project:

http://www.most.gov.cn/xinwzx/xwzx/twzb/xydkdwxd/twzwbwzsl/201701/t20170106_130251.htm

many cases, such key players are explicitly specified in individual tender guidelines, or are easily identifiable in relevant news on the Mega Projects' website. A close R&D partnership with them should be cultivated. EU actors should in any case possess all the requirements that other general applicants must meet to apply, especially legal personality in mainland China.

Future outlook: “2030 Innovation Mega Projects”

The 13th Five-year period (2016-2020) will be the last quinquennium of implementation of the sixteen currently-existing Mega Projects. By 2020, the final objectives set for each of them should have been achieved. According to the **13th Five-year Plan for Science, Technology and Innovation** published by the State Council in August 2016, during this period the sixteen Mega Projects will gradually be replaced by a new category of Mega Projects, reflecting and incorporating new developments and trends in both national and international S&T priorities and needs.

Fifteen new “**2030 Innovation Mega Projects**” were listed by the State Council’s STI blueprint, with the implementation period ending in 2030;³⁷ these were then followed by a sixteenth programme on artificial intelligence (AI) introduced in July 2017 by the State Council:

2030 Innovation Mega Projects (to be fully launched by 2020)	
Aircraft engines and gas turbines (*) 航空发动机及燃气轮机	Smart power grids 智能电网
Deep-sea space station (*) 深海空间站	Space-ground integrated information networks (*) 天地一体化信息网络
Quantum communication and computing (*) 量子通信与量子计算机	Big data 大数据
Brain science and brain-like research (*) 脑科学与类脑研究	Smart manufacturing and robotics 智能制造和机器人
Cyberspace security 国家网络空间安全	R&D and application of new key materials 重点新材料研发及应用
In-orbit service and maintenance system of deep-space exploration and spacecraft 深空探测及空间飞行器在轨服务与维护系统	Environmental management of the Jing-Jin-Ji region 京津冀环境综合治理
Independent innovation in seed industry 种业自主创新	Health 健康保障
Clean and efficient utilisation of coal 煤炭清洁高效利用	New Generation Artificial Intelligence (**) 新一代人工智能重大科技项目

(*) Refers to those 2030 Innovation Mega Projects for which preliminary work from relevant authorities has already started, and which are expected to be fully launched within the next two years ([source link](#)).

(**) This new Mega Project was introduced by the State Council’s **Development Plan for New Generation Artificial Intelligence**, published at the end of July 2017, as part of what is referred to as a “forward-looking ‘1+N’ project cluster layout”, whereas ‘1’ refers to the new Artificial Intelligence (AI) Mega Project; and ‘N’ refers to the several new AI-related tasks to be included in other currently-existing national STI projects.

Only the **New Generation Artificial Intelligence Mega Project** was launched in November 2017;³⁸ it is not clear when the others will be officially launched. Relevant information refers to a first

³⁷ In Chinese: 科技创新 2030--重大项目。These were outlined in Chapter 4 of the *13th Five-year Plan for Science, Technology and Innovation*: http://www.gov.cn/zhengce/content/2016-08/08/content_5098072.htm

³⁸ The AI 2030 Mega Project was officially launched during a conference held in 15 November 2017. An official promotion office formed by 15 different government/party bodies or associations was established; the list of the

group of other new Mega Projects for which their overall development plan and implementation schemes are currently being finalised by relevant authorities (projects marked with * in the above table). Other scattered pieces of news also provide evidence of substantial preparatory activities in some of these areas, such as the establishment of the CAS Institute of Quantum Information and Quantum Science within the Hefei National High- and New-Technology Zone (HNTZ), also thanks to a 1 billion RMB grant received by the central government.³⁹ Other developments were registered in the area of *Aircraft Engines and Gas Turbines*, with the establishment, by the CAS Institute of Engineering Thermophysics, of the CAS Guanneng Gas Turbine Co. Ltd within the Shenyang HNTZ.⁴⁰ These are expected to be the main bases and actors central to their corresponding new Mega Projects.

It also remains unclear whether the 2030 Innovation Mega Projects will be divided into Civilian and Military projects, as their predecessors were.

Recommendation for EU stakeholders

Unfortunately, unlike programmes under the Natural Science Foundation of China, or National Key R&D Programmes (found in the next chapter of this guide), very little information is available online for the Mega Projects. Their strategic nature as well as their importance for the country makes these very difficult to access for international actors, and not very attractive due to strict IP ownership and utilisation requirements. This is also confirmed by the fact that no concrete evidence of international participation has ever been identified, although general press releases or consultations held during the project suggest so.

For these reasons, Mega Projects do not generally represent an area particularly recommended to European actors. Those willing to try in any case to participate in Mega Projects, are recommended to:

- Focus on the four Mega Projects which explicitly encourage international cooperation, namely:
 - *Prevention and treatment of HIV/AIDS, viral hepatitis and other major communicable diseases*
 - *Development of major new drugs*
 - *New generation broadband wireless mobile communication networks. This Mega Project will be introduced more in detail in Annex 3.2*
 - *Water pollution control and treatment technologies ([link](#)). This Mega Project will be introduced more in detail in Annex 3.3*
- Some of the these Mega Projects (especially the ICT Mega Project) openly publish calls for comments a few months before the official tenders, it is highly recommended that European actors actively respond to these by providing timely feedback, showing their commitment to the Mega Project's tasks as well as to the country's industrial targets.

experts forming the Mega Project's strategic consultation committee was published. The conference also announced the first group of national artificial intelligence open innovation platforms, which include: (i) Baidu's Autonomous Driving National AI Open Innovation Platform; (ii) Aliyun's City Brain (Urban Cognition) National AI Open Innovation Platform; (iii) Tencent's Medical Imaging National Open Innovation Platform; and (iv) iFlyTek's Intelligent Voice National AI Open Innovation Platform. It is expected that large contributors and strong commitment to these four nationally-recognised AI platforms will enjoy greater access and opportunities for participation under the AI 2030 Mega Project. Source: http://www.stdaily.com/app/yaowen/2017-11/15/content_596423.shtml

³⁹ Source: http://www.cas.cn/cm/201710/t20171019_4618301.shtml. This was followed by the launch of the first long-distance quantum encrypted communication line in the world – Beijing-Shanghai: <http://www.ah.gov.cn/UserData/DocHtml/1/2017/9/30/8605527576407.html>.

⁴⁰ Source: <http://www.chinanews.com/ny/2017/10-20/8357262.shtml>

- Identify the key major players within each of these Mega Projects. Many applications and consortiums for numerous project activities under Mega Project must in fact be organised by key influential actors in the field, therefore they have large influence in deciding the final composition of their consortium team. In many cases, such key players are explicitly specified in individual tender guidelines, or are easily identifiable in relevant news on the Mega Projects' website. A close R&D partnership with them should be cultivated. It is also recommended that EU actors possess all the requirements that general applicants must meet to apply, particularly legal entity status in mainland China.

Annexes

The following annexes are included in this section:

- Annex 3.1 – Management regulations for Civilian Mega Projects
Management Regulations of (Civilian) National S&T Mega Projects
Fund Management Measures for (Civilian) National S&T Mega Projects
Other management regulations
- Annex 3.2 – the *New Generation Broadband Wireless Mobile Communication Networks* Mega Project (ICT Mega Project)
- Annex 3.3 – the *Water Pollution Control and Treatment* Mega Project (Water Mega Project)
Interim Measures for the Management of the “Water Mega Project”

Annex 3.1 – Management Regulations for Civilian Mega Projects

Management Regulations of (Civilian) National S&T Mega Projects

On 27 June, MOST, NDRC and MOF jointly released the [Regulations on the Management of \(Civilian\) National S&T Mega Projects](#) (国科发专〔2017〕145号). The Regulations outline:

- General Provisions:
 - The management of Mega Projects follows the below principles:
 - Coordination of resources, particularly:
 - a. Enhancement of the role of enterprises as main actors;
 - b. Active participation of government agencies, local governments, research structures and universities;
 - c. Strengthening the link between Mega Projects and other national STI projects.
 - Clear division of responsibilities;
 - Periodic evaluation, increased performance;
 - Focus on talents and innovation ecosystem.
 - These regulations apply to ten civilian Mega Projects.
- Organisation and division of responsibilities:
 - The inter-ministerial joint council is responsible for:
 - Reviewing the Mega Projects’ overall development plan, implementation schemes, and management regulations; as well as proposals for adding new Mega Projects;
 - Selecting professional management agencies.
 - Under the leadership of the inter-ministerial joint council, MOST, NDRC and MOF (“three ministries”) are responsible for:
 - Researching and formulating the Mega Projects’ overall development and implementation plan, management regulations and supporting measures;
 - Guiding each Mega Project’s line government agency (see below) in the formulation of annual project guidelines;
 - Monitoring and evaluating Mega Projects, reporting their implementation status to the CPC’s Central Committee and the State Council;
 - Coordinating and strengthening the link among different Mega Projects, as well as with other national STI projects.

- The Mega Projects' line government agencies⁴¹ are responsible for:
 - Establishing a management and implementation office for their Mega Project, and coordinating daily operations;
 - Establishing an experts' committee (see below);
 - Formulating annual project guidelines, managing confidentiality and archives;
 - Formulating annual implementation status reports for their Mega Project.
- The Mega Projects' experts' committees are responsible for:
 - Launching research on the Mega Projects' implementation strategy, providing technical advises on specific priorities, directions and technological paths;
 - Providing advises to the Mega Projects' line government agencies in terms of technology, management and results commercialization;
 - Each experts' committee shall select a working group chief technologist.
- Professional management agencies are responsible for:
 - Participating in the formulation of tender guidelines;
 - Organising and collecting applications to specific project activities, and evaluations;
 - Signing legal contracts with the units implementing activities under Mega Projects;
 - Organising funds allocation; adjusting projects' budget in line with de facto needs.
- Project leading units are responsible for:
 - Conducting research, fund management, commercialisation of results and all the other activities planned under Mega Projects;
 - Ensuring the smooth delivery of the project deliverables and expected outputs.
- Local governments are responsible for:
 - Assisting and supporting the implementation of Mega Projects;
 - Ensuring a constant and open dialogue with central government authorities and the Mega Projects' line government agencies.
- Annual tender guidelines:
 - The Mega Project line agency, the experts' committees and the professional management agency draft the annual tender guidelines;
 - Applications to Mega Projects can be divided into the following methodologies:
 - **“Directionally-entrusted”** applications (定向委托): project leading units are already decided and specified in the tender. Usually being *shiye danwei* belonging to Chinese ministries, they are entrusted by line agencies to identify and recruit consortium members. The final composition of the consortium and of the specific R&D tasks to implement must be approved by the Mega Project's expert committee after different rounds of evaluation.
 - **“Directionally-selected”** applications (定向择优): units interested in this category of project activities can apply independently. After a first evaluation of all individual applications, the Mega Project's evaluation committee forms different consortiums, selecting a project leading unit and putting together different and complementary units (which are not consulted during this process). The selected project leading unit will then coordinate with the

⁴¹ Namely government agencies responsible for a specific Mega Project in line with their area of competence, for instance the Ministry of Environmental Protection and Ministry of Housing and Urban-Rural Development are the line agencies of the “*Water Pollution Control and Treatment Technologies*” Mega Project (“Water Mega Project”).

consortium and draft a detailed project implementation proposal, which must be approved the expert committee after different rounds of evaluation.

- **“Openly-selected”** applications (公开择优): already-formed consortiums apply as a whole to particular activities. Detailed technical and financial proposals must be submitted. After two rounds of evaluation, the most competitive proposals are approved. *In some cases, some applicants can be included into consortiums of project activities belonging to the “directionally-selected” modality of application.*
- The deadline for submitting applications to “Openly-selected” projects is, in principle, no less than 50 days from the day the tender guidelines are published;
- Experts sitting in evaluation committees are extracted from the experts’ database, and published online;
- A preliminary list of selected projects is submitted to MOST, NDRC and MOF for final approval. The final lists of projects assigned shall be published online.
- Implementation process management:
 - Professional management agencies will sign a legal contract with each project’s leading unit;
 - Professional management agencies are responsible for the daily management of ongoing projects;
 - Each Mega Project’s professional management agency every year in December shall submit an implementation status report to the corresponding line agency, which will in turn submit it to MOST, NDRC and MOF, and the State Council.
- Evaluation and supervision:
 - MOST, NDRC and MOF conduct evaluations and inspections of the implementation status of Mega Projects, independently or through third-party agencies. This is done by:
 - Conducting selective examinations of single projects;
 - Inspecting the work of professional management agencies;
 - Performance evaluation results are reported to the State Council.
 - Establishment of a Credit Management System for Scientific Research, collecting information and implementing a category-based management model according to:
 - Credit rating (practices) of applicants during the project application processes;
 - Credit rating of project leading units during the implementation phase;
 - Rating of evaluators during project evaluation and inspection stages;
 - Units with negative credit ratings will temporarily or permanently lose the right to apply to or take part in any phases of Mega Projects.
- Project conclusion:
 - End-of-project procedures should be completed within six months after the expiration of the contract (maximum extendable period for contracts is one year);
 - Professional management agencies are responsible for conducting project conclusion procedures;
 - Project conclusion results must be submitted to the Mega Project’s line government agencies, and in turn submitted to MOST, NDRC and MOF.
- Fund management:
 - Relevant fund management-regulations will be strictly enforced.
- Project results, IP and asset management:
 - Each Mega Project should establish a long term mechanism for IPR protection and management, focusing on:

- Formulation of clear IPR-related objectives;
- Keeping track of national and international IPR-related actions;
- Formulation of an IPR analysis report.
- Under the guidance of line government agencies, professional management agencies are responsible for IPR management;
- IP ownership and utilization rights of Mega Projects abide to the *Technology Progress Law*, the *Promotion of Technology Transfer Law*, and the *National Intellectual Property Strategy Outline*. Units implementing Mega Projects have the obligation to provide to other domestic units paid-up or royalty-free licenses for IPR produced under Mega Projects;
- Professional management agencies and units implementing Mega Projects should agree in advance on IPR ownership, utilization and licensing rights, in order to promote technology transfer and commercialisation;
- Intangible assets generated during the implementation of Mega Projects are managed and utilised by the project leading units. Economic benefits generated from technology transfer and the utilisation of intangible assets must abide by the *Promotion of Technology Transfer Law* and relevant national regulations;
- Solid assets generated with central budget should abide by relevant national regulations.
- Information, archives and confidentiality
- **International cooperation:**
 - Mega Projects are encouraged to launch equal and mutual beneficial international cooperation activities, in order to make full use of international resources;
 - In line with the Mega Projects' objectives, emphasis will be laid on secondary innovation (i.e. introducing, digesting, absorbing and re-innovating). Systematic secondary innovation schemes and measures will be formulated and strictly enforced;
 - Under the guidance of line government agencies, professional management agencies are responsible for Mega Projects' international cooperation-related work;
 - International cooperation activities launched by project leading units must be approved by the Mega Project's professional management agency and line agency;
 - International cooperation activities should strictly abide by relevant foreign affairs and confidentiality provisions.
- Supplementary provisions:
 - The Regulations are effective from the date of publishing. The previous *Interim Measures on the Management of National S&T Mega Projects* (国科发计〔2008〕453号) are no longer effective.

Fund Management Measures for (Civilian) National S&T Mega Projects

On Friday 7 July 2017, MOST, NDRC, and MOF jointly issued the **Fund Management Measures for (Civilian) National S&T Mega Projects** (财科教〔2017〕74号). The Measures illustrate:

- General provisions:
 - Funding for Mega Projects should have diversified sources, including central government funding, local government funding, self-financing, and funding through other channels.
 - Central government funding follows two approaches:

- Pre-financing: granted according to the project implementation status and in accordance with the original budget approved. Basic and not-for-profit researches as well as R&D of key technologies usually follow this approach.
- Post-financing: granted after the end of the project, following relevant project conclusion and acceptance procedures. Projects with clear tangible industrial objectives, or projects implemented by large consortiums usually follow this approach.
- Division of responsibilities:
 - Under the leadership of the inter-ministerial joint council, MOST, NDRC, and MOF are responsible for:
 - Formulating Mega Projects' implementation schemes and annual plans;
 - Ensuring the coordination of Mega Projects with other national STI projects;
 - Evaluating and concluding Mega Projects.
 - MOF is responsible for:
 - Establishing fund management mechanisms for Mega Projects;
 - Reviewing annual budget plans submitted by line government agencies (see below);
 - Monitoring the financial management of line government agencies and professional management agencies.
 - Line government agencies are responsible for:
 - Formulating specific fund management implementation rules;
 - Formulating annual budget plans for each Mega Project, on the basis of budget estimations submitted by professional management agencies;
 - Reviewing and approving budget adjustments;
 - Monitoring budget implementation status, reporting annual fund usage, and evaluating project outcomes.
 - Professional management agencies are responsible for:
 - Reporting budget estimations to line government agencies on the basis of the list of project proposals selected after a round of evaluation.
 - Project leading units are responsible for:
 - Formulating, implementing, and reporting budget proposals;
- Budget estimate management:
 - Line government agencies should formulate annual budget plans according to the Mega Project's general and stage budget approved by the State Council;
 - Annual budget plans are co-evaluated by MOF and MOST.
- Methods of funds approval, and scope of expenditure:
 - Funding for Mega Projects' specifically targets:
 - Expenditure for specific project activities, which are further divided into:
 - d. Direct costs: including facilities fees, materials fees, testing fees, publication fees, labour fees, expert consultation fees, infrastructure fees, etc;
 - e. Indirect costs: refer to costs initially unforeseen, including those for fixed assets, water, electricity, gas, heat, management fees, and awards granted to researchers. These are managed by project leading units.

- Expenditure for management fees included in each ministry's annual budget and approved by MOF. These include costs for: conferences, business trips, expert consultation, labour, audit/evaluation/tender/supervision, publishing, facilities, and other fees.

Both are reviewed and managed separately.

- Budget formulation and approval:
 - Project budget is formulated by project leading units during their application, and include both expenditures and revenue;
 - Professional management agencies integrate all budget proposals from selected applications into an annual budget plan, which is reported to line government agencies, MOST, NDRC and MOF before the end of September every year;
 - Professional management agencies may authorise third-party institutions to review budget proposals;
 - MOF, MOST and NDRC review, approve or modify annual budget plans and revert to line government agencies and professional management agencies. On this basis, professional management agencies officially launch projects.
- Budget implementation
 - From 1 January 2018, funds under Mega Project will not be transferred via special bank accounts, but in accordance with relevant regulations on national treasury single account system;
 - Professional management agencies proceed with transferring approved funds to project leading units, in accordance with relevant regulations on national treasury single account system.
 - Project leading units cannot decide to suspend payment to other consortium members (unless justified). In such cases professional management agencies are authorised to suspend funding to project leading units.
- Supplementary provisions:
 - According to these Measures, line government agencies should formulate specific fund management implementation rules for their specific Mega Projects;
 - MOF is responsible for explaining the Measures to all parties involved;
 - Previous Mega Projects' fund management regulations and measures are repealed

Other management regulations

Name	Date published and serial code	Description
Interim Provisions for Import Tax Policies under Mega Projects 科技重大专项进口税收政策暂行规定	25 July 2010 财关税〔2010〕28号 Link	Illustrating the eligibility requirements and the procedures through which units implementing Mega Projects can apply for an exemption of import duties
Interim Provisions for IP Management under National Mega Projects 国家科技重大专项知识产权管理暂行规定	16 August 2010 国科发专〔2010〕264号 Link	Regulating the management, evaluation, ownership, protection, transfer and application of intellectual property generated under Mega Projects. In particular, <u>the Provisions state that any IP can be unconditionally used by the State (or by other actors on the State's behalf) in case of major national needs; those IPs involving national security belong directly to the State</u>
Interim Management Measures for the conclusion of projects (activities) under National Mega Projects 国家科技重大专项项目（课题）验收暂行管理办法	23 July 2011 国科发专〔2011〕314号 Link	Illustrating the specific methods, content and procedures through which the projects and their expenses are evaluated at the end of the project, by expert teams or third-party agencies. Consequences of failing such evaluations are also illustrated

Name	Date published and serial code	Description
Interim Measures for S&T Reporting Management under Central Finance S&T Projects (Programmes, Funds) 中央财政科技计划（专项、基金等）科技报告管理暂行办法	29 December 2016 国科发创〔2016〕419号 Link	Indicating the requirements, frequency, content, classification, and format through which relevant reports should be submitted by teams implementing any projects under the five pillars of the Chinese national STI funding system. They also include provisions for sharing and utilisation of research results
Trial Measures for the Management of the National S&T Expert Pool 国家科技专家库管理办法（试行）	14 April 2017 国科办创〔2017〕25号 Link	Regulating the process through which relevant experts are (i) inserted into the national experts' pool, (ii) selected for evaluating proposals, as well as their conditions and requirements. The <i>Measures</i> also allow international experts (meeting certain criteria) to be included in the pool
Fund Management Measures for (Civilian) National S&T Mega Projects 国家科技重大专项（民口）资金管理办法	27 June 2017 财科教〔2017〕74号 Link	Illustrating the payment structure of Mega Projects: pre-financing + post-financing (at the end of the project). They also illustrate the procedures through which relevant budget proposals are evaluated and approved
Measures on the Financial Acceptance of (Civilian) National S&T Mega Projects 国家科技重大专项（民口）项目（课题）财务验收办法	28 June 2017 财科教〔2017〕75号 Link	Illustrating the specific procedures, content and methods through which all project expenses incurred are audited and evaluated at the end of the project, by third-party agencies
General Budget (Phase-budget) and Annual Budget Formulation Guidelines for Civilian Mega Projects 国家科技重大专项（民口）总概算（阶段概算）编制指南 国家科技重大专项（民口）分年度概算编制指南	26 June 2017 财科教〔2017〕76号 Link	Illustrating the requirements, procedures and methods through which relevant authorities should formulate different budget plans for Mega Projects (general budget; phase-budget; and annual budget)
Archive Management Regulations for (Civilian) National S&T Mega Projects 国家科技重大专项（民口）档案管理规定	10 November 2017 国科发专〔2017〕348号	Regulating the responsibilities, procedures, scope through which materials produced under Mega Projects must be archived, in order to ensure the long-term conservation and openness of scientific resources

Annex 3.2 – New Generation Broadband Wireless Mobile Communication Networks Mega Project

The Mega Project “*New Generation Broadband Wireless Mobile Communication Networks*” (“ICT Mega Project”) was officially approved in December 2007 by the State Council Standing Committee, led by former Premier Wen Jiabao, before becoming fully operational in 2008.

Although the ICT Mega Project has constantly evolved during the past decade, it generally focuses on the R&D of new broadband cellular mobile communication systems with large capacity; broadband wireless access systems with low cost and broad coverage; and short wireless interconnection systems and sensor networks. Its main goal is to enhance China’s indigenous innovation capacities by generating IP, formulating international technology standards, and expanding the commercial application of new information and communication technologies.

Specifically, since its launch, the ICT Mega Project has been involved in the development of third and fourth generation mobile internet technologies. During the 13th Five-year period (2016-2020) the ICT Mega Project will primarily focus on R&D of 5th generation mobile communication (5G) key technologies and applications, while continuing to develop chips and meters supporting 4G augmentation.

Management regulations and responsible bodies

The main legal framework regulating the ICT Mega Project and outlining its rules of participation is the *Management Regulations of (Civilian) National S&T Mega Projects*, included in Annex 3.1 (“*Management Regulations*”). In the case of the ICT Mega Project, applications should be submitted online, pre-evaluated and endorsed by local industry and information technology departments in the province or municipality where applicants are located.⁴² The professional management agency of the ICT Mega Project is the **Industry Development and Promotion Centre of the Ministry of Industry and Information Technology (MIIT)**.

In addition, MIIT has also published the *Implementation Regulations (Trial) for Fund Management of MIIT’s Mega Project*, which apply specifically to the ICT Mega Project.⁴³ These further specify central government funding’s management and allocation principles, division of responsibilities among relevant stakeholders, methods (pre- and post-financing), and areas (equipment, materials, testing, travels, conferences, international exchanges, consulting, etc; as well as indirect fees such as electricity, water and heating fees, or incentives for the research team, etc).

Rules of participation, eligibility requirements and international participation

Rules of participation and eligibility requirements that applicants must possess, together with the specific modality of application, are specified in individual tenders published on the Mega Projects’ website, and occasionally in specific project activities. These generally include:

- Requirement for applicants to be enterprises, universities or research structures legally registered in mainland China;
- Official endorsement and support from local industry and information technology departments in the province or municipality where the applicants are registered (full list in footnote no. 42);
- Additional funding should be provided by the applicants as well as supporting local governments, according to certain proportions indicated in the project guidelines (generally, central government’s funding does not exceed one-third of the total);

⁴² Full list of departments can be found at: <http://www.nmp.gov.cn/tztg/201709/W020170918320831877969.doc>

⁴³ <http://www.miit.gov.cn/n1146285/n1146352/n3054355/n3057278/n3057283/c3558679/content.html>. The Regulations also apply to the other two MIIT-led Mega Projects: “*Core electronic devices, high-end general chips and fundamental software*”; and “*Advanced CNC machines and Fundamental Manufacturing Equipment*”.

- Most projects require the project leading unit to be an enterprise (depending on the specific project, these could be enterprises involved in: equipment manufacturing, broadcast and TV systems, meter instruments, network operators, etc.); sometimes the leading unit should be an R&D or standardisation structure;
- Limits on the total number of units that can participate in a consortium;
- “Industry-University-Research cooperation” is often particularly encouraged.

2017 and 2018 calls **encouraged international actors to participate** in consortiums, as long as these had legal personality in mainland China.⁴⁴

Past calls and research topics

Since its official launch in 2008, calls for applications to the ICT Mega Project have been published on a yearly basis, with the last call for 2018 applications released in September 2017 ([link](#)).⁴⁵

The most recurrent research topics since the beginning of the 13th Five-year period (2016-2020) were:

- R&D of 5G:
 - 5G wireless technologies (2016, 2017, and 2018 calls);
 - 5G networks, application and services (2016, 2017 and 2018 calls);
 - 5G key devices (2016 call), modules and platforms (2017 and 2018 calls).
- R&D and industrialisation of LTE-A:
 - LTE-A core chips and components; LTE-A testing instruments and platforms; LTE-A technology standards and product R&D (2016 call);
 - LTE-Advanced Pro Terminal RF conformance testing instruments; and LTE-Advanced Pro Terminal conformance TTCN testing (2017 call).
- Mobile wireless technologies for industrial application (2016 call).

Previous calls for comments on a draft version of the annual tender are also usually published.⁴⁶

Outlook for the 13th Five-year period (2016-2020)

During the 13th Five-year period (2016-2020), the ICT Mega Project will continue to focus on two legs:

Further development and breakthroughs of 4G technologies

The main focus will be **chips** and **meters** supporting **4G augmentation**, as well as:

- Extension of 4G coverage in rural, remote, and mountainous regions and islands;
- Provision of free high-speed 4G wireless connection in popular urban public areas;
- Improvement of spectrum resources allocation, wireless spectrum management, and radio wave security and order;
- Reasonable utilisation of satellite frequencies and orbit resources;
- Expansion of aerial internet, and improvement of aerial-ground connectivity.

R&D of 5G key technologies

While further developing 4G, the main priority and line of action of the Mega Project has shifted to R&D of **5G** key technologies, instruments, wireless networks, applications, services, equipment and platforms. It also aims to promote 5G global standards and to promote mobile internet and IoT applications. This is consistent with the objectives outlined by various 13th Five-year Plans, namely:

- Speeding up 5G and ultra-wide band research; launch of 5G commercial use by 2020;

⁴⁴ During a press conference on the status of implementation of the ICT Mega Project in January 2017, the Director of MIIT’s Communication Development Department said that several FIEs have participated within the R&D activities under the Mega Project: http://www.most.gov.cn/xinwzx/xwzx/twzb/xydkdwx/twzbxwzsl/201701/t20170106_130251.htm

⁴⁵ Links to past calls for applications: [2017](#); [2016](#); [2015](#); [2014](#); [2013](#); etc.

⁴⁶ Links to past calls for proposals: [2018](#); [2017](#); [2016](#); [2015](#); etc.

- Upgrade to IPv6, which shall be supported by the main Chinese commercial, education, research and government websites, as well as by over 80% of top 100 Chinese apps;
- Laying down the future network architecture, technology and security system;
- Achievement of major breakthroughs in key technologies in the areas of: (i) big data and cloud computing; (ii) independently-controllable operating systems; (iii) high-end industrial and large-scale management software; and (iv) artificial intelligence.

Relationship with the 2030 Innovation Mega Projects and other initiatives

None of the sixteen new 2030 Innovation Mega Projects will be exclusively dedicated to broadband wireless mobile communication networks. One possible reason might be due to the 2030 Mega Projects' explicit target of new areas at the frontiers of science where key disruptions are expected to stretch throughout the next decade. This automatically excludes 5G technologies, as China aims to complete the development and achieve commercial application of 5G technologies by 2020. Nevertheless, broadband wireless mobile communication network technologies will likely be integrated and channelled into different newly-emerging 2030 Mega Projects, such as the “*Quantum Communication and Computing*”, “*Cyberspace Security*”, “*Space-ground Integrated Information Network*”, “*Big data*”, and the “*New Generation Artificial Intelligence*” Mega Projects.⁴⁷

The ICT Mega Project has also very close links with the **IMT-2020 Group**. In fact, the ICT Mega Project is often referred to by the media as the main platform through which the IMT-2020 Group conducts 5G-related R&D.⁴⁸ Several members and consultants of the IMT-2020 Group are also very active in implementing the ICT Mega Project, with the most prominent case represented by the ICT Mega Project's chief engineer.

New information and communication technologies are also the first of the ten key sectors at the heart of “**Made in China 2025**” (MIC2025). The MIC2025 plan, unveiled in 2015 by the State Council, explicitly emphasises the role of Mega Projects and the other national STI projects in pushing forward the strategy, especially through funding and contribution to the country's innovation capacities, which in the field of ICT are mainly related to breakthroughs in 5G broadband communication technology. ICT technologies will also be central in achieving the integration between information technology and industry (*lianghua ronghe*) on which a large part of the national strategy is based, particularly through a wider application of IPv6 in IoT and mobile internet.

Conclusions: openness of the ICT Mega Project

Two more tenders are expected to be published before the Mega Project officially comes to end in 2020, and these are likely to be anticipated by previous calls for proposals usually published few months in advance. EU telecoms and ICT industry stakeholders are nonetheless well-positioned for participating under the ICT Mega Project together with Chinese partners, in light of the **EU's and China's commitment to reciprocity in accessing 5G-related research funding**.⁴⁹ More specifically, it is expected that higher possibilities for participation exist for those EU actors already cooperating with Chinese counterparts under the **IMT-2020 Promotion Group**, which plays a key and central role in pushing forward the ICT Mega Project.⁵⁰

⁴⁷ This was explicitly suggested by Wan Gang, Chinese Minister of Science and Technology, during a press conference held on the margins on the *Two Sessions* in March 2017 ([link](#)).

⁴⁸ Some examples can be found at: http://www.cnii.com.cn/hygl/2016-01/08/content_1677694.htm; http://ydh.cena.com.cn/2017-01/06/content_349652.htm; <http://tech.china.com.cn/it/20170109/292522.shtml>

⁴⁹ This is a result of an agreement signed in September 2015 by the EU and China on 5G research, which launched a key bilateral partnership in access to 5G-related research funding, market access, and membership in 5G associations. More information on: http://europa.eu/rapid/press-release_IP-15-5715_en.htm.

⁵⁰ The European Union Chamber of Commerce in China's Information and Communication Technology Working Group Position Paper 2017/18 argues that the IMT-2020 Promotion Group is still not fully open to wholly foreign-owned enterprises (WOFEs), although some progress has been registered. Limited evidence of EU ICT industry stakeholders actively participating in the ICT Mega Project was also confirmed during one EUCCC ICT working group meeting.

Annex 3.3 – Water Pollution Control and Treatment Mega Project

The Mega Project “*Water Pollution Control and Treatment*” (“Water Mega Project”) was officially launched in 2007, with the objective of realising major breakthroughs in key technologies for controlling and improving the country’s water quality, particularly in the areas of:

- Control and treatment of industrial pollution sources;
- Control and treatment of agricultural nonpoint source pollution;
- Urban wastewater treatment and recovering;
- Water quality purification and ecological rehabilitation;
- Drinking water safety; and
- Water monitoring and early-warning.

The activities of the Water Mega Project are mainly implemented in China’s major water basins, specifically in what is referred to as “three rivers, three lakes, one (large) river, and one reservoir”:

- Liao River, Huai River, and Hai River basins;
- Tai Lake, Chao Lake, and Dian Lake basins;
- Songhua River basin; and
- Three Gorges Reservoir region.

The Water Mega Project is the biggest-ever environmental protection investment made in China, with an estimated total budget expenditure by all its participants of around 30 billion RMB (around 3.9 billion EUR) over its duration (2007-2020).

Management regulations and responsible bodies

The Water Mega Project also has its own specific management framework. The *Interim Measures for the Management of the “Water Mega Project”*,⁵¹ published in November 2016, outlines in detail:

- Division of responsibilities among different government bodies: line authorities are the **Ministry of Environmental Protection (MOEP)** and the **Ministry of Housing and Urban-Rural Development (MOHURD)**; the daily management and operation of the Water Mega Project are conducted by an ad hoc office established within the MOEP;
- Specific requirements that applicants must possess;
- Specific requirements that principal investigators (PIs) must possess, see below;
- **Criteria for the evaluation** of proposals, namely:
 - Scientific value and feasibility of the proposed research objectives and deliverables;
 - Rationality and innovativeness of the proposed research content and technological framework;
 - Representativeness of the proposed technology demonstration activities;
 - Rationality of the budget proposed for project activities;
 - Profile and conditions of project leading unit, PI, and consortium participants
- Reporting requirements and interim evaluations, etc.

A full abstract of the *Interim Measures* is included below. Several additional measures specific for the Water Mega Project also exist in the areas of fund and expenditure management; IP and results management; financial evaluation, etc.⁵²

⁵¹ In Chinese: 《水专项管理暂行办法》, http://www.nmp.gov.cn/tztg/201611/t20161115_4748.htm. A detailed abstract is included at the end of this annex.

⁵² These can be found on the Water Mega Project’s website: <http://nwpcp.mep.gov.cn/wjxz/zcwj/>

Rules of participation, eligibility requirements, and international participation

Specific project activities under Water Mega Project follow the three different **modalities of application** outlined at the beginning of this chapter, while rules of participation and eligibility requirements for applicants are specified in the Water Mega Project's *Interim Measures*:

- **Specific requirements for applicants** (units):
 - Institute of higher education, R&D structure or enterprise legally registered in China;
 - Previous experience in leading or participating in national-level major research or engineering projects;
 - Registered capital higher than the proposed project budget;
 - Possess enough financial resources to ensure the smooth implementation of the project before its end (exceeding at least 70% of the total amount of funds to be received at the end of the project);
 - Should not have collected any negative records in the past three years when applying to or implementing national STI projects.
- **Specific requirements for PIs:**
 - Previous experience in leading or participating in national-level major research or engineering projects;
 - Well-known scientist in the field holding a senior technology job position, and with enough time to dedicate to the project (at least 9 months per year, corresponding to at least 60% of his/her total working time);
 - Can only lead one project at a time, and one specific research activity;
 - Should not have collected any negative records and should not be on the blacklist.

Specific project activities in individual tenders may also indicate additional requirements, mainly related to the participation – with additional supporting funds – of local government departments where the project activities will be launched, e.g. Jiangsu and Zhejiang provincial environmental departments; Beijing or Langfang (Hebei) municipalities, etc.

The *Interim Measures* also **encourage the participation of high-level foreign talents** (art. 40), while the latest two annual calls also **encouraged domestic applicants to invite German partners in their consortiums**, which should however provide additional funds. This is a result of a series of bilateral agreements signed between China and Germany in the past few years (footnote no. 35).

Past calls, research topics, and transparency

The Water Mega Project's latest call for 2018 applications was published in August 2017 ([link](#)). The application period lasted in total 5 weeks.⁵³

The last two rounds of application funded projects in the following fields:

- Key demonstration of regional coordinated control across Jing-Jin-Ji area
- Key demonstration of regional coordinated control across the Tai Lake basin
- Integration and application of technology systems for the management of water basins
- Integration and application of technology systems for pollution treatment in water basins
- Integration and application of technology systems for drinking water safety control
- Improvement, verification, application, and divulgation of water basin technologies

The central government's budget allocated to these tasks was 3.66 billion RMB (around 474 million EUR) in 2017; and 1.54 billion RMB (around 199 million EUR) in 2018.

⁵³ Links to past calls: [2017](#); 2015 ([first call](#); [second call](#)); 2014 ([first call](#), [second call](#)); [2013](#); [2009](#).

Outlook for the 13th Five-year period (2016-2020)

According to the **13th Five-year Plan for Science, Technology, and Innovation** released by the State Council in August 2016, the Water Mega Project's objectives to realise by 2020 are:

- R&D of a group of key core technologies and integration of complete equipment sets in the areas of (i) restoration of water circulation systems; (ii) whole-process treatment of water pollution; (iii) drinking water safety; (iv) rehabilitation of ecological service functions; and (v) long-term water pollution management mechanisms;
- Launch of comprehensive demonstration activities across the Jing-Jin-Ji area and the Tai Lake basin; formation of three major technology systems in the areas of watershed pollution treatment and management, and drinking water safety;⁵⁴ and establishment of a big data-based water environment monitoring and control platform.

During the 13th Five-year period emphasis will also be put on accelerating the transfer and commercialisation of technology results (which has become an important key performance indicator), and on strengthening process management and evaluation systems. Ultimately, the Water Mega Project will actively contribute to the realisation of the targets and objectives set in April 2015 by the **Water Pollution Prevention and Control Action Plan** – commonly referred to as “Water Ten Articles” – the main framework guiding the country's efforts in cleaning its waters through 2030.⁵⁵

Relationship with the 2030 Innovation Mega Projects

The only new 2030 Innovation Mega Project representing continuity with the Water Mega Project is the **“Comprehensive Environmental Treatment of Jing-Jin-Ji region”**: it will extensively rely on the demonstration work initiated under its predecessor in this key area. At the same time, it will extend its action to the soil and atmosphere, aiming to establish a water-soil-atmosphere integrated control and treatment mechanism featuring a synergic recycling of industrial-agricultural-urban resources. The preliminary work for the launch of the new 2030 Mega Project was already initiated in mid-2017.⁵⁶

Conclusions: openness of the Water Mega Project

New calls are expected in the next two years, before the Water Mega Project officially comes to end. These are not preceded by previous calls for comments. Although no concrete evidence of international participation was identified, the Water Mega Project appears slightly **more open to international participation**: its legal framework explicitly encourages **high-level foreign talents** to participate in relevant R&D tasks. International participation going beyond talents and also embracing enterprises or research structures, however, appears to be an exclusive privilege of

⁵⁴ According to the Water Mega Project's chief technology officer, the CAE's academician Mr. Meng Wei, there currently exist several challenges in conducting such technology integration and demonstration in both areas. For instance, the large presence of small dams in the Jing-Jin-Ji region is one issue to overcome in order to establish ecological corridors with inter-connected water systems: http://news.ifeng.com/a/20170706/51384228_0.shtml

⁵⁵ This was explicitly outlined during an implementation meeting that the Water Mega Project's relevant stakeholders held in June 2017 ([source](#)). The **Water Ten Articles'** objectives by 2020 include: (i) 70% of the seven main lakes and rivers to reach 'excellent' or 'good' quality levels; (ii) 93% of drinking water sources for cities at the prefectural-level or above should reach Grade II of quality; (iii) reduction to 10% of “black and odorous water bodies” in cities at the prefectural-level or above; (iv) full collection and treatment of urban wastewater in cities at the prefectural-level or above; and (v) achievement of 20% water recycling rate in cities with water shortage: http://www.gov.cn/xinwen/2015-04/17/content_2848204.htm

⁵⁶ A series of field visits were completed by the expert group responsible for drafting the Mega Project's Implementation Framework from 2020 to 2030: http://www.most.gov.cn/kjbgz/201707/t20170725_134204.htm

Germany. It is not clear whether partners from other European countries will also be encouraged to participate, but there are no indicators suggesting the contrary.

Interim Management Measures for the Water Mega Project

On **Tuesday 15 November 2016**, the Ministry of Environmental Protection (MOEP) and the Ministry of Housing and Urban-Rural Development (MOHURD) published the [Interim Management Measures for the “Water Pollution Control and Treatment” Major S&T Project](#). The *Interim Measures*, which shall come into force from the date of issue, highlight in particular:

- The specific requirements for project applicants (art. 17, 1):
 - Universities, R&D centres, or enterprises legally registered in China;
 - Should: (a) possess good scientific research basis and high-level scientific teams; (b) have achieved high-level and competitive research results; and (c) have already led or participated in previous National Mega Projects;
 - Applicants’ registered capital should be higher than the total project budget;
 - Should cooperate with all the other consortium participants;
 - Should have the financial capacity to implement the project before actually receiving national funds (at least 70% or above of the total funds to be received);
 - Should not have any negative records and should not be in the black list.
- The specific requirements for PIs (art. 17, 2) are:
 - Previous leading or participation experience in National Mega Projects; should be a well-known scientist in the field; hold a senior technology job position; has enough time and spirit to dedicate to the project;
 - Can only lead one project at a time; can only lead one subproject activity; can only participate in a total of 2 sub-topic activities;
 - Possess all the requirements already outlined for project applicants;
 - Should not have any negative records and should not be in the black list.
- The evaluation criteria for tender applications (art. 19) are:
 - The scientific value and feasibility of research objectives, deliverables and outputs;
 - Rationality and innovativeness of research content and technological path;
 - Representativeness of technology demonstrations;
 - Rationality and matching degree of project budget with specific project activities;
 - Profile and conditions of the PI and consortium participants;
- The evaluators of the applications will be extracted from the national expert database. Evaluations will take place through video interviews or face-to-face discussions.
- The reporting and evaluation activities to be conducted during implementation phase are:
 - Annual report; Annual investigation; and interim evaluation (art. 24, 25, 26);
- Art 40: “the **participation of high-level foreign talents is encouraged**” (*note: this is however limited to individuals. There is no mention of foreign institutions or enterprises*).
- Art. 41 to 44 outline IP-related regulations. In particular:
 - art. 41 provides that IP will be managed according to the [Interim Provisions for IP Management under National Mega Projects](#). These state that any IP can be unconditionally used by the State (or by other actors on the State’s behalf) in case of national needs; those IPs involving national security belong directly to the State
 - art. 43 provides that all the intangible assets produced will belong to the State, and will be managed and utilised by the units implementing the project;
 - art. 44 provides that all the solid assets purchased with the Water Mega Project’s budget will also belong to the State.
- Art. 47 states that project applicants must abide relevant rules and regulation in terms of data and research material sharing.

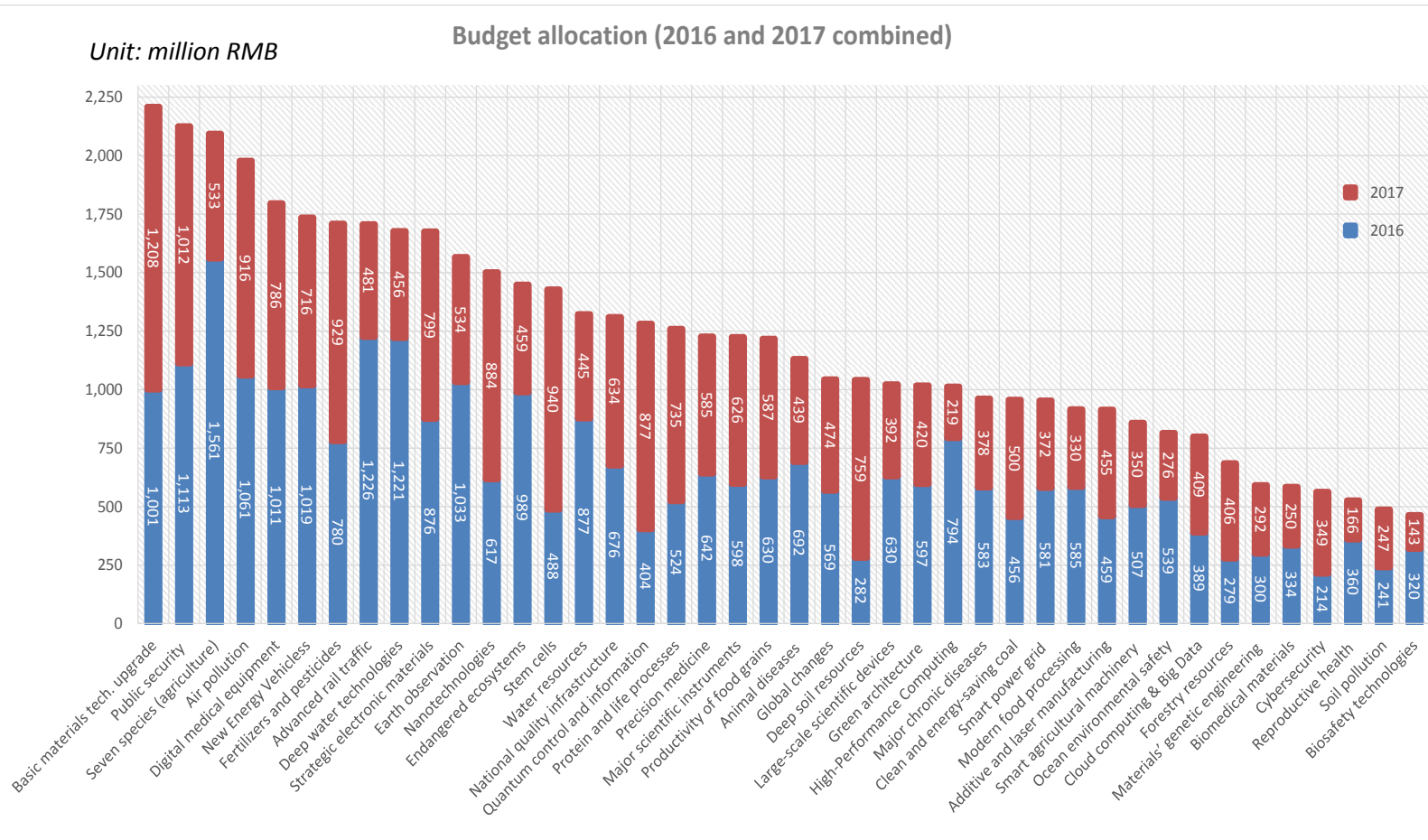
4. National Key R&D Programmes

National Key R&D Programmes (hereinafter referred to as “NKPs”) are a new category of projects created after the 2014 reform of the national STI funding system. They have incorporated numerous previously-existing programmes such as MOST’s “863 Programme” for R&D, “Programme 973” for basic research, Key Technologies R&D Programme, and International S&T Cooperation Programme; and NDRC and MIIT’s Industrial Technology R&D Fund.

NKPs support R&D in areas of social welfare and people’s livelihood, such as agriculture, energy and resources, environment, and health, focusing especially on strategic, fundamental and prospective major scientific issues, key generic technologies as well as international S&T cooperation regarding core industrial competitiveness, indigenous innovation capabilities, and national security. They feature several well-targeted and defined objectives and deliverables to be achieved in a period ranging from three to five years, reflecting a top-down and industry-university-research cooperation design which integrates basic research, technology application, demonstration and commercialisation.

NKPs are currently among the most active and standardised of the five pillars. A total of 42 NKPs were initially established, followed by the launch of 6 new NKPs in the second half of 2017 (a full list is included in Annex 4.1). Each NKP funds numerous projects in different areas.

Since their official launch, a total of 50.7 billion RMB (around 6.57 billion EUR) were allocated by the central government for 42 NKPs in the 2016 and 2017 annual calls.



A total of 2,288 projects were funded under the 2016 and 2017 annuals calls for 42 NKPs. The majority was led by institutes of higher education and research structures (37.5% and 33%, respectively), followed by State-owned Enterprises (12%) and privately-held enterprises (9.5%). Almost eight thousand experts took part in the evaluation of proposals. A breakdown of the top 100 project leading units for NKPs in 2016 and 2017 is included in Annex 4.2.

The main legal framework governing NKPs are the ***Interim Measures for the Management of National Key R&D Programmes***, released by MOST and MOF at the end of June 2017.⁵⁷ These outline the NKPs' management structure and the division of responsibilities among different government bodies (which is similar to that of Mega Projects, with the only difference being that the NDRC is not involved in NKPs); the tender cycle and methods for applications; the eligibility requirements applicants must possess; reporting and evaluation tasks during the project implementation phase, as well as the project conclusion procedures to undertake at the end of the project. It is noteworthy that the *Interim Measures* explicitly **encourage China-based affiliates of overseas entities to participate and lead NKPs**, and foreign experts to be invited to sit in evaluation. A detailed abstract of the *Interim Measures* is included in Annex 4.3, together with the other main regulatory documents of NKPs – mainly *Fund Management Measures*, *Budget Preparation Guidelines*, and *Budget Evaluation Norms*.

It should also be noted that calls under the **EU-China Co-Funding Mechanism**, from the Chinese side, are labelled as “National Key R&D Programmes”, together with other **intergovernmental cooperation programmes** (including bilateral programmes with 13 EU member states,⁵⁸ or multilateral programmes with international institutions such as CERN, SKA, GIF, or BRICS countries, etc.). The “*Research on the Development of Magnetic Confinement Fusion Power*” ([link](#)) and “*Strategic International S&T Cooperation with One Belt, One Road countries*” ([link](#)) too fall under this category of projects.

Rules of participation and eligibility requirements

There exist two categories of requirements that applicants must possess in order to apply to NKPs:

- **General requirements** outlined by the *Interim Measures*; and
- **Additional requirements** applying to individual NKPs

The first category includes: the requirement for applicants to have been legally registered in mainland China for a minimum duration of around 1 year; age-related requirements for proposed PIs or sub-topic coordinators; limitations on the maximum number of central S&T funding projects simultaneously implementable by PIs or other team members (generally no more than one or two national-level projects at the same time); and instructions regarding which government agency the applicant should obtain endorsement from.⁵⁹ If the proposed PI is a foreign national (including Hong Kong, Taiwan, and Macau), then relevant employment certificates should be provided (by the Chinese employer if the PI is employed full-time in China, or by both the Chinese and foreign employer if not employed full-time in China). Central and local governmental agencies, government officials, and experts who have drafted the tenders are automatically non-eligible.

⁵⁷ In Chinese: 《国家重点研发计划管理暂行办法》（国科发资〔2017〕152号）。

http://www.most.gov.cn/mostinfo/xinxifenlei/fgzc/gfxwj/gfxwj2017/201706/t20170628_133796.htm

⁵⁸ These include: Austria, Belgium, Czech Republic, Denmark, Germany, Finland, France, Hungary, Italy, Netherlands, Poland, Portugal, and United Kingdom. The most recent call with some of these countries can be found at: http://service.most.gov.cn/2015ztzg_all/20170602/2187.html

⁵⁹ Official written endorsement from certain bodies is required to submit applications. Entities belonging to, or with direct business/operation relation with State Council's bodies should seek endorsement by these; companies which are members of industry associations, or “A levels” S&T alliances should seek endorsement by these; the rest should seek endorsement from the S&T departments of the municipality or province where they are located. A full list of endorsing bodies is available at: http://service.most.gov.cn/2015ztzg_all/20161011/1962.html

Additional requirements might also be required for specific NKPs, depending on the NKP's field, directions (e.g. research- or commercialisation-oriented), or activities (e.g. experiments involving certain resources). The most recurrent generally are: requirement for the project consortium to provide additional funds according to certain proportions specified in the tender (usually ranging from 1:1 to 4:1 in correlation with funds to be provided by the central government); encouragement of "industry-university-research" joint applications; obligation to promote the conversion and application of results generated under the project;⁶⁰ mandatory or legally-binding data-sharing with MOST;⁶¹ or requirement to launch certain project activities in specifically-indicated areas such as national sustainable development pilot areas. Some calls also encourage, or in some cases require, young scientists to participate or lead the projects as PIs.

Six specific NKPs also require project applicants to obtain the prior approval from central government authorities for the utilisation, transportation, trade, import, etc., of certain genetic or highly-pathogenic resources; or to possess specific licenses for those research activities involving animal experiments.⁶²

Lastly, it should be noted that few NKPs also feature the "**directional application**" (定向申报) methodology of application as already seen in Mega Projects, i.e. project leading units already decided and specified in the tender guidelines, and entrusted to identify and recruit consortium members. Any actors interested in this category of projects should contact and coordinate with project leading units.

Tender cycle, application process, and transparency

Tender guidelines for NKPs are published on the **National Science and Technology Information System, Public Service Platform** (commonly referred to as "National S&T Service Platform")⁶³ on a yearly basis, usually in groups. The first cycle of 2016 annual calls was published between February and April 2016. The cycle of 2017 annual calls was published in October 2016. 2018 annual calls were published in October 2017 and December 2017.

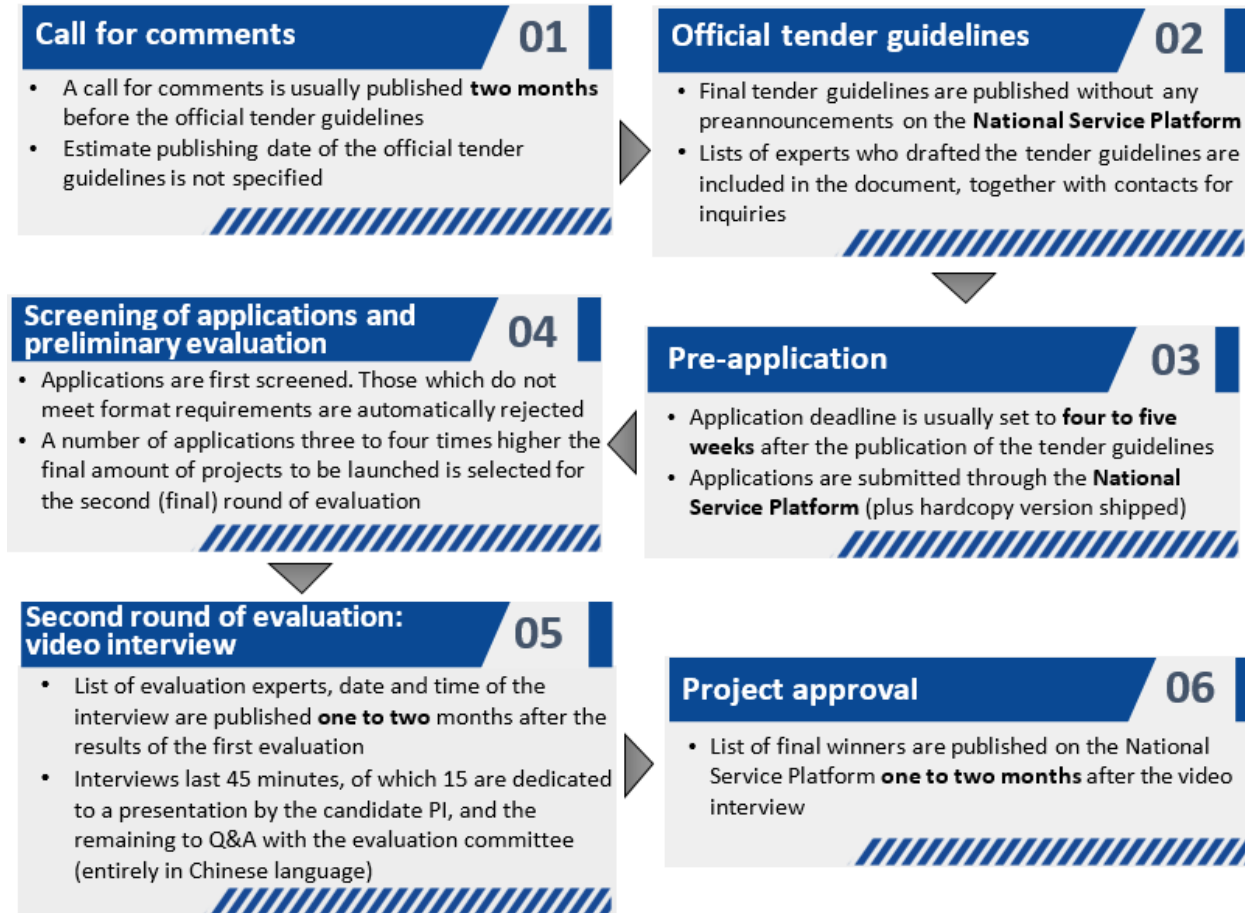
The tender cycle usually lasts six months, and can be summarised as follows:

⁶⁰ No specific details or requirements on how such results shall be converted. This however suggests that any NKP proposals should include specific deliverables related to conversion of technology results and commercialisation into specific products or equipment.

⁶¹ Legally-binding agreement should be signed for the unconditional and timely delivery of all the scientific data produced under the project to a platform designed by MOST, which shall also be shared with other participants as well as other companies and the public. Applications missing such a written agreement will automatically be rejected. Failure to deliver relevant data will lead to the suspension and recovery of funds, and subsequent blacklisting. It is however not clear what it is referred to as "data".

⁶² These are: 1) "*R&D of technologies for major animal disease prevention and control, and efficient and safe breeding*"; 2) "*R&D of biomedical materials, restoration and transplant of tissue and organs*"; 3); "*R&D of biosafety key technologies*"; 4) "*Research on the prevention and control of major chronic non-communicable diseases*"; 5) "*Research on precision medicine*"; and 6) "*Research on reproductive health and the prevention and control of major birth defects*".

⁶³ In Chinese: 国家科技管理信息系统公共服务平台: <http://service.most.gov.cn/index/>



Unlike most of the other funding programmes, the application process for NKPs is divided into **two rounds of application**:

- **Pre-application**, submitted online through the National Service Platform (hardcopy versions of the application materials must also be shipped as indicated in the tender guidelines)
- **Official application** of candidates who have passed the screening and first evaluation round

The **application deadline** is usually four to five weeks from the date of publishing of the final tender guidelines.⁶⁴ Unlike in Europe, Chinese programmes do not follow the practice of **pre-announcing** new calls. In practice, the publication of previous calls for comments on a draft version of the tender might nonetheless be seen as such (although these do not specify the estimated date of publishing of the final tender guidelines), thus allowing potential applicants to start preparing proposals and consortiums in advance. From an analysis conducted on 2016 and 2017 cycles, it emerged that no substantial differences generally exist between draft tenders in calls for comments and final tenders published (generally related to revised deliverables, or to new added research topics).

Both NKPs' tender guidelines and management regulations do not indicate the criteria according to which proposals are evaluated. However, two NKPs in 2017 published an attachment indicating a detailed **scoring system** on the basis of which proposals are evaluated during the final interview ([link](#)). It includes fourteen points belonging to five categories:

⁶⁴ Although the *Interim Measures for the Management of National Key R&D Programmes* specify that “the deadline for applications is, in principle, no less than 50 days from the date of publishing of tenders guidelines”.

- Research content (e.g. “Does the proposed research content cover all the targets and deliverables listed in the tender guidelines?”);
- Objectives and technology roadmap (e.g. “Is the proposed research methodology rational, feasible, and innovative? Are KPIs rational, quantifiable and measurable?”);
- Tasks and overall organisation (e.g. “Rationality and feasibility of research activities”);
- Research team and foundations (e.g. “Research and innovation capabilities of the project leader and team members”);
- Expected output and risk analysis (e.g. “Are expected outputs clear? What is their socio-economic impact?”).

Nevertheless, the scoring results are not shared with the applicants after the evaluation.⁶⁵ An English translation of the scoring system is included in Annex 4.4.

All information related to any stage of the NKPs’ cycle, including calls for comments, official tender guidelines, are regularly published on the National Service Platform. The **lists of experts** who have drafted each tender guidelines, or who sit in the evaluation committees, are also openly published and accessible from the platform, together with the **lists of final approved projects** and winners.⁶⁶ This contributes to a very high degree of transparency for NKPs – the highest among the five funding programmes. Substantial improvements are also being registered year-on-year in those areas which resulted less transparent in previous years.

It is noteworthy that Chinese tech giants such as Huawei, Lenovo, Tencent, Baidu, etc., are not generally involved in NKPs as project leading units (the most active one was Huawei Technologies, with 3 projects led in 2016 and 2017).

Lastly, it should be noted that similarly to Mega Projects introduced in the previous chapter, trainings or various information sessions on specific NKPs, or on NKPs in general, are occasionally organised by MOST or professional management agencies.⁶⁷ The procedures for being invited to participate in such events are not clear.

International participation: figures, challenges, and opportunities

Even though the legal framework of NKPs explicitly encourages the participation of international actors and experts in both the preparatory and implementation stages of the projects, in reality the situation seems to not meet these expectations.

From an analysis of the 2016 and 2017 annual tender cycles, it emerged that:

- Only 22 out of 2,288 (0.9%) NKPs assigned were led by international entities
- Only 2 out of 2,288 NKPs assigned were led by a foreign PI
- Very few foreign experts sat in evaluation committees (all being ethnic Chinese foreign nationals, or Hong Kong citizens)

International participation

Two examples of FIEs which were assigned NKPs are:

- **Koning (Tianjin) Medical Equipment**, of the US-based Koning Corporation (NKP “*R&D of digital diagnosis and treatment equipment*”); and
- **Shanghai Advanced NDT Equipment Co**, a joint venture with the US-based Aerosino Corporation (x-ray generator) (NKP “*Development of major scientific instruments and equipment*”)

Both the two foreign PIs were registered in the same NKP “*Smart agricultural machinery equipment*”, and in both cases are two Italian nationals employed by **Lovol Heavy Industry Co.** a Tianjin-based private Chinese enterprise. [Link 1](#); [link 2](#).

⁶⁵ This finding emerged from a series of interviews conducted with European R&D industry stakeholders.

⁶⁶ This information is however limited to project leading units and PIs, and does not include information on project consortium members.

⁶⁷ Two examples can be found at: http://www.most.gov.cn/kjbgz/201709/t20170907_134782.htm; and http://www.most.gov.cn/kjbgz/201710/t20171012_135324.htm.

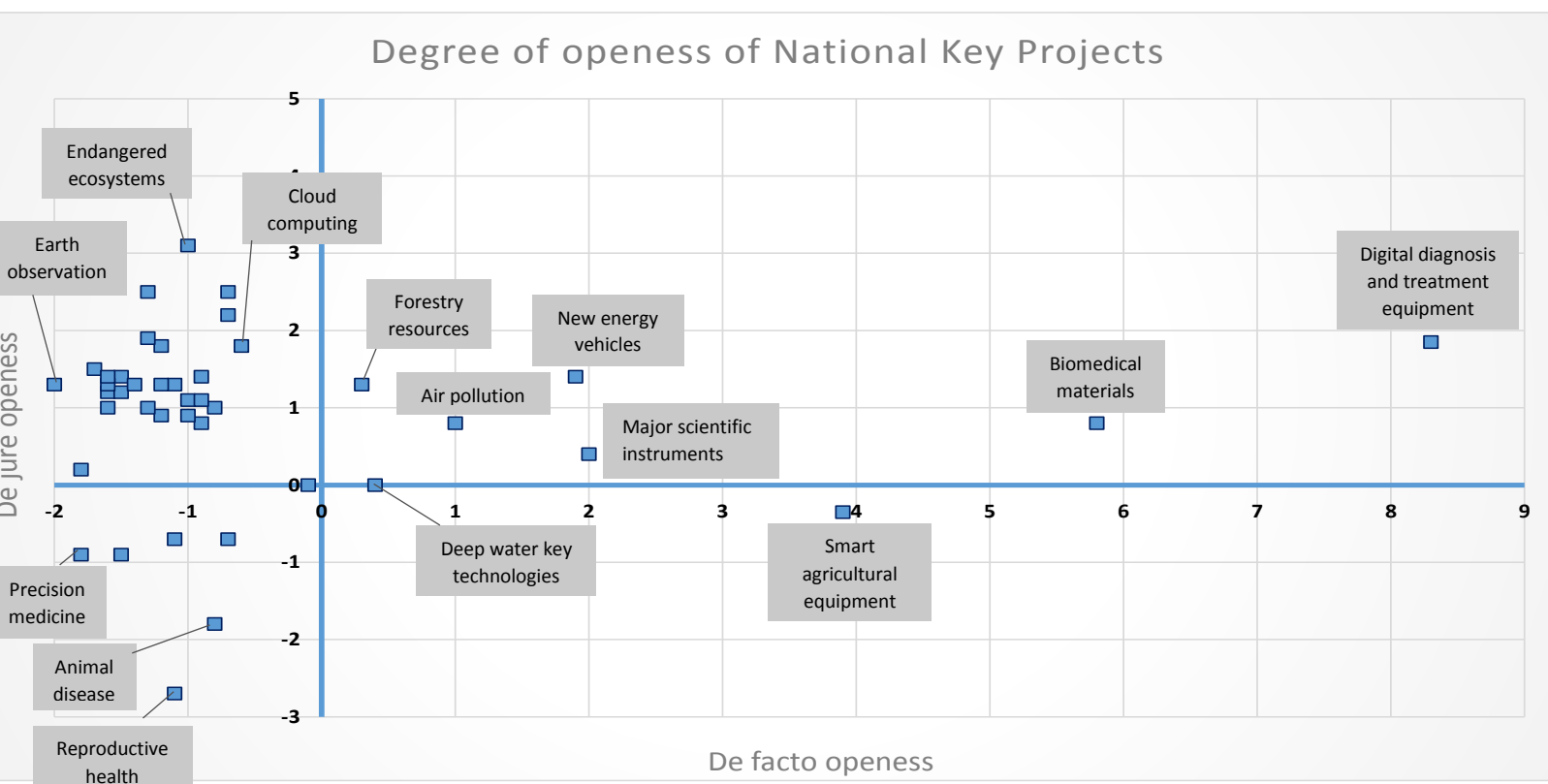
- No evidence of foreign experts among the expert committees drafting tender guidelines

No figures on international participation in wider project consortiums are available, but is expected that these should be higher.

As it was suggested throughout a series of interviews conducted with EU R&D industry stakeholders, the low degree of international participation might be attributable to a still **narrow mind-set** prevailing among many decision-makers and evaluators, who in the majority of cases belong to state-owned enterprises, *shiye danwei* or other governmental or quasi-governmental organisations. Their lack of understanding of the role and contributions that international enterprises and research institutions offer to the Chinese innovation ecosystem tend to divert their judgments towards safer (domestic) options, or to proposals from different departments belonging to the same organisation.

In addition, the relatively **short application period** is considered to represent a significant challenge to preparing effective proposals; however, this is mitigated by the publication of previous calls for comments on draft versions of the tender guidelines, usually published two or three months in advance (see previous page).

From an accurate analysis of the *de jure* requirements and the *de facto* implementation both in the 2016 and 2017 annual cycles, it clearly emerged that some NKPs tend to appear **more open and accessible compared to others**; or appear open at the *de jure* level, but only showing opposing results at the *de facto* level. These differing degrees of openness of National Key R&D Programmes are depicted in the below scatter diagram:



The **vertical axis** represents the *de jure openness*. A certain score is added to or deducted from each NKP according to the transparency index or technical barriers encountered at each stage of the tender, and according to the proportion of evaluators belonging to privately-owned entities in contrast to

government/state-owned/military entities.⁶⁸ Additional points are also granted to those NKPs whose tender guidelines explicitly encourage international cooperation, or to those NKPs which have foreign drafters or evaluators, or evaluators belonging to foreign-invested enterprises.

The **horizontal axis** represents the *de facto openness* of NKPs. A certain score is added to or deducted from each NKP according to the proportion of project winners belonging to privately-owned entities in contrast with government/state-owned/military entities, and according to the proportion of project leading units which were also represented in the group of experts drafting the tender guidelines, or in the expert evaluation committees.⁶⁹ An additional score is assigned for each foreign-invested entity which was assigned a project, or to those projects whose PI is a foreign national.

Three main findings emerge from the scatter diagram:

- High concentration of NKPs in the top-left quadrant, which includes 26 NKPs which appear open at the *de jure* level, but not equally so when it comes to the *de facto* situation;⁷⁰
- Few NKPs appear open both at the *de jure* and *de facto* level;⁷¹
- Few NKPs appear closed both at the *de jure* and *de facto* level.⁷²

This chart was designed with the purpose of **guiding EU actors** to allocate more efficiently the resources spent for preparing applications to NKPs. It is not a rule-generating tool intended to exclude a priori those NKPs which scored negative results; nor does it guarantee that future applications to NKPs scoring positive results will be successful. In reality, a series of improvements were already registered in closed NKPs between 2016 and 2017, and are likely to continue in 2018 and in the following years.

Future outlook

The 2016 and 2017 tender cycles were completed for all NKPs. The 2018 tender cycle started in May 2017, with the publication of calls for comments, around six months before the official publication of final tender guidelines. Each NKP will be implemented for five years, meaning that two other annual cycles will take place in 2019 and 2020 for currently-existing NKPs, before being replaced by a new batch of programmes.

⁶⁸ Evaluators belonging to state or military entities are more likely to have biases towards international applicants.

⁶⁹ High correlations of positive matches between project winners with project drafters and evaluators might indicate closeness. Although these figures refer only to working units rather than individuals (as the latter would automatically be excluded from applying to NKPs in that year), drafters might still be able to circulate relevant information to their colleagues in other departments of the same organisation, thus *de facto* reducing the openness and accessibility of the NKP for actors without such linkages with drafters - particularly international actors, which are very scarcely represented among project drafters.

⁷⁰ The most prominent case is the NKP “*Research on restoration and protection of typical endangered ecosystems*”, whose tender guidelines explicitly encouraged international cooperation both in the 2016 and 2017 annual cycles, but in the end almost half of the final winners belonged to either project drafters or project evaluators: this reduces by half the *de facto* accessibility to this NKP for international actors.

⁷¹ The most prominent cases are the NKPs “*R&D of digital diagnosis and treatment equipment*” and “*R&D of biomedical materials, restoration and transplant of tissue and organs*”, which in addition to encouraging international cooperation in the 2016 and 2017 annual tender guidelines, also assigned a large quantity of projects to private and foreign-invested actors (eight in total).

⁷² One example is the NKP “*Research on precision medicine*”, whose high number of technical barriers, and the large proportion of project winners belonging to project evaluators (two-thirds) contribute to a largely negative score, despite one of the experts sitting in the evaluation committee being an ethnic Chinese foreign-national. Other NKPs in this quadrant are: “*Research on the prevention and control of major chronic non-communicable diseases*”; “*R&D of biosafety key technologies*”; “*Research on reproductive health and the prevention and control of major birth defects*”; “*Exploration and extraction of deep soil resources*”; and “*R&D of technologies for major animal disease prevention and control, and efficient and safe breeding*”.

Recommendation for EU stakeholders

Similarly to the funding programmes under the Natural Science Foundation of China, numerous articles and blogs providing tips and recommendations on different aspects of the application process to NKPs can easily be found online or on public Wechat accounts. Given the large number of projects funded under NKPs (2,288 in only two years), many experts have gained rich knowledge and applicable experience. Moreover, the entire tender cycles of 2016 and 2017 NKP calls have been strictly monitored and analysed by the project team.

On this basis, the most significant recommendations to European actors are summarised below according to different aspects of the application process:

Choose the right NKP

- As illustrated in the scatter diagram in the previous page, some NKPs appear more open and accessible compared to others. This is mainly due to explicit encouragement of international cooperation, to less stringent eligibility requirements, or to higher concentration among both evaluators and winners of privately-held firms rather than State or military entities.
- Additionally, some NKPs might have slight overlaps in terms of R&D tasks to be funded: different aspects of the same product/technology might fall under different NKPs. It is therefore recommended to focus on the NKPs that appear to be most open, particularly at the *de jure* level, based on the scatter diagram.⁷³

Choose the right partner and consortium

- Most NKP tasks are large and ambitious, and therefore require larger teams and consortiums to be implemented. A good idea would be to choose partners who already have previous experience in leading or participating in NKPs. Lists of winners and PIs for all NKPs approved in 2016 and 2017 are available and openly accessible from the National Service Platform (although information is limited to project leading units rather than the entire consortiums; numerous examples can be found [here](#)).
- At the same time, NKPs have strict limits on the number of government-funded projects that can be implemented at the same time by the proposed PI or sub-topic leaders, as well as on the number of applications that can be submitted to the same NKP. Make sure that the proposed PI or sub-topic leader is eligible; otherwise the application will automatically be rejected.

Diversification of funds

- One of the major changes brought by the 2014 reform of the Chinese STI funding system relates to the inclusion of additional funds in addition to those provided by the central government. A good proposal will therefore include diversified funds from local governments, as well as additional funds provided by the consortium itself; central government funds generally not exceeding one-third of it. Sometimes this is an explicit requirement in many NKPs, but it is also recommended to follow this approach even if not explicitly required. Certificates of origin of funds must also be submitted as part of the application materials.

Research topic

- The more aligned the research proposal is with local or national needs, or the more international competitiveness it has, then the higher the chances of approval will be.

⁷³ For instance, one product/technology to be funded under the NKP “*Precision medicine*” – which has one of the lowest degree of openness – can be adapted so that it might also fall under the NKP “*Digital diagnosis and treatment equipment*”, which has the highest degree of openness.

- Research results and deliverables should be clear, very well-defined, and measurable (e.g. patent filed; standard formulated; new technology developed; a certain market share reached by a newly-developed or commercialised product, etc).
- As NKPs' positioning is to support the creation of new technologies, products and equipment in areas for people's livelihood, the proposed topic should feature strong application and industrialisation prospects. Particular emphasis should be put on matching downstream industries.
- Take advantage of the high degree of transparency of NKPs: extensively read past tender guidelines to identify trends and evolution of priorities; compare the list of proposals which have passed the first round of evaluation with those which were finally approved, so to identify what type of proposals were rejected and what projects were approved (lists are publicly available from the National Service Platform, numerous examples can be found [here](#)). Press releases on the implementation status or results achieved under approved projects are also frequently published on MOST's website (examples [here](#), and [here](#)).

Filling the application form

- Make sure that the application form when submitting the second official application is in line with and matches the one previously submitted in the pre-application phase:
 - Only minor adjustments are allowed, and generally are limited to increases in KPIs, deliverables, content, facilities or team members. No reductions of what had been originally proposed are generally allowed.
 - The project budget cannot be higher than that originally proposed in the pre-application.
- Pay attention to budgetary calculations:
 - Make sure that the scope of each item included the budget proposal is in line with its official definition as outlined in relevant measures, e.g. *NKPs Fund Management Measures*; and *Complementing Implementation Rules* (detailed abstracts in Annex 4.3)
 - Keep in mind the criteria for the evaluation of budget proposals, as specified in the *Complementing Implementation Rules* (Annex 4.3): conformance of expenditure scope and standards with relevant financial regulations; relevance with the NKP's R&D tasks, objectives and content; rational allocation and distribution
 - Draft budget according to the criteria for evaluation specified in the *Complementing Implementation Rules*
 - Make sure that the amount for each item included in the budget proposal is in line with relevant expenditure standards and guidelines outlined by relevant national guidelines and regulations (for instance, travel and accommodation fees); other fees such as purchase of equipment or materials should be strictly in line with real market costs
 - Include and emphasise budget dedicated to resource-sharing
 - Several additional budget-related tips can be found online, for instance at [this link](#).

Video interview

- A concise PPT on the proposal should be submitted before the video interview takes place. Make sure that the PPT is concise and clearly outlines the research methodology, as well as potential risks and measures for their reduction and management

Be proactive

- Positively respond to calls for comments on draft tender guidelines regularly published on the National Service Platform, show commitment.
- When possible, try attending relevant trainings, conferences or various information sessions organised by MOST or professional management agencies on specific NKPs, or on NKPs in general (footnote no. 67)

Annexes

The following annexes are included in this section:

- Annex 4.1 – List of National Key R&D Programmes
- Annex 4.2 – Breakdown of top 100 project leading units for 2016 and 2017 NKPs
- Annex 4.3 – Management regulations of NKPs
Interim Measures for the Management of National Key R&D Programmes
Fund Management Measures for National Key R&D Programmes
 Complementing Implementation Rules to the “*Fund Management Measures for National Key R&D Programmes*”
- Annex 4.4 – Scoring system for NKP calls

Annex 4.1 – List of National Key R&D Programmes

List of National Key R&D Programmes (NKPs)			
Research on stem cells and their conversion 干细胞及转化研究	Clean and efficient utilization of coal, and new energy saving technologies 煤炭清洁高效利用和新型节能技术	New Energy Vehicles 新能源汽车	Public security risk prevention and control and emergency response technologies and equipment 公共安全风险防控与应急技术装备
Breeding of seven species (agriculture) 七大农作物育种	Cloud computing and big data 云计算和大数据	Industrialisation and technological upgrading of major basic materials 重点基础材料技术提升与产业化	Green building and industrialisation of construction 绿色建筑及建筑工业化
Research on atmospheric pollution factors and control technologies 大气污染成因与控制技术研究	Additive and laser manufacturing 增材制造与激光制造	Strategic advanced electronic materials 战略性先进电子材料	Research on restoration and protection of typical endangered ecosystems 典型脆弱生态修复与保护
Smart agricultural machinery equipment 智能农机装备	Advanced rail traffic 先进轨道交通	High-performance computing 高性能计算	High-efficient utilization and development of water resources 水资源高效开发利用
Technology innovation for the cultivation and highly-efficient utilization of forestry resources 林业资源培育与高效利用技术创新	Development of major scientific instruments and equipment 重大科学仪器设备开发	Earth observation and navigation 地球观测与导航	S&T innovation for increased productivity of food grains 粮食丰产增效科技创新
R&D of technologies for prevention and control of animal diseases, and efficient and safe breeding 畜禽重大疫病防控与高效安全养殖综合技术研发	Materials' genetic engineering key technologies and support platforms 材料基因工程关键技术与支撑平台	Regulation and control of protein machines and life processes 蛋白质机器与生命过程调控	R&D of technologies for prevention and restoration of agricultural lands polluted by heavy metals or diffuse sources 农业面源和重金属污染农田综合防治与修复技术研发
Technology and devices for modern food processing, grains storage and transportation 现代食品加工及粮食收储运技术与装备	Cybersecurity 网络空间安全	Global changes and response 全球变化及应对	Nanotechnologies 纳米科技

R&D of biomedical materials, and tissue and organs restoration and transplant 生物医用材料研发与组织器官修复替代	Smart power grid technologies and equipment 智能电网技术与装备	R&D of digital diagnosis and treatment equipment 数字诊疗装备研发	Quantum control and quantum information 量子调控与量子信息
Research and application of generic technologies for national quality infrastructure 国家质量基础的共性技术研究与应用	R&D of technologies for reducing the utilisation and increasing the efficiency of chemical fertilizers and pesticides 化学肥料和农药减施增效综合技术研发	Research on precision medicine 精准医学研究	Monitoring, early warning, and prevention of major natural disasters 重大自然灾害监测预警与防范
Exploration and extraction of deep soil resources 深地资源勘查开采	R&D of biosafety key technologies 生物安全关键技术研发	Research on the prevention and control of major chronic non-communicable diseases 重大慢性非传染性疾病防控研究	Smart robotics 智能机器人
Deep water key technologies and equipment 深海关键技术与装备	Research on reproductive health and the prevention and control of major birth defects 生殖健康及重大出生缺陷防控研究	R&D of food safety key technologies 食品安全关键技术研发	R&D and application demonstration of modern service industry's generic key technologies 现代服务业共性关键技术研发及应用示范
Ocean environmental safety safeguarding 海洋环境安全保障	Frontier research on large-scale scientific devices 大科学装置前沿	Research on the modernisation of traditional Chinese medicine 中医药现代化研究	Key scientific issues of disruptive technologies 变革性技术关键科学问题

Annex 4.2 – Breakdown of top 100 project leading units for 2016 and 2017 NKPs

Rank	Institution (Chinese)	Institution (English)	NKPs assigned
1	清华大学	Tsinghua University	60
2	上海交通大学	Shanghai Jiaotong University	42
3	浙江大学	Zhejiang University	40
4	复旦大学	Fudan University	39
5	北京大学	Peking University	39
6	中山大学	Sun Yat-sen University	38
7	中国科学技术大学	University of Science and Technology of China	31
8	中国计量科学研究院	China Institute of Metrology	26
9	天津大学	Tianjin University	23
10	四川大学	Sichuan University	20
11	中国农业大学	China Agricultural University	18

Rank	Institution (Chinese)	Institution (English)	NKPs assigned
12	南京大学	Nanjing University	18
13	华中科技大学	Huazhong University of Science and Technology	18
14	中国标准化研究院	China National Institute of Standardisation	18
15	中国人民解放军第三军医大学	PLA Third Military Medical University	18
16	中国科学院地理科学与资源研究所	CAS - Institute of Geographic Sciences and Natural Resources Research	17
17	同济大学	Tongji University	15
18	中国人民解放军总医院	Chinese PLA General Hospital (301 Hospital)	15
19	西安交通大学	Xi'an Jiaotong University	13
20	中国农业科学院植物保护研究所	CAAS - Institute of Plant Protection	13
21	中国科学院物理研究所	CAS - Institute of Physics	13
22	中国医学科学院肿瘤医院	CAMS - Cancer Hospital	13
23	中国科学院半导体研究所	CAS - Institute of Semiconductors	12
24	中国建筑科学研究院	China Academy of Building Research	12
25	中国科学院生态环境研究中心	CAS - Research Center for Eco-Environmental Sciences	12
26	厦门大学	Xiamen University	12
27	华中农业大学	Huazhong Agricultural University	11
28	北京理工大学	Beijing Institute of Technology	11
29	北京科技大学	University of Science and Technology Beijing	11
30	中国科学院合肥物质科学研究院	CAS - Hefei Institute of Physical Science	11
31	武汉大学	Wuhan University	11
32	北京师范大学	Beijing Normal University	11
33	中国水利水电科学研究院	MWR - China Institute of Water Resources and Hydropower Research	11
34	中国农业科学院作物科学研究所	CAAS - Institute of Crop Sciences	10
35	哈尔滨工业大学	Harbin Institute of Technology	10
36	中国医学科学院阜外医院	CAMS - Fuwai Hospital	10
37	水利部交通运输部国家能源局南京水利科学研究院	MWR, MOT, CEA - Nanjing Hydraulic Research Institute	10
38	中国科学院上海生命科学研究院	CAS - Shanghai Institute of Biological Sciences	10

Rank	Institution (Chinese)	Institution (English)	NKPs assigned
39	吉林大学	Jilin University	9
40	华南理工大学	South China University of Technology	9
41	山东大学	Shandong University	9
42	重庆大学	Chongqing University	9
43	中国中车股份有限公司	CRRC Corporation Limited	9
44	中国特种设备检测研究院	China Special Equipment Inspection and Research Institute	9
45	中国检验检疫科学研究院	Chinese Academy of Inspection and Quarantine	9
46	东华大学	Donghua University	8
47	中国科学院高能物理研究所	CAS - Institute of High Energy Physics	8
48	北京航空航天大学	Beihang University	8
49	中国科学院大气物理研究所	CAS - Institute of Atmospheric Physics	8
50	中国电力科学研究院	State Grid Corporation - China Electric Power Research Institute	8
51	东南大学	Southeast University	8
52	广州海洋地质调查局	Guangzhou Marine Geological Survey Bureau	8
53	中国人民解放军第四军医大学	PLA Fourth Military Medical University	8
54	中国科学院大连化学物理研究所	CAS - Dalian Institute of Chemical Physics	8
55	中国海洋大学	Ocean University of China	8
56	南京农业大学	Nanjing Agricultural University	7
57	钢铁研究总院	Central Iron & Steel Research Institute	7
58	中南大学	Central South University	7
59	大连理工大学	Dalian University of Technology	7
60	中国科学院上海硅酸盐研究所	CAS - Shanghai Institute of Ceramics	7
61	哈尔滨工程大学	Harbin Engineering University	7
62	全球能源互联网研究院	State Grid Corporation - Global Energy Interconnection Research Institute	7
63	中国科学院动物研究所	CAS - Institute of Zoology	7
64	南开大学	Nankai University	7
65	国家纳米科学中心	National Center for Nanoscience and Technology	7

Rank	Institution (Chinese)	Institution (English)	NKPs assigned
66	上海交通大学医学院附属瑞金医院	Ruijin Hospital (Shanghai Jiaotong University)	7
67	中国科学院遗传与发育生物学研究所	CAS - Institute of Genetics and Developmental Biology	7
68	上海联影医疗科技有限公司	United Imaging Medical Technologies Co., Ltd	7
69	中日友好医院	China-Japan Friendship Hospital	7
70	北京化工大学	Beijing University of Chemical Technology	6
71	中国科学院武汉物理与数学研究所	CAS - Wuhan Institute of Physics and Mathematics (WIPM)	6
72	中国科学院化学研究所	CAS - Institute of Chemistry	6
73	中国科学院东北地理与农业生态研究所	CAS - Northeast Institute of geography and Agroecology	6
74	中国科学院沈阳自动化研究所	CAS - Shenyang Institute of Automation	6
75	中国医学科学院基础医学研究所		6
76	南京信息工程大学	Nanjing University of Information Science & Technology	6
77	首都医科大学附属北京天坛医院	Beijing Tiantan Hospital (Capital Medical University)	6
78	中国环境科学研究院	Chinese Research Academy of Environmental Sciences	6
79	中国农业科学院哈尔滨兽医研究所	CAAS - Harbin Veterinary Research Institute	5
80	中国农业机械化科学研究院	Chinese Academy of Agricultural Mechanisation Sciences	5
81	北京有色金属研究总院	General Research Institute for Nonferrous Metals	5
82	中国石油化工有限公司	Sinopec Group	5
83	中国建筑材料科学研究总院	China Building Materials Academy	5
84	中国人民解放军国防科学技术大学	PLA National University of Defense Technology	5
85	西北工业大学	Northwestern Polytechnical University	5
86	中国科学院南京土壤研究所	CAS - Nanjing Institute of Soil Science	5
87	中国安全生产科学研究院	China Academy of Safety Science and Technology	5
88	长江勘测规划设计研究有限责任公司	Changjiang Survey, Planning, Design and Research Co., Ltd	5
89	中国医学科学院北京协和医院	CAMS - Beijing Xiehe Hospital	5
90	中国科学院海洋研究所	CAS - Institute of Oceanology	5
91	首都医科大学宣武医院	Xuanwu Hospital (Capital Medical University)	5
92	首都医科大学附属北京安贞医院	Beijing Anzhen Hospital (Capital Medical University)	5

Rank	Institution (Chinese)	Institution (English)	NKPs assigned
93	苏州大学	Soochow University (Suzhou University)	5
94	国家海洋技术中心	National Ocean Technology Centre	5
95	中国农业科学院农业资源与农业区划研究所	CAAS - Institute of Agricultural Resources and Agricultural Zoning	5
96	中国建筑股份有限公司	China State Construction Engineering Corporation	5
97	中国人民解放军第二军医大学	PLA Second Military Medical University	5
98	中国人民解放军军事医学科学院军事兽医研究所	PLA Military Academy of Medical Sciences - Military Veterinary Institute	4
99	西北农林科技大学	Northwest Agriculture and Forestry University	4
100	中国农业科学院蔬菜花卉研究所	CAAS - Institute of Vegetables and Flowers	4

Annex 4.3 – Management regulations of NKPs

Interim Measures for the Management of National Key R&D Programmes

On 28 June MOST and MOF jointly released the [Interim Measures for the Management of National Key R&D Programmes](#) (国科发资〔2017〕152号). The Measures outline:

- General Provisions:
 - Emerged from the reform of the national STI public funding system, NKPs mainly finance the nation's major strategic socioeconomic development needs, such as agriculture, energy and resources, eco-environment, and health, building up innovation chains from basic and frontier science to key technologies and applications;
 - NKPs are project-based. Specific projects can establish sub-projects that contribute to the main project;
 - NKPs shall be included in the National Service Platform and coordinated with NSFC, Mega Projects, Technology Innovation Guidance Fund(s), and the Bases and Talents Programme.
- Organisation and division of responsibilities:
 - The inter-ministerial joint conference is responsible for reviewing the NKPs' overall development plan, the establishment of new NKPs, and the selection of professional agencies;
 - The strategic consulting and revision committee is responsible for advising the inter-ministerial joint conference on the NKP's overall development plan, the establishment of new NKPs, and the division of tasks;
 - As the leading authority of NKPs, MOST is responsible for:
 - Researching and formulating NKPs-related management regulations;
 - Advising on NKPs' goals, development, as well as the establishment of new NKPs;
 - Formulating NKPs' implementation schemes and tender guidelines;
 - Recommending professional agencies for the daily management of NKPs;

- Conducting annual and interim evaluations, formulating adjustment suggestions;
- Promoting technology transfer and commercialisation, and information sharing;
- Organising experts' working groups for NKPs' implementation and management;
- Conducting strategy and policy research.
- Relevant government bodies and local authorities are responsible for:
 - Advising on the R&D needs in relevant NKP areas;
 - Participating in the formulation of NKP tender guidelines.
 - Participating in the annual and interim evaluation of NKPs;
 - Daily management and monitoring of NKPs' fund usage;
- NKPs' experts' working groups are responsible for:
 - Launching strategy and policy research;
 - Advising on the NKPs' implementation schemes and tender guidelines;
 - Reviewing the compliance of specific project proposals with the NKP implementation scheme and tender guidelines;
 - Participating in the annual and interim evaluation of NKPs.
- The professional management agencies are responsible for:
 - Participating in the formulation of tender guidelines;
 - Organising applications and evaluation of specific projects; signing legal contracts with the units implementing each NKPs;
 - Organising funds allocation; adjusting projects in line with de facto needs;
 - Reporting the implementation status of NKPs to MOST;
 - Promoting the commercialisation of results and information sharing.
- Leading implementing units of NKPs (project leaders) are responsible for:
 - Implementing the specific research tasks for the NKP they were granted;
 - Formulating implementation status reports, information reports, and S&T reports;
 - Reporting incidents and adjustments;
 - Cooperating in monitoring, evaluation, and final review procedures.
 - Fulfilling the obligation of maintaining confidentiality; protecting IPR; and promoting commercialisation and application of results.
- NKP implementation schemes and tender guidelines:
 - MOST leads the formulation of the NKPs' overall development plan, which will be presented to the inter-ministerial joint conference;
 - MOST and other relevant authorities select new NKPs to be launched, and formulate relevant implementation schemes according to the overall development plan approved by the inter-ministerial joint conference. Implementation schemes shall also be approved by the inter-ministerial joint conference;
 - NKPs are target-oriented and generally have a five-year implementation period, during which adjustments or extensions can be made according needs;
 - Tender guidelines and calls for applications to specific project activities are formulated annually, in line with the NKP's development plan and implementation scheme. Tender guidelines are drafted by MOST, other relevant authorities, professional agencies, and by the experts' working group;

- Units implementing NKPs are mainly selected through public tendering. In limited cases such units can be directly appointed by relevant authorities (i.e. “directional NKPs”⁷⁴);
- Tender guidelines are published on the National Service Platform after comments have been collected from the public. Lists of experts who drafted the document and application requirements should be included.
- Tender guidelines of confidential projects are not openly published.
- The deadline for applications in principle is no less than 50 days from the day the tender guidelines are published (*note: this was not the case for 2016 and 2017 applications*);
- Local governments and enterprises are encouraged to provide additional financial support.
- Selection of projects:
 - Project applicants: applicants to specific NKPs are research institutions, universities, and enterprises that:
 - Have strong capacities and conditions for R&D;
 - Have standardised operation and management procedures;
 - Are registered in mainland China;
 - Have independent legal personality
 - Consortiums applying to NKPs must indicate one unit as “project leading unit”. A joint application agreement among the consortium members should be signed;
 - PIs: individuals leading the implementation of the specific project tasks. They should meet the requirements specified by each tender guidelines;
 - **International cooperation is encouraged:**
 - Affiliates of overseas research institutions, universities, and enterprises that are registered in mainland China and have independent legal personality can lead or participate in NKP applications, in line with the tender guidelines;
 - Foreign experts (including Hong Kong, Taiwan and Macao) can apply as PIs in line with the requirements outlined by the tender guidelines.
 - Evaluations experts:
 - Experts sitting in evaluation committees are extracted from the national experts’ database, and published online;
 - Foreign experts are encouraged to be invited to sit in evaluation committees.
 - The tender application process consists of two parts:
 - Pre-application with the first round of review and screening, to be submitted online through the National Service Platform;
 - Official applications of candidates selected from the pre-application, to be submitted in hardcopy version to the professional management agencies:
 - f. Evaluation experts review the official application materials, and select a number of candidates three to four times higher than the final number of projects to be approved;
 - g. Selected candidates should attend an evaluation interview via video conference.

⁷⁴ Contrarily to ordinary NKPs for which endorsement can be obtained from any bodies within one’s own administrative area, the “directional NKPs” (定向项目) require applications to be endorsed by explicitly indicated government bodies or units, and/or to be led by specific units, and/or to be launched in certain areas/facilities.

- Based on the interview outcomes, the professional agencies submit the list of selected project winners (including budget to be allocated) to MOST for final approval;
- After MOST's final approval, the final list of project winners is published online.
- Project implementation:
 - The professional management agencies are responsible for supervising, reporting, and conducting ad hoc inspections of ongoing projects;
 - Each NKPs' project leader shall submit an annual implementation status report every year in November, through the National Service Platform;
 - An interim evaluation for each project is conducted by professional management agencies after three years of implementation;
 - Each NKP's professional agency shall submit an implementation status report to MOST every year in December.
- Project conclusion and results management:
 - End-of-project procedures should be completed within six months after the expiration of the contract (maximum extendable period is one year);
 - Professional agencies are responsible for leading the experts' committees to conduct project conclusion evaluations through peer review, third-party assessment, etc.;
 - The experts' committees consist of technology, management, and industry experts;
 - The evaluation outcomes can be divided into three categories:
 - Eligible: NKPs that have delivered the deliverables on time, and with good quality;
 - Non-eligible: NKPs that have not achieved the objectives due to reasons that are not force majeure; or NKPs with false project materials, missing reports, or NKPs whose implementing units do not cooperate with relevant procedures;
 - End-of-project: NKPs that have not achieved the expected results due to force majeure.
 - Within three months after the completion of end-of-project procedures, the professional agencies must provide feedback to the project implementation units, and report to MOST;
 - Project leaders shall formulate achievement reports to be included in the National S&T Report Service System⁷⁵ and the National S&T Achievement Database⁷⁶.
 - IP ownership, utilisation and licensing rights of NKPs abide to relevant national laws and regulations. Relevant units shall sign in advance an official agreement on IPR ownership and utilisation. For national security, national interest and major public interest, the State can authorise other parties to utilise IP generated from NKPs with or without payment.
- Supervision and evaluation:
 - MOST, MOF and other relevant authorities will conduct regular inspections on:
 - The work of managing authorities and the effectiveness of project implementation;
 - The implementing parties' duties, implementation status, and fund management;

⁷⁵ In Chinese: 国家科技报告服务系统 ([link](#)).

⁷⁶ In Chinese: 国家科技成果转化项目库 ([link](#)). Note: the National S&T Achievement Database was established in September 2014, and contains detailed information on S&T results across different regions and industries. S&T results contained in this database will be the main receivers of funds and investments from the National Fund for Technology Transfer and Commercialisation, under the 4th pillar (see fourth ad hoc study on the Technology Innovation Fund).

- The experts participating in the drafting of tender guidelines or evaluations.
- o Each phase of the tender cycle should be highly-transparent;
- o Establishment of a uniform information system to include information on the launch of NKPs, annual and interim management, dynamic adjustment, and monitoring and evaluation, as well as the project assignment, financial distribution, process management procedures, etc. All information shall be traceable and retrievable.
- Supplementary provisions:
 - o The Measures are effective from the date of publishing;
 - o The previous **Notice on Issues Related to the Management of National Key R&D Programmes during the Reform's Transitional Period** (国科发资〔2015〕423号) is no longer effective.

Fund Management Measures for National Key R&D Programmes

On Friday 3 March 2017, MOST and MOF released the [*Fund Management Measures for National Key R&D Programmes*](#) (财科教[2016]113号). The Measures, which were issued to regulate fund management and utilisation during the implementation of National Key R&D Programmes, include:

- Budget management provisions
 - o MOST and MOF will commission related professional agencies in evaluating the overall budget plan
- Central funding scope:
 - o Direct fees are allocated to support expenditure for: equipment, materials, testings, purchasing publications or IP, logistics, consultancy, service charges, and others;
 - o Indirect fees are allocated to support expenditure for items which cannot be foreseen at the time of application. Indirect fees are calculated according to the following percentages:
 - Projects < 5 mln RMB: 20%;
 - Projects > 5 mln RMB but < 10 mln RMB: 15%;
 - Projects > 10 mln RMB: 13%
- Budget implementation and revision
 - o Project leading agencies are required to review the previous year spending and submit reports to professional management agencies before 20 April every year
- Finance check and approval
- Supervision
 - o Enhancing information sharing between MOST and MOF;
 - o Implementing regular on-site inspections;
 - o Advancing risk alert and prevention;
 - o Specifying illegal activity penalties;
 - o Setting up a credit management system to record funding check results.

Complementing Implementation Rules to the “Fund Management Measures for National Key R&D Programmes”

On Friday 29 September, the Ministry of Science and Technology issued the [*Complementing Implementation Rules to the “Fund Management Measures for National Key R&D Programmes”*](#) (国科发资〔2017〕261号). The Complementing Implementation Rules provide additional provisions to the *Fund Management Measures for National Key R&D Programmes* (财科教〔2016〕113号), and include two main documents:

- **Budget Preparation Guidelines for National Key R&D Programmes:** outlining the specific definition, requirements, instructions, procedures and templates for drafting budget proposals to be submitted by applicants to National Key R&D Programmes calls.
- **Budget Evaluation Norms for National Key R&D Programmes:** illustrating the mechanisms, criteria, procedures and methods through which budget proposals are evaluated:
 - Mechanisms:

In general, evaluation of NKP applications is divided into two main legs:

 - Evaluation of the applicants' research and technology proposals (i.e. specific research tasks and deliverables): conducted by the NKPs' professional managing agencies;
 - Evaluation of the budget proposals submitted by applicants in order to deliver the above research and technology targets: conducted objectively, independently and impartially by third-party evaluation agencies entrusted by the NKPs' professional managing agencies.

Passing the budget evaluation is a *necessary but not sufficient condition* for the approval of NKP proposals (e.g. one proposal might feature a rational budget, but might lack the necessary research and technology targets indicated by the NKP tender guidelines).
 - Evaluation criteria:
 - Conformance of the proposed budget's expenditure scope and standards with relevant national financial regulations and fund management measures;
 - Relevance of the budget proposal with the NKP's R&D tasks, objectives, and content;
 - Economic rationality of the budget proposal, which should be on the same level as other national and international research activities, and rationally distributed.
 - Evaluation procedures are divided as following:
 - The third-party evaluation agency selects five to nine evaluation experts from the national S&T experts pool; around one-third of which should be experts from financial or management fields, the remaining being technology experts;
 - Preliminary evaluation: within 15 days, the third-party evaluation agency conducts a preliminary round of evaluation of the budget proposals of those shortlisted applicants selected by the NKP's professional managing agencies. The content of the preliminary evaluation is mainly "direct expenses" (in contrast to "indirect expenses", which are automatically calculated according to certain percentages);
 - Feedback after preliminary evaluation: the NKP's professional managing agency submits its feedback on the national S&T service platform, and requests further clarifications and explanations from the applicants;
 - Final evaluation: after receiving further clarifications, budget proposals are evaluated through peer review;
 - Conclusion and reporting: the final evaluation outcome of the third-party evaluation agency is formally written in a stamped ad hoc report, to be submitted to the NKP's professional managing agency.
 - Evaluation methods include the following:
 - Policy comparison: assessment of the conformity of the budget proposals with relevant policies, financial and audit regulations;

- Objectives and tasks comparison: assessment of the relevance of the budget proposals with the objectives and research tasks indicated by the NKP tender guidelines;
- Survey method: assessment of the rationality of proposed budget through a survey of expenditure standards and costs of similar research activities in the same area;
- Experts' experience: assessment of the rationality of the proposed budget according to the evaluation experts' experience and understanding of budget expenditure and patterns;
- Reference to previous cases: assessment of the rationality of proposed budget expenditure through review of previous similar cases in the same area;
- "Backstepping" of expected outputs: assessment of the rationality of proposed budget according to the expected outputs included in the project proposal.
- o Quality control measures. Third-party budget evaluation agencies should:
 - Establish a set of principles that evaluating experts should respect;
 - Organise trainings for evaluating experts;
 - Constantly monitor all evaluation procedures to ensure the timely completion of evaluation tasks as required;
 - Adopt the necessary measures to ensure an independent, objective and impartial evaluation;
 - Adopt the necessary measures to avoid and punish conflicts of interest or bad practices;
 - Keep records of all phases and procedures of evaluation.

Annex 4.4 – Scoring system for NKP calls ⁷⁷

Interview evaluation table for National Key R&D Programmes

Project Title: _____ Project application code: _____

NKP: _____ Programme Direction: _____

Project applicant: _____ Principal investigator: _____

Evaluation content	Evaluation indicator	Points (total)	Points (obtained)
Research content	1. Does the proposed research content cover all the targets and deliverables listed in the tender guidelines? 2. Is the analysis of the domestic and international status quo and trends accurate and comprehensive? 3. Innovativeness, prospectiveness and time-effectiveness of the proposed research content	30	
Objectives and technology roadmap	1. Are objectives well-defined and focused? 2. Are the proposed technology roadmap and research methodology rationale, feasible, and innovative? 3. Are KPIs rational, quantifiable, and measurable?	20	

⁷⁷ The original version in Chinese of this table was published for two NKP calls: "Green building and industrialisation of construction" published on 16 March ([link](#)), and "R&D of Biosafety Key Technologies" published on 5 April ([link](#)).

Tasks and organisation	1. Scientificity and systematicity of project activities 2. Rationality and feasibility of R&D development plan and organisation	20	
Research team and work foundations	1. Research team's scientific level and rationality of task division 2. PI's scientific research and innovation capacities 3. Project applicants' organisational skills and project implementation mechanisms 4. Current research work foundations and conditions	20	
Expected outputs and risk analysis	1. Are expected outputs clear? What is their socio-economic impact? 2. Is the analysis of project's technology and implementation risks clear? Are countermeasures effective?	10	
Total		100	
Final judgement	<input type="checkbox"/> Recommended <input type="checkbox"/> Not recommended		
Evaluation comments (please provide comments and suggestions for those proposals which are recommended; please illustrate the specific reasons why the proposal is not recommended):			
Evaluation expert's signature			
YY__MM__DD__			

Remarks:

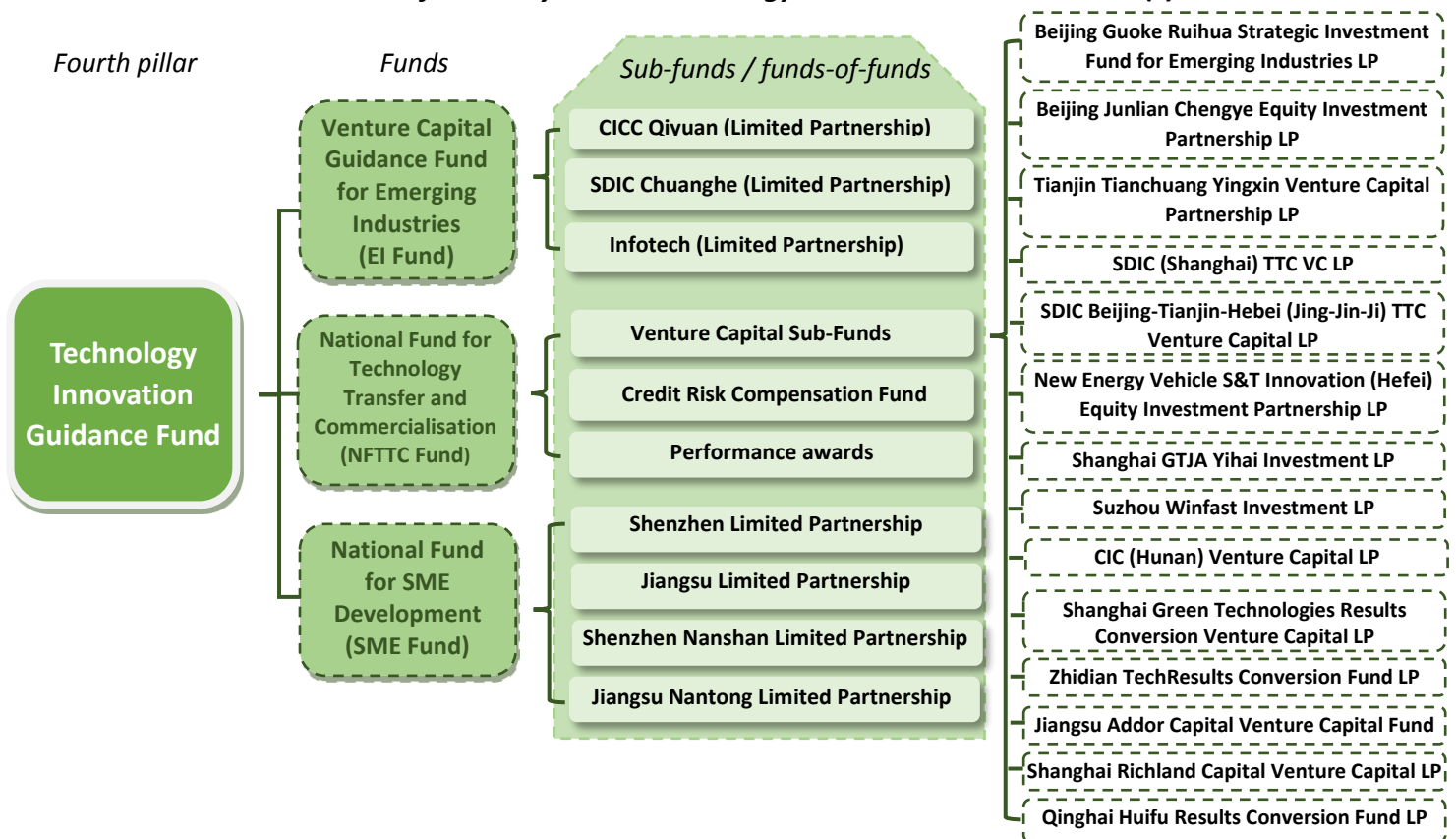
1. Evaluation indicators can be further elaborated according to the specific NKP implementation plan as well as the specific requests outlined in each tender guidelines.
2. Total score obtained from recommended proposals should in principle be above 75.

5. Technology Innovation Guidance Fund

The Technology Innovation Guidance Fund – the fourth funding pillar – is a new category of funds **exclusively oriented to start-ups and small- and medium-sized enterprises** (SMEs). Similarly to National Key R&D Programmes (third funding pillar), it emerged from a structural re-organisation, re-classification and merging of previously existing national funds from different government departments.

It consists of three main funds, which are in turn organised into several sub-funds or funds-of-funds (FOFs). These invest in innovative start-ups and SMEs in priority and strategic areas through venture capital (VC) funds, private equity, and risk compensations, and according to market mechanisms. The aim is to stimulate the transfer, capitalisation and commercialisation of scientific technology results. The structure of the Technology innovation Guidance Fund is summarised as:

Structure of currently active Technology Innovation Guidance Fund(s)



As of November 2017, a total of 3 major funds and 65 FOFs or sub-funds were created, amounting to a **total of 114.1 billion RMB** (around 14.8 billion EUR). The scale of the funds is expected to reach 300 billion RMB (around 38.9 billion EUR) in the next few years, around one-third of which invested by the central government, and the remaining to be provided by local governments at all levels, corporations, financial institutions, or other social actors. All of them are currently very active, with an average of 70 new investments concluded every month, some of which on foreign-invested start-ups or SMEs.

The Technology Innovation Guidance Fund significantly differs from the other funding pillars of the Chinese national STI funding system, as in this case the receivers of central government funds will

not be the final end users of such funds (e.g. to implement R&D projects), but are special funds created ad hoc (FOFs, equity funds, VC funds, etc) to re-invest in enterprises according to market mechanisms, but in line with the priorities outlined by State policies. It thus follows a “**two-level process**” whereas:

- 1) Applicants (consisting of limited partnerships among local governments, enterprises and financial institutions, and led by an investment firm) apply to be selected as national-level FOFs or sub-funds through public bid. If selected, they will receive additional financial injections from the central government;
- 2) Once selected, national-level FOFs and sub-funds will re-invest in enterprises.

By contrast, the other pillars are characterised by a “**one-level process**” consisting of applicants applying to direct government funding for implementing research projects. This key difference is vital for understanding the Technology Innovation Guidance Fund, especially with regards to its positioning in relation to the other national funding programmes.

Additionally, unlike the first three funding pillars, no **pillar-wide regulations** or management measures have been issued for the Technology Innovation Guidance Fund: each specific fund and sub-fund has its own management framework, and investment decisions are conducted relatively independently by the funds’ managing firms. No **unified websites** or platforms were created for the pillar, and related information is not integrated onto the National S&T Service Platform, making existing information highly-fragmented and scattered among different websites or press releases.

In the following sections, the funds which form the Technology Innovation Guidance Fund are introduced in detail, focusing in particular on the management regulations guiding their establishment and operations; their targets and areas of investments; and on instances of investments on foreign-invested entities. It should be noted that any information related to investments concluded, shareholders or investors, are extracted from the National Enterprise Credit Information Publicity System.⁷⁸

Venture Capital Guidance Fund for Emerging Industries

The **Venture Capital Guidance Fund for Emerging Industries** (hereinafter referred to as “EI Fund”) was established in January 2015.⁷⁹ The total size of the EI Fund will amount to 200 billion RMB (around 25.9 billion EUR), 40 of which is to be invested by the central government, and the remaining to be provided by local governments and social actors.

The official authority of the EI Fund is the EI Fund Council, located within the **NDRC**, and formed by representatives from NDRC, MOF, MOST, MIIT, SASAC, and social investors. It works under the co-chairmanship of NDRC and MOF.

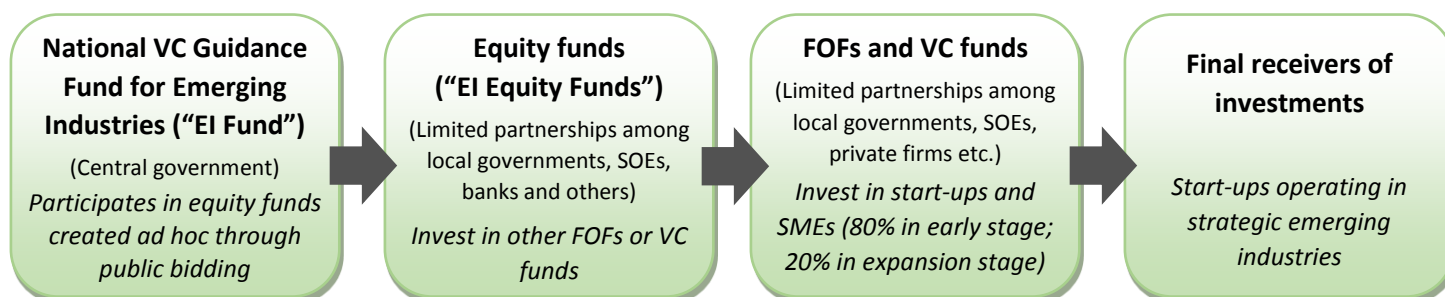
The EI Fund participates in **equity funds** (hereinafter referred to as “EI equity funds”), which are created ad hoc after being selected through public bidding. The EI equity funds’ daily operations are delegated to professional managing firms. These invest mainly in other **FOFs** or **venture capital funds** (VC funds), which in turn re-invest in innovative enterprises operating in one of the **strategic emerging industries** listed in the *13th Five-year Plan on National Strategic Emerging Industries*.⁸⁰ 80% of the investments will be directed to enterprises in **early- and start-up stages**; the remaining

⁷⁸ In Chinese: 国家企业信用信息公示系统. Under the management of the State Administration of Industry and Commerce, it provides official information on all enterprises registered in mainland China: <http://www.gsxt.gov.cn/>

⁷⁹ In Chinese: 国家新兴产业创业投资引导基金. No website or platforms currently exist for the EI Fund.

⁸⁰ These include: ICT, advanced manufacturing, new materials, biology, new energy vehicles, new energy, energy-saving and environmental technologies, and digital innovation industries.

20% to enterprises in their **expansion stage**. Investments follow market principles, without the government's direct intervention. This complex mechanism is summarised as:



Three EI equity funds were created by November 2017, with a scale amounting to 70 billion RMB (around 9 billion EUR).⁸¹ The first and the second EI equity fund, with a size of 40 billion RMB and 20 billion RMB respectively, started operations in January 2017. The third EI sub-fund, with a size of 10 billion RMB, started operations in February 2017. These are:

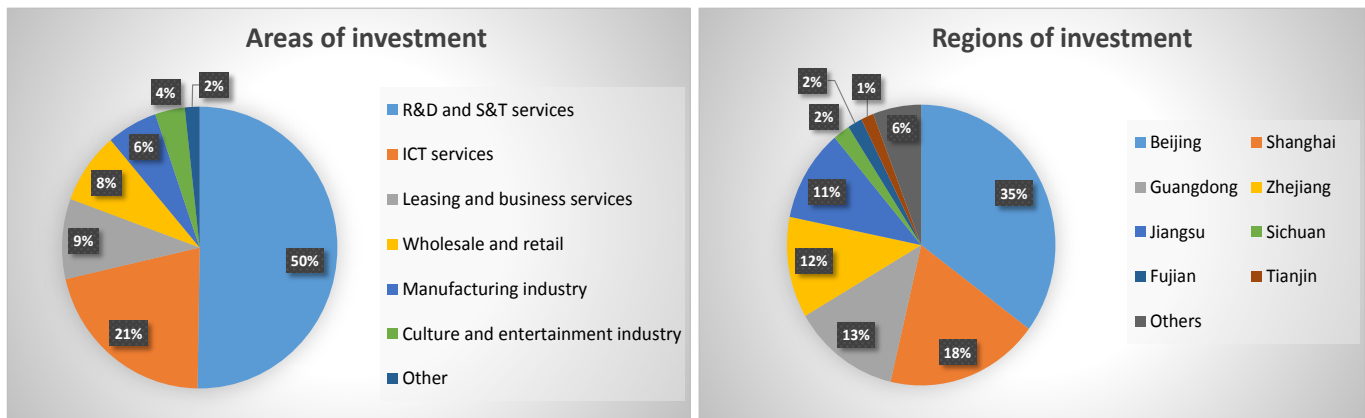
N.	Name	Amount	HQs	Shareholders	Managing firm
1	CICC Qiyuan LP 中金启元国家新兴产业创业投资引导基金（有限合伙）	40 billion RMB	Hangzhou, Zhejiang province	1) CCB (Beijing) Principal Asset Management: 48.75% 建信（北京）投资基金管理有限责任公司 2) Ministry of Finance: 22.5% 中华人民共和国财政部 3) Boser Capital: 12.5% 博时资本管理有限公司 4) Other investors in Hubei: 8.75% Hubei Provincial Communication Investment Group; Hubei Provincial United Investment Group; Wuhan Optical Valley Industrial Investment	CICC Jiacheng Investment Management Co Ltd 中金佳成投资管理有限公司 <i>Private equity investment firm 100% controlled by China's first joint venture investment bank: China International Capital Corporation Limited (CICC).</i>
2	SDIC Chuanghe LP 国投创合国家新兴产业创业投资引导基金（有限合伙）	20 billion RMB	Beijing, Shunyi district	1) Ministry of Finance: 26% 中华人民共和国财政部 2) State Development & Investment Corporation (SDIC): 23% 国家开发投资公司 3) Beijing Municipal Engineering Consulting Corporation: 23% 北京市工程咨询公司 4) Other investors in Hubei: 27.5% Shanghai Jiading district VC Management Ltd; Beijing Shunyi district S&T Innovation Co Ltd; Guangzhou Industry Investment Management	SDIC Chuanghe (Beijing) Fund Management Co. Ltd 国投创合（北京）基金管理有限公司 <i>Investment fund largely controlled by the State Development & Investment Corporation (40%). The other main investor (30%) is a limited partnership largely funded by SHCapital and Cenova Ventures. The Singaporean Gosstech Technologies holds 5% shares of the firm</i>
3	Infotech LP 盈富泰克国家新兴产业创业投资引导基金（有限合伙）	10 billion RMB	Shenzhen, Guangdong province	1) Ministry of Finance: 37.5% 中华人民共和国财政部 2) Shenzhen Redwood Venture Capital Co., Ltd: 33.3% 深圳红树林创业投资有限公司 3) Shenzhen Longgang district Investment Holding Group: 13.3% 深圳市龙岗金融投资控股有限公司 4) Other investors in Anhui: 11.6% Anhui Province High-Tech Industry Investment Co; Hefei Gaoxin Development & Investment Group	Infotech (Shenzhen) Emerging Industries Investment Management Co. Ltd 盈富泰克（深圳）新兴产业投资基金管理有限公司 <i>Investment firm under Infotech Venture Co Ltd, headquartered in Shenzhen, with offices in Beijing, Shanghai, and Silicon Valley. It has invested in Sino-foreign JVs, including US-based iSoftStone</i>

⁸¹ The announcement for the first public bidding was published in June 2016 on NDRC's website ([link](#)). Among the requirements that applicants must possess, there were: (i) at least 60% of investments conducted in strategic emerging and high-tech industries; (ii) size over 200 million RMB, participated by local governments and leading enterprises; (iii) be managed by a management firm holding at least 1% of the fund's share.

Investments conducted

As of November 2017, the three EI equity funds have invested in 47 FOFs or VC funds, which have in turn concluded investments in 419 enterprises operating in strategic emerging industries. This corresponds to an average of 38 investments concluded per month. The first and the second EI equity funds were the most active, occupying 98% of the total investments made.

Half of investments were conducted in enterprises involved in **R&D and S&T services**, followed by **software and ICT services** (21%). **Beijing** received over one-third of the total investments, followed by Shanghai (18%), Guangdong (13%), Zhejiang (12%) and Jiangsu (11%) provinces.



The processes through which investments are conducted remain complex. The EI equity funds' managing firms are responsible for identifying, recommending, and concluding appropriate investments in FOFs or VC funds. These however need to be **approved by their board of partners**, which also includes the central government. No indications that international actors are excluded from receiving investments were identified, as long as they meet the general conditions outlined by the government.

National Fund for Technology Transfer and Commercialisation

The **National Fund for Technology Transfer and Commercialisation** (hereinafter referred to as "NFTTC Fund") was established in July 2011.⁸² According to its legal framework – the *Interim Measures for the Management of the National Fund for Technology Transfer and Commercialisation*, issued by MOST and MOF⁸³ – the purpose of the NFTTC Fund is to support the transfer and commercialisation of scientific results (new technologies, products, techniques, materials, etc.) achieved under national and local government funding. This is done through supporting the establishment of venture capital sub-funds (hereinafter referred to as "VC sub-funds"); credit risk compensations; and performance awards.

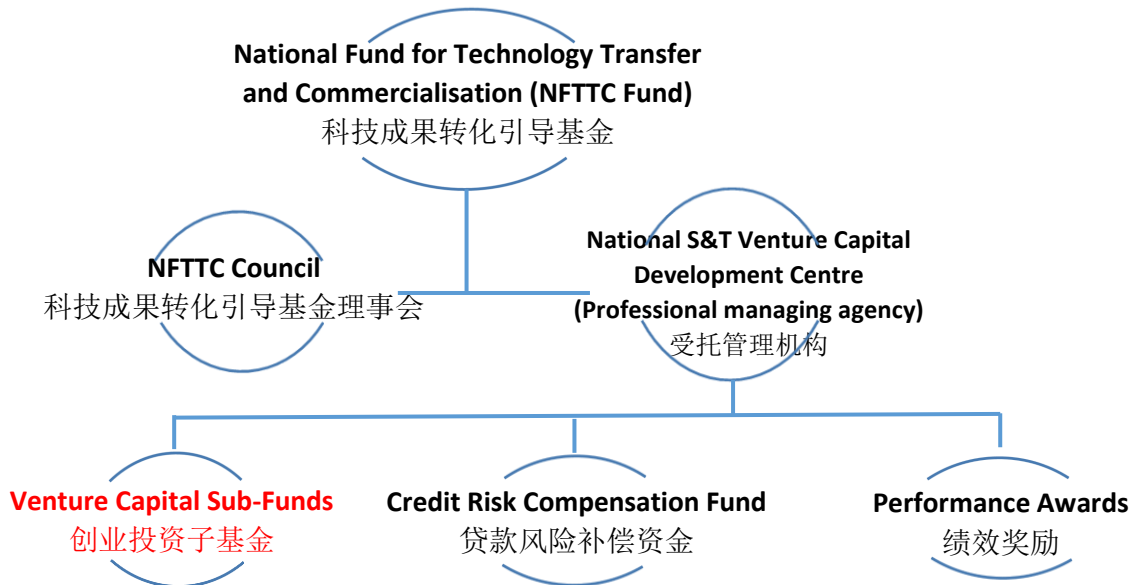
Similarly to the EI Fund, the NFTTC Fund features a combination of central government funds, local government funds, and funds from enterprises, financial institutions, and other social actors. It abides by the principles of "performing a guiding, indirect, not-for-profit, and market-oriented role". It targets and supports the commercialisation of results and technologies included in the **National**

⁸² In Chinese: 国家科技成果转化引导基金. The NFTTC Fund is the only major fund under the fourth funding pillar with its own website: <http://www.nfttc.gov.cn/>

⁸³ In Chinese: 《国家科技成果转化引导基金管理暂行办法》: http://www.most.gov.cn/tjcw/tczcwj/201205/t20120517_94467.htm

Science and Technology Achievement Database.⁸⁴ It thus also aims to strengthen the link with other government funding programmes, particularly by making sure that scientific results generated under these are translated into concrete commercial products.

The highest managing authorities of the NFTTC Fund are MOST and MOF. The NFTTC Fund consists of a supervising body, the NFTTC Council, and a professional managing agency responsible for the daily management and operation of the Fund.⁸⁵



As of November 2017, only the venture capital sub-funds are active.⁸⁶

Fourteen venture capital sub-funds

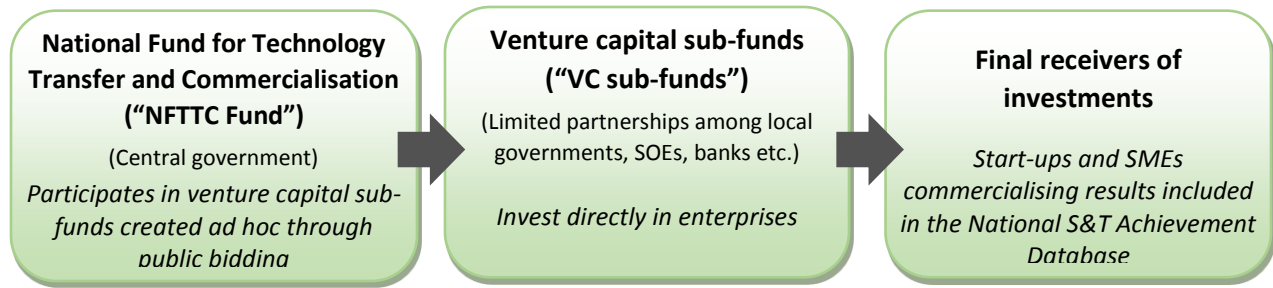
VC sub-funds are the main medium through which the NFTTC operates. These are selected through public bidding to MOST and MOF, are registered as limited partnerships, and managed by a professional managing firm.⁸⁷ They in turn invest directly in enterprises.

⁸⁴ In Chinese: 国家科技成果转化项目库. The Database was established in September 2014, and contains detailed information on S&T results in all regions and industries. S&T results generated under national funding projects will automatically be inserted in the database (except those involving state secrets), while those under local-level funding programmes will be included only after approval of relevant bodies. Website: <http://www.nstad.cn/>

⁸⁵ The National S&T Venture Capital Development Centre (国家科技风险开发事业中心) is a *shiye danwei* under MOST: <http://www.stvc.com.cn/>. The list of the members and chair of the NFTTC Council is available at: <http://www.nfttc.gov.cn/www/nfttc/211/index.html>

⁸⁶ The Credit Risk Compensation Fund, which is granted to financial institutions which grant loans to enterprises for the commercialisation of S&T results included in the National S&T Achievement Database, is inactive as of November 2017, although official management regulations were published at the end of 2015 ([link](#)).

⁸⁷ According to the VC sub-funds' legal framework – *Interim Measures for the Management of the Venture Capital Sub-Funds under the National Fund for Technology transfer and Commercialisation* ([link](#)) – VC sub-funds should (i) amount to over 100 million RMB; (ii) have a life cycle of maximum 8 years; and (iii) be managed by a VC management firm registered in mainland China, which should in turn hold at least 5% of the VC sub-fund's shares. Central government funds can only amount to 20% to 30% of the funds' amount.



Each VC sub-fund specialises in different industries, and at least 50% of the total investments should be done in enterprises legally registered in mainland China and which focus on the commercialisation of results included in the National S&T Achievement Database.⁸⁸

As of January 2018, a total of **fourteen VC sub-funds** have been established, totalling an amount of 24.7 billion RMB (around 3.1 billion EUR), around 23% of which are provided by the central government. The first batch was established in December 2015 ([link](#)); the second batch in December 2016 ([link](#)); and the third batch in January 2018 ([link](#)). Their official contacts were in many cases published on MOST website.

N.	Name	Amount	Shareholders	Managing firm	Focus industry	Contact
1	Beijing Guoke Ruihua Strategic Investment Fund for Emerging Industries LP 北京国科瑞华战略性新兴产业投资基金（有限合伙）	2.2 billion RMB	1) Beijing Guoke Ruifu Equity Investment Fund (Limited Partnership): 39% 北京国科瑞孚股权投资基金（有限合伙） 2) Export-Import Bank of China: 27% 中国进出口银行 3) National S&T Venture Capital Development Center (MOST): 20% 国家科技风险开发事业中心 4) Other investors: 14% China Development Bank Capital; Hangzhou Jinde Investment Management Co Ltd; CAS Investment Management Co Ltd; Beijing Zhongguancun VC Development Co Ltd.	CAS Investment Management Co., Ltd. (CAS) 中国科技产业投资管理有限公司 <i>The major shareholder of this firm (43%) is the Chinese Academy of Sciences. During the past 27 years, the firm has supported over 300 tech-transfer and commercialisation projects, including on Sino-foreign JVs.</i>	Manufacturing of high-end machinery, IT, Consumption and health industries	Kuang Yue 匡玥 Phone: 010-82607629-834 Fax: 010-62137930-802 kuangyue@casim.cn
2	Beijing Junlian Chengye Equity Investment Partnership LP 北京君联成业股权投资合伙企业（有限合伙）	1.7 billion RMB	1) Beijing Legend Capital Huicheng Equity Investment LP: 70% 北京君联慧诚股权投资合伙企业（有限合伙） 2) National S&T VC Development Center (MOST): 29.5% 国家科技风险开发事业中心 3) Beijing Legend Capital Tongdao Investment Consulting LP: 0.5% 北京君联同道投资顾问合伙企业（有限合伙）	Legend Capital 君联资本管理股份有限公司 <i>Legend Capital is an independent VC investment firm under Legend Holdings, which in turn is the controlling shareholder of Lenovo. It manages several USD and RMB funds with a total of assets under management of over 30 billion RMB, and focuses on growth-oriented enterprises in China.</i>	Smart manufacturing, professional services, TMT and innovative consumption	Yi Chunxia 衣春霞 Jin Jun Phone: 010-89139589 Fax: 010-89139001 yicx@legendcapital.com.cn jinjun@legendcapital.com.cn

⁸⁸ In addition, VC sub-funds *cannot* invest in: (i) listed enterprises; (ii) enterprises operating in entrusted loans, mortgages, insurance, and real estate; (iii) stocks, futures, corporate bonds, trust products, wealth investment products, insurance plans, and other financial derivative products; (iv) enterprises with unlimited joint and several liability; and (v) donations, loans, sponsorships to third-party agencies.

N.	Name	Amount	Shareholders	Managing firm	Focus industry	Contact ⁸⁹
3	Tianjin Tianchuang Yingxin Venture Capital Partnership LP 天津天创盈鑫创业投资合伙企业	286 million RMB	1) National S&T Venture Capital Development Center (MOST) 国家科技风险开发事业中心 2) Tianjin Venture Capital Co., Ltd 天津创业投资管理有限公司 3) Other investors in Tianjin: <i>Tianjin Binhai Tianchuang Zhongxin Equity Investment Fund Co., Ltd; Tianjin Binhai Tourism Area Investment Holding Co., Ltd; Tianjin Science & Technology Finance Holding Group Co., Ltd.</i>	<u>Tianjin Venture Capital Co., Ltd</u> 天津创业投资管理有限公司 <i>One of the major shareholders of this firm is the Tianjin municipal government (20%). It has invested in more than 50 high-tech enterprises, focusing in the areas of IT, environment, medicine, and modern services.</i>	Environmental protection and energy saving, ICT, advanced manufacturing	Tian Lijuan 田丽娟 Phone: 022-86259756 Fax: 022-86259326 tj@tjvcm.com
4	SDIC (Shanghai) TTC Venture Capital LP 国投(上海)科技成果转化创业投资基金企业(有限合伙)	10 billion RMB	1) State Development and Investment Corporation (SDIC): 21% 国家开发投资公司 2) National S&T Venture Capital Development Center (MOST): 20% 国家科技风险开发事业中心 3) Shanghai Science & Technology Venture Capital (Corporation) Co., Ltd.: 10% 上海科技创业投资(集团)有限公司 4) Other investors in Ningbo Meishan Bonded Port Area: 38.5% <i>Luojia Ximing and Qianping Yongshun Investment Management LP;</i> 5) Other investors: 10.5% <i>China Life Insurance Company Limited; Shanghai Shuangchuang Incubation Investment Centre LP; SDIC Shanghai VC Management Co., Ltd.</i>	SDIC (Shanghai) Venture Capital Management Co., Ltd 国投(上海)创业投资管理有限公司 <i>This firm belongs entirely to the SDIC Venture Capital Management Co., Ltd, and invested in Microvast Power Systems Inc., an US-ventured manufacturer of Lithium ion battery cell and battery packs.</i>	E-information, advanced manufacturing, green energy, biomedical, and commercialisation of results in areas covered by S&T Mega Projects	Shen Qiang 沈强 MP: 18601086920 shenqiang@sdicvc.com
5	SDIC Beijing-Tianjin-Hebei (Jing-Jin-Ji) TTC Venture Capital LP 国投京津冀科技成果转化创业投资基金(有限合伙)	1 billion RMB	1) China Gaoxin Investment Group Corporation: 39.5% 中国国投高新产业投资公司 2) National S&T Venture Capital Development Center (MOST): 20% 国家科技风险开发事业中心 3) Beijing capital Technology Development Group Co., Ltd: 15% 北京首都科技发展集团有限公司 4) Other investors: 25.5% <i>Hebei Provincial S&T Investment Centre; Tianjin S&T Finance Holding Group Co., Ltd</i>	SDIC Venture Capital Management Co., Ltd 国投创业投资管理有限公司 <i>The main investor (40%) of this managing firm is the China Gaoxin Investment Group Corporation, which is also the first shareholder of the sub-fund</i>	IT, advanced manufacturing, biomedical industries	Tang Jianping 汤剑平 MP: 13801079866 tangjianping@sdicvc.com

⁸⁹ Any contacts listed in this column was publicly published on MOST website.

N.	Name	Amount	Shareholders	Managing firm	Focus industry	Contact
6	New Energy Vehicle S&T Innovation (Hefei) Equity Investment LP 新能源汽车科技创新（合肥）股权投资合伙企业（有限合伙）	500 million RMB	1) Hefei Guoxuan High-Tech Power Energy Co., Ltd.: 43% 合肥国轩高科动力能源有限公司 2) National S&T Venture Capital Development Center (MOST): 30% 国家科技风险开发事业中心 3) Other investors in Anhui: 27% <i>Hefei Science & Technology Risk Investment Ltd; Anhui Wantou Industrial Investment Ltd; Hefei Gaoxin Construction Investment Group; Hefei Guoke New Energy Equity Investment Management LP</i>	Hefei Guoke New Energy Equity Investment Management LP 合肥国科新能股权投资管理合伙企业 <i>The largest investor (24%) behind this management firm is the Hefei Guoxuan High-Tech Power Energy Co Ltd, which is also the first shareholder of the sub-fund</i>	New energy vehicles and relevant industries	Fang Jianhua 方建华 Phone: 0551-62616737 Fax: 0551-62675471 fangjh99@126.com
7	Shanghai GTJA Yihai Investment Partnership LP 上海高特佳懿海投资合伙企业（有限合伙）	352.4 million RMB	1) Xiamen GTJA Investment LP: 40% 厦门高特佳健康优享投资合伙企业（有限合伙） 2) National S&T Venture Capital Development Center (MOST): 23% 国家科技风险开发事业中心 3) Juzhou Asset Management (Shanghai) Co., Ltd.: 16% 钜洲资产管理（上海）有限公司 4) CreditEase Investment Management (Beijing) Co., Ltd.: 8.5% 宜信卓越财富管理（北京）有限公司 5) Other investors in Shanghai: 12.5% <i>Shanghai Jiading Venture Capital Management Co., Ltd; Shanghai Huichen Juye Investment LP; Shanghai Chuanqing Investment Management Center (LP); Shanghai GTJA Investment Management Co Ltd</i>	Shanghai GTJA Investment Management Co., Ltd. 上海高特佳投资管理有限公司 <i>The GTJA Investment Group invests in the healthcare industry, including medicine, medical services, equipment, and smart treatment. Since 2011, it has invested in over 100 companies.</i>	Biomedical industry	Sun Jialin 孙佳林 Phone: 021-32515637-611 Fax: 021-32515610 sunjl@szqig.com
8	Suzhou Winfast Investment Partnership LP 苏州瑞华投资合伙企业（有限合伙）	1 billion RMB	1) Tibet Ruihua Capital Management Co., Ltd: 40% 西藏瑞华资本管理有限公司 2) National S&T Venture Capital Development Center (MOST): 30% 国家科技风险开发事业中心 3) Suzhou High-Tech Venture Capital Group Co., Ltd.: 10% 苏州高新创业投资集团有限公司 4) Other investors in Jiangsu/Zhejiang: 20% <i>Jiangsu Huachang Chemicals Co Ltd; Zhejiang Huayi Investment Management Ltd; Yangzhou Yongchun Investment LP; Jiangsu Winfast Venture Capital Management Co., Ltd</i>	Jiangsu Winfast Venture Capital Management Co., Ltd 江苏瑞华创业投资管理有限公司 <i>The main investor (49%) behind this management firm is the Tibet Ruihua Capital Management Co., Ltd</i>	Biomedical industry, electronic information, new materials	Lu Xinghua 鲁兴华 Phone: 025-83172109 Fax: 025-8317213 Xhlcn1977@aliyun.com

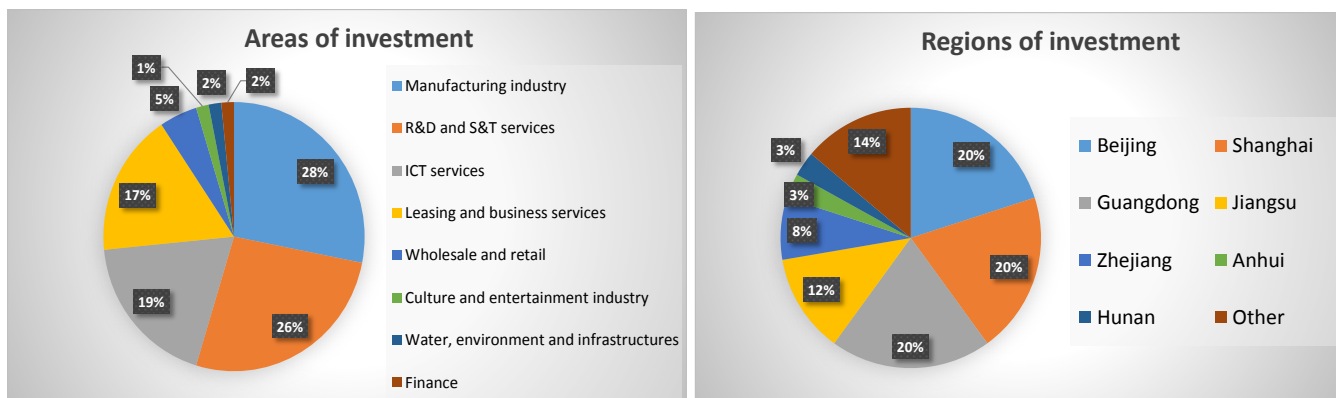
N.	Name	Amount	Shareholders	Managing firm	Focus industry	Contact
9	China Venture Capital Co. Ltd (Hunan) Venture Capital LP 中投建华（湖南）创业投资合伙企业（有限合伙）	300 million RMB	1) Beijing Tuomei Investment Co., Ltd.: 43.5% 北京拓美投资有限公司 2) Hunan High-Tech VC Co., Ltd.: 22% 湖南高新创业投资集团有限公司 3) National S&T Venture Capital Development Center (MOST): 20.5% 国家科技风险开发事业中心 4) Other investors: 14% Natural persons	Zhongtou Jianhua (Hunan) - China Venture Capital Co. Ltd 中投建华（湖南）投资管理有限公司 <i>Controlled by China Venture Capital Co., Ltd, an investment firm that invests in start-up and growth stages of innovative SMEs with indigenous innovation.</i>	Energy-saving, clean technologies, new materials, ICT	Phone: 010-64685180 Fax: 010-64685181 fsb@c-vc.com.cn wxt@c-vc.com.cn
10	Shanghai Green Technologies Results VC Centre LP 上海绿色技术创业投资中心（有限合伙）	3.51 billion RMB	1) Shanghai Shuang Chuang S&T Investment Centre 上海双创科技投资中心（有限合伙） 2) Shanghai Shuang Chuang Investment Management Co. Ltd 上海双创投资管理有限公司	Shanghai Shuang Chuang Investment Management Co. Ltd 上海双创投资管理有限公司	Energy-saving, environmental-friendly new materials, and other green technology fields	Phone: 021-63736688 Fax: 021- 63736689 lijb@shivc.com.cn
11	Anhui Ma'anshan Zhidian Technology Results Conversion No. 1 Fund LP 马鞍山支点科技成果转化一号投资管理中心（有限合伙）	2 billion RMB	1) Ma'anshan Economic Development Zone 马鞍山经济技术开发区建设投资有限公司 2) Ma'anshan Jiangdong Industry Investment Co 马鞍山江东产业投资有限公司 3) National S&T Venture Capital Development Center (MOST) 国家科技风险开发事业中心	Ma'an Shan Zhidian Chuangke Technology Industry Investment Co. Ltd 马鞍山支点创科科技产业投资有限公司	New materials, advanced, energy-saving and environmental-friendly	Phone: 021-32585851 Fax: 021-32585857 lindongyang@pivotpe.com fulidong@pivotpe.com
12	Jiangsu Addor Capital Results Innovation Venture Capital Fund LP 江苏毅达成果创新创业投资基金（有限合伙）	1 billion RMB	1) Jiangsu Govtor Capital: 29% 江苏高科技投资集团有限公司 2) Nanjing Gaoke Investment Co Ltd: 7% 南京高科新创投资有限公司 3) Other investors: 36%	Addor Capital 江苏毅达股权投资基金管理有限公司 <i>One of the largest PE investment firms in mainland China. Its investors comprise nearly 200 Chinese and international organisations and individuals, as well as Jiangsu provincial government (35%). The firm has invested in Sino-foreign JVs.</i>	Biopharmaceuticals, information technologies	Phone: 18151676762; 025-85529617 Fax: 025-85529900 huminyu@addorcapital.com

N.	Name	Amount	Shareholders	Managing firm	Focus industry	Contact
13	Shanghai Richland Capital Venture Capital (Limited Partnership) 上海沃燕创业投资合伙企业（有限合伙）	550 million RMB	1) Shanghai Feiyan Investment LP: 42% 上海飞衍投资合伙企业（有限合伙） 2) Shanghai STVC Group: 25% 上海创业投资有限公司 3) Jiangsu Xincheng Printing Group: 12% 江苏鑫城印刷集团有限公司 Other investors: 21%	Richland Capital 北京沃衍资本管理中心（有限合伙） <i>Founded in 2011 and with 1 billion RMB of assets under management, Richland Capital is one of China's most valuable private equity investment firms. It has invested in Sino-foreign JVs.</i>	New materials, high-end equipment, information technologies	Phone: 13683367782 ; 010-87758066 wangmingxuan@richlandcap.com
14	Qinghai Huifu S&T Results Conversion Investment Fund (Limited Partnership) 青海汇富科技成果转化投资基金（有限合伙）	300 million RMB	1) Xining Economic and Technology Zone Investment Holdings Group: 48% 西宁经济技术开发区投资控股集团有限公司 2) Shanghai STVC Group: 28% Qinghai State-owned S&T Assets Management Co Ltd. 青海国有科技资产经营管理有限公司 3) Qinghai Chengfu Venture Capital Ltd: 22% 青海诚富创业投资管理有限公司	Qinghai Huifu Kunlun Venture Capital Management Co. Ltd 青海汇富昆仑创业投资管理有限公司	Electronic information, energy-saving and environmental-friendly, biopharmaceuticals, new materials	Phone: 13897468307 Fax: 0971-6170593 42589503@qq.com
Total		24.7 billion RMB				

Investments conducted and international participation

By the end of 2017, the fourteen VC sub-funds have concluded investments in 65 enterprises. Not all of them were however active.

Contrary to the EI Fund, for which over half of the investments were conducted in R&D and S&T services, the VC sub-funds invested mainly in the **manufacturing industry** (28%). The geographical distribution of investments was similar, with Beijing, Shanghai and Guangdong province each receiving 20% of the total investments, followed by Jiangsu (12%) and Zhejiang province (8%).



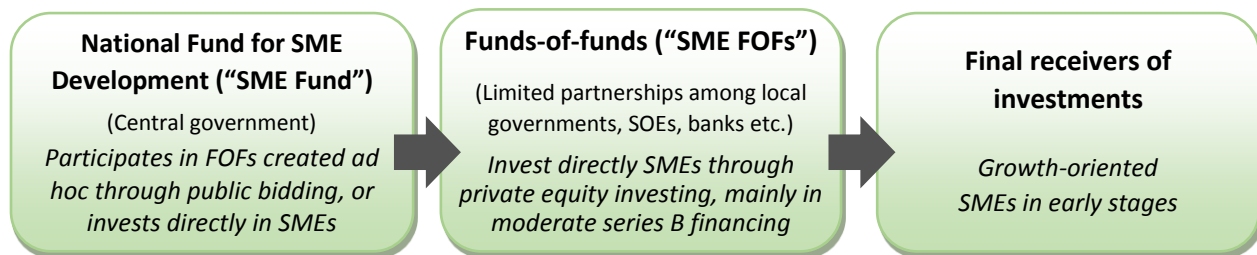
Each VC sub-fund's **managing firm** is responsible for each sub-fund's daily operations. Although this suggests that they retain a certain degree of independence in deciding the receivers of investments, each investment needs to be approved by their board of partners, which also includes the central government. This does not exclude international actors from being receivers of such funds.

National Fund for SME Development

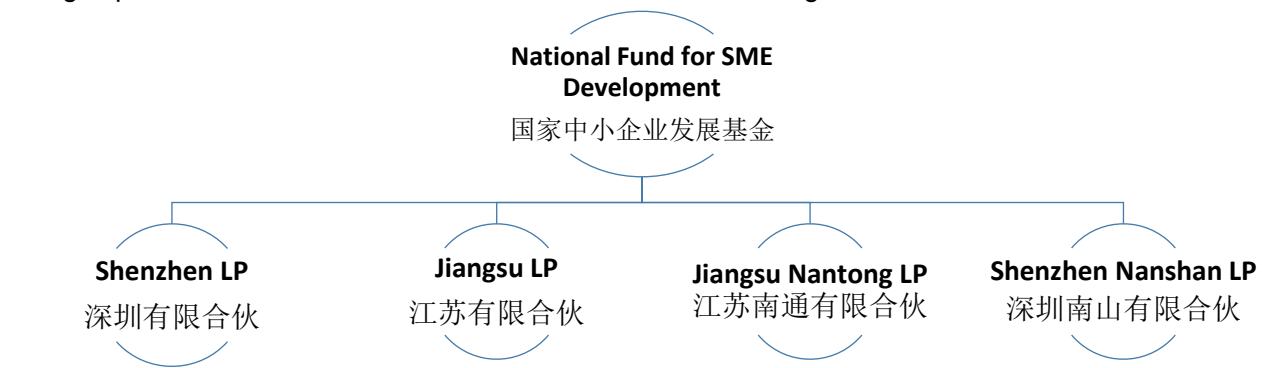
The **National Fund for SME Development** (hereinafter referred to as “SME Fund”) was established in September 2015 by the State Council, with the purpose of supporting and boosting the mass innovation and entrepreneurship of SMEs.⁹⁰ The total size of the SME Fund will amount to 60 billion RMB (around 7.7 billion EUR), one-fourth of which is to be directly invested by the central government, and the remaining to be provided by local governments at all levels, private and state-owned corporations, and financial institutions.

The official authority of the SME Fund is the SME Fund Council, located within the **Department of SMEs of MIIT**, working under the co-chairmanship of MOF, MIIT, MOST, NDRC, and the State Administration of Industry and Commerce (SAIC).

Through the establishment of FOFs (“SME FOFs”) and direct investment, the SME Fund invests in priority sectors in **highly-competitive manufacturing industries** featuring high market failure risks and evident spill-over effects. The focus is especially on **growth-oriented SMEs in seed and start-up stages**, largely through private equity investments supporting **moderate series B financing** or beyond. Each SME FOF should give particular attention to (i) investing in the Jing-Jin-Ji, Yangtze Economic Belt, or the One Belt, One Road regions; (ii) solving bottlenecks and weaknesses that hinder SMEs’ core competitiveness; and (iii) increasing the supply-side quality and standards to cope with the increasing improvements and diversification of consumption standards.



Four SME FOFs have been established under the SME Fund (“SME FOFs”) as of November 2017 through public bidding, and totalling an amount of 19.5 billion RMB (around 2.52 billion EUR).⁹¹ The first SME FOF was established in Shenzhen in January 2016 as a trial fund, and amounts to 6 billion RMB. It was followed by three additional SME FOFs in November and December 2016, two in Jiangsu province, and another one in Shenzhen, each amounting to 4.5 billion RMB.



⁹⁰ In Chinese: 国家中小企业发展基金. No website or platforms currently exist for the Fund.

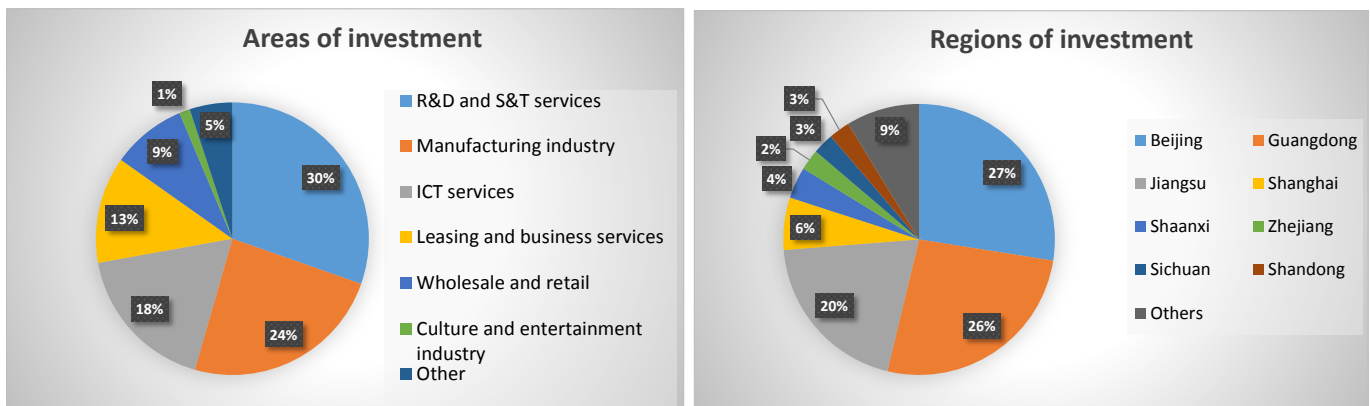
⁹¹ The announcement for the first public bidding was published in December 2015 on MIIT’s website ([link](#)). Among the requirements that applicants must possess, there were: (i) registered in mainland China with a capital of over 100 million RMB; (ii) composition of the investment team’s core team; (iii) cumulative assets-under-management over 6 billion RMB, 60% of which channelled into SMEs; (iv) average profit rate of 15%, with proved track of investment records; (v) be managed by a management firm holding at least 1% of the fund’s share, responsible for fund-raising.

N.	Name	Amount	Shareholders	Managing firm	Focus industry
1	SME Fund – Shenzhen Limited Partnership 国家中小企业发展基金（深圳有限合伙）	6 billion RMB	1) Ministry of Finance: 25% 中华人民共和国财政部 2) Shenzhen SMEs Service Department: 25% 深圳市中小企业服务署 3) Tehua Investment Holding Co., Ltd.: 13.3% 特华投资控股有限公司 4) Other investors in Shenzhen: 36.7% Shenzhen Capital Group Co., Ltd Shenzhen Hongxin Investment Limited Partnership Shenzhen Huahui Group Co., Ltd Shenzhen Ronghao Investment Co., Ltd	Shenzhen Guozhong Venture Capital Co., Ltd. 深圳国中创业投资管理有限公司 <i>The firm is largely controlled (49%) by the Shenzhen Capital Group Co., Ltd, a VC firm established by the Shenzhen municipal government which also has a 10% share of this SME Sub-fund. The other main investor (40%) is the private firm Pingxiang Changrong Investment Management LP</i>	Priority focus: new energy vehicles (several projects covering all segments of the industry chain already financed); Other focuses: IT chips; advanced manufacturing; internet; energy and environment; drugs and healthcare; new materials and chemical engineering
2	SME Fund – Jiangsu Limited Partnership 国家中小企业发展基金（江苏有限合伙）	4.5 billion RMB	1) Jiangsu Yida SME Development Fund LP: 54% 江苏毅达中小企业发展基金（有限合伙） 2) Ministry of Finance: 24.5% 中华人民共和国财政部 3) Other investors: 21% Jiangsu Provincial Government Investment Fund LP; Taiping General Insurance Co., Ltd; Addor Capital Investment Fund Management Co., Ltd	Addor Capital 江苏毅达股权投资基金管理有限公司 <i>One of the largest PE investment firms in mainland China. Its investors comprise nearly 200 Chinese and international organisations and individuals, as well as Jiangsu provincial government (35%). The firm has invested in Sino-foreign JVs. The firm is also the managing firm of one of the fourteen VC sub-funds</i>	IT; advanced manufacturing; clean technologies; drugs and healthcare; modern service industry
3	SME Fund – Jiangsu Nantong Limited Partnership 国家中小企业发展基金（江苏南通有限合伙）	4.5 billion RMB	1) THG Investment Centre (Nantong LP): 51% 清控银杏投资中心（南通有限合伙） 2) Ministry of Finance: 24.5% 中华人民共和国财政部 3) Other investors: 24.5% Tibet TH Asset Management Co Ltd; Tibet Linzhi Asset Management Co Ltd; Trust One Investment Fund Management (Beijing)Ltd	THG Venture Capital Management (Beijing) Co., Ltd. 清控银杏创业投资管理（北京）有限公司 <i>One of the leading university-industry equity investors in mainland China, co-funded by Tsinghua Holdings Corporation Limited. It started S&T investment in 1999 and has since invested in around 100 SMEs, including Sino-foreign JVs.</i>	IT; advanced manufacturing; clean technology; drugs and healthcare; modern service industry
4	SME Fund – Shenzhen Nanshan Limited Partnership 国家中小企业发展基金（深圳南山有限合伙）	4.5 billion RMB	1) Ministry of Finance: 24.4% 中华人民共和国财政部 2) Shenzhen Guidance Investment Fund Co Ltd: 24.3% 深圳市引导基金投资有限公司 3) Essence Securities Co., Ltd: 22.2% 安信证券股份有限公司 4) Other investors: 28% Shenzhen Huitong Jinkong Funds Investment Co Ltd; Xinyu Huabang Investment Management Centre LP; China Vanke Co., Ltd; Shenzhen Chuangdong Fangfusheng Investment LP; Shenzhen Zhonghe Ruimin Investment Management Ltd	Shenzhen Zhonghe Ruimin Investment Management Co., Ltd. 深圳市众合瑞民产学研投资管理有限公司 <i>Shenzhen Zhonghe Ruimin has managed venture funds for over 20 billion RMB, has invested in over 150 projects, 50 of which exited through IPO and M&A.</i>	IT; smart manufacturing; new materials; drugs and healthcare; consumer industry

Investments conducted

As of November 2017, the four SME FOFs have concluded investments in 79 SMEs. The first and the second FOFs were the most active, accounting for 81% of the total investments made.

Over half of investments were conducted in enterprises involved in **R&D and S&T services**, and in the **manufacturing industry** (30% and 24%, respectively), followed by **software and ICT services** (18%). **Beijing** and **Guangdong** provinces were the largest receivers of investments (27% and 26% of the total, respectively), followed by Jiangsu province (20%).



Similarly to the three EI equity funds and the fourteen VC sub-funds introduced in the previous sections, uncertainty also surrounds the processes through which the SME FOFs select and conclude investments on SMEs. No indications that international actors are excluded from becoming receivers of investments were however identified.

Criteria for investments, and international participation

As illustrated, the processes through which such funds and sub-funds conduct investments remain relatively complex. Relevant documents only regulate the processes through which each of the three major funds under this funding pillar (EI Fund, NFFTTC Fund, and SME Fund) identify, select and conclude investments in sub-funds (equity funds, VC funds, FOFs, etc). These are usually recommended by managing firms, and approved by their board of partners (in which the central government should participate in view of its average 20% to 30% shares).

On the other hand, however, it is not clear how these sub-funds (equity funds, VC funds, FOFs) will, in turn, re-invest in enterprises – i.e. the final receivers and beneficiaries of this funding pillar. Relevant documents only outline what the areas and targets are in which investments should be channelled, and stress that all of them should operate according to market mechanisms, with no government intervention.

It should be noted that, in addition to the central government, financial institutions or corporate actors also participate in all the sub-funds (equity funds, VC funds, FOFs) under this funding pillar, suggesting that a certain return on investments is expected. Limited government intervention, centrality of managing firms, and the for-profit nature of these funds suggest that **technologically-advanced international actors with large prospects of growth are well-positioned to become targets of such investments**, as long as they meet the necessary conditions outlined by the government (e.g. innovative enterprises in the strategic emerging industries listed in the *13th Five-year Plan on National Strategic Emerging Industries*; enterprises commercialising scientific results included in the National S&T Achievement Database, etc).

In fact, an analysis of the investment portfolios of all currently-existing sub-funds (equity funds, VC funds, FOFs) confirm that **numerous foreign-invested enterprises have successfully received investments**, as summarised in the below table:

TECHNOLOGY INNOVATION GUIDANCE FUND					
Funds	Sub-funds (equity funds; VC funds; FOFs)	Number of sub-subfunds	Nov-17		
			Investments in portfolio	of which on FIEs	of which on FIEs (%)
1 Venture Capital Guidance Fund for Emerging Industries (EI Fund) 国家新型产业投资引导基金	CICC Qiyuan National Venture Capital Fund LP 中金启元国家新兴产业创业投资引导基金 (有限合伙)	16	119	21	18%
	SDIC Chuanghe National Venture Capital Fund (LP) 国投创合国家新兴产业创业投资引导基金 (有限合伙)	25	291	26	9%
	Infotech National Venture Capital Fund (LP) 盈富泰克国家新兴产业创业投资引导基金 (有限合伙)	6	9	3	37%
2 National Fund for Technology Transfer and Commercialisation (NFTTC Fund) 国家科技成果转化引导基金	Venture Capital sub-funds 创业投资子基金	14	65	13	20%
3 National Fund for SME Development (SME Fund) 国家中小企业发展基金	SME Fund – Shenzhen Limited Partnership 国家中小企业发展基金 (深圳有限合伙)	N/A	39	3	8%
	SME Fund – Jiangsu Limited Partnership 国家中小企业发展基金 (江苏有限合伙)		25	0	0%
	SME Fund – Jiangsu Nantong Limited Partnership 国家中小企业发展基金 (江苏南通有限合伙)		12	2	17%
	SME Fund – Shenzhen Nanshan Limited Partnership 国家中小企业发展基金 (深圳南山有限合伙)		3	0	6%
TOTAL		61	563	68	12%

Statistics show that:

- Around **12% of total investments concluded by the numerous sub-funds (47) under the three EI Equity Funds were in foreign-invested enterprises**. In several cases, this percentage is as high as 75%, reaching 100% in one case;
- Around **20% of total investments concluded by the 14 VC sub-funds under the NFTTC Fund were in foreign-invested enterprises**. In some cases, this percentage reaches 50% of the total investments made by one specific sub-fund;
- Only **6% of the total investments concluded by the four SME FOFs under the SME Fund were in foreign-invested enterprises**.

It should however be noted that the vast majority of these were done on **Chinese-majority joint ventures**, mostly with Hong Kong-based partners. Significant examples of ventures which western investors participated in include: **Microvast Power System** (a designer, developer and manufacturer of fast charging, long-life, and non-flammable lithium-ion battery systems, subsidiary of Microvast Corporation which is co-headquartered in Texas and Zhejiang province, and ventured by the International Finance Corporation); and **Traffor Technology**, a Sino-European invested company doing R&D and manufacturing of inductors and transformers).

Numerous cases were identified of investments conducted on enterprises founded and controlled by ethnic Chinese foreign nationals. Only in very limited cases, the chairman or legal representative of

International participation

Two examples of JVs invested by western investors:

- **Microvast Power System** (微宏动力系统 (湖州) 有限公司), subsidiary of Microvast Corporation, co-headquarter in Texas
- **Traffor Technologies** (特富特科技 (深圳) 有限公司), a Sino-European JV

Two examples of JVs with chairman being a non-ethnic Chinese foreign national:

- **Chengdu Insiga Semiconductors** (成都英思嘉半导体技术有限公司)
- **Mailman Consulting** (上海邮人商务咨询有限公司)

foreign-invested beneficiaries was a non-Chinese foreign national, as in the case of **Chengdu Insigna Semiconductors** (a semiconductor and electronic integration company, also backed by Korean investors) and **Mailman Group** (a consultancy which helps sports organisations around the world to establish a social media and marketing presence in China).

Although **evidence of investments on Western wholly foreign-owned enterprises has yet to be identified**, these funds are still considered to offer good opportunities to European actors, especially **entrepreneurs or scientists looking to enter the Chinese market in cooperation with Chinese partners**, or for multinational corporations to establish joint ventures with local partners for the commercialisation of technology results.

Recommendations for EU stakeholders

The **three major funds under the Technology Innovation Guidance Fund are mainly intended** to stimulate the growth and vitality of technologically-advanced and resource-seeking innovative start-ups and SMEs. **European entrepreneurs or scientists** looking for financing to enter the Chinese market are those the primary ideal targets of the fourth funding pillars.

As illustrated, most of the sub-funds (equity funds, VC funds, FOFs) under the pillar have records of investments in foreign-invested enterprises, although in different measure. Each of them invests in different areas and regions. A three-step strategy is recommended for EU actors aiming at receiving such investments:

1. Self-evaluation of priorities and needs: the right type of investment will depend on the actor's specific priorities and needs, i.e. majority, minority or equal partnership; funding for R&D or manufacturing; IP plans; future aim to get listed on the stock market; etc.
2. Identification of the right fund: identification of a shortlist of funds for potential investment (FOFs, sub-funds, etc) according to one's priorities and needs, as well as the sector and region (each fund focuses on different areas and regions). Funds with higher percentage of foreign-invested enterprises among their investment portfolios should be primary candidates for where to look as they indicate a certain degree of openness;
3. Target and contact the shortlisted funds' managing firms (contacts for some funds were provided above; others are easily accessible online): each funds' daily operations are conducted independently by their managing firms: they identify, select and recommend potential investments to their board of partners. Cooperation potential with such managing firms exist, especially in view of their determination to meet the country's strategic needs of turning domestic companies into global competitors, acquiring high- and new-technologies, and expanding into international markets.⁹² It should also be noted that the lower the level of the fund (sub-fund, etc) compared to the Technology Innovation Guidance Fund (e.g. the FOFs or VC funds under the EI equity funds, in turn under the EI Fund), the more likely it is that their decision-making is done independently without government intervention.

A table summarising all the numerous funds (sub-funds, etc) currently-existing under the fourth funding pillar, indicating their area and region of investments, the number of investments concluded as well as the percentage of those done on FIEs, is provided in Annex 5.2.

Multinational corporations (either Chinese or foreign-invested) may also still find useful to cooperate with one of the start-ups or SMEs receiving such funds, for instance for the commercialisation or industrial application of technology results with good market prospects.

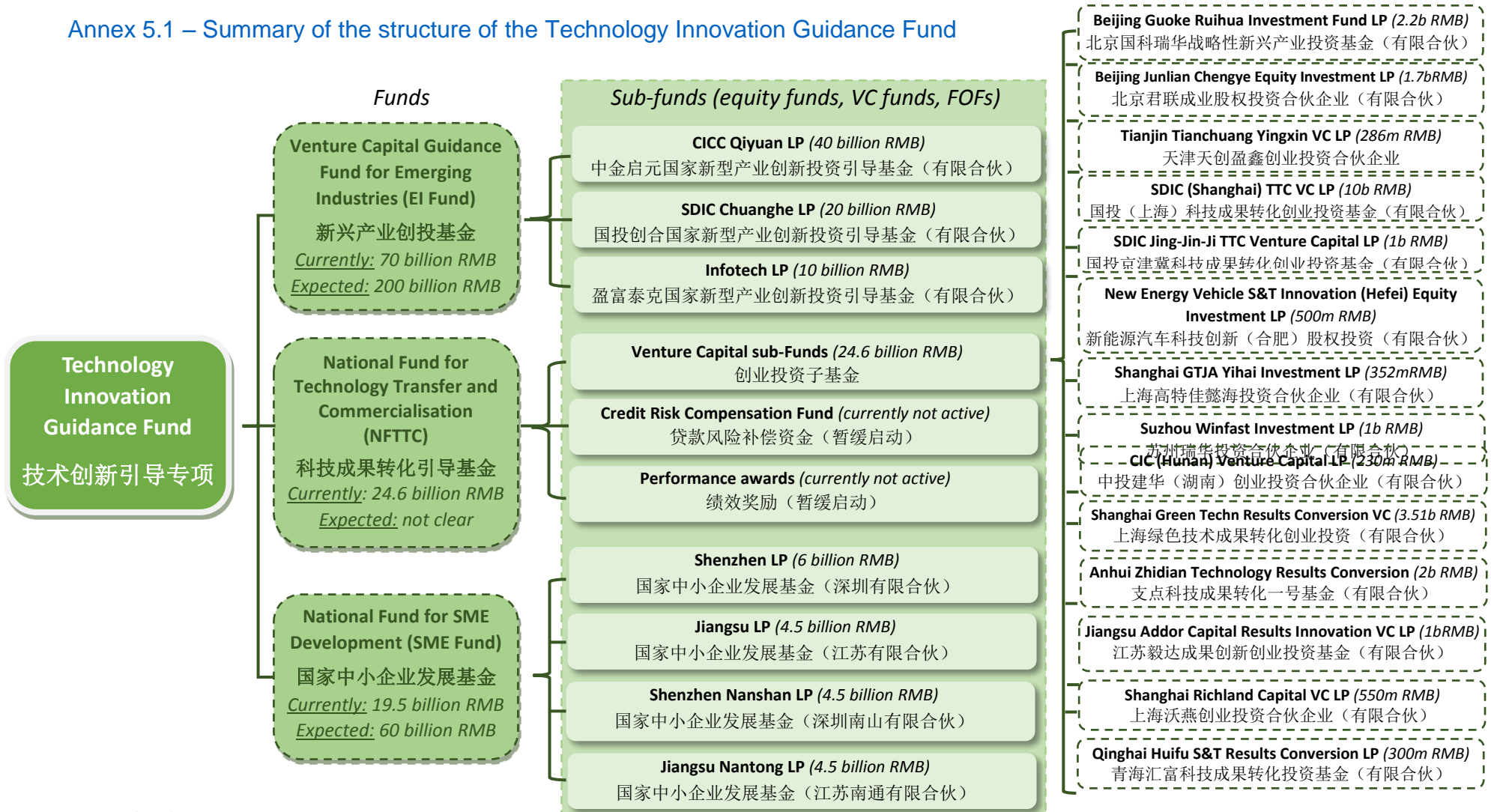
⁹² This is confirmed by the fact that most of these managing firms have already independently concluded and exited investments in several foreign-invested JVs, or MNCs. Examples are the US-based iSoftStone; Memsic; the MNCs AAG Energy; VML China; SuperMap, etc.

Annexes

The following annexes are included in this section:

- Annex 5.1 – Summary of the structure of the Technology Innovation Guidance Fund
- Annex 5.2 – Summary of the funds under the Technology Innovation Guidance Fund

Annex 5.1 – Summary of the structure of the Technology Innovation Guidance Fund



Annex 5.2 – Summary of the funds under the Technology Innovation Guidance Fund

Funds	Sub-funds (equity funds, VC funds, FOFs)	Size	Sector	Managing firm	Nov-17		
					Investments in portfolio	of which on FIEs	of which on FIEs (%)
Venture Capital Guidance Fund for Emerging Industries (EI Fund) - CICC Qiyuan LP 中金启元国家新兴产业创业投资引导基金（有限合伙）	CICC Qiyuan (Hubei) Private Equity InvestmentLP 中金启元国家新兴产业创业投资引导基金（湖北）股权投资企业（有限合伙）	40 billion RMB	R&D and S&T services; ICT services; manufacturing; leasing and business services; wholesale and retail; culture and entertainment; finance	CICC Jiacheng Investment Management Co Ltd 中金佳成投资管理 有限公司	0	0	0%
	Shanghai Huoshanshi Investment Management 上海火山石一期股权投资合伙企业（有限合伙）				16	4	25%
	Ningbo Honghui Equity Investment (LP) 宁波弘晖股权投资合伙企业（有限合伙）				11	0	0%
	The Arena Capital Centre (LP) 上海竞动域投资中心（有限合伙）				5	0	0%
	Tibet Banyan Venture Capital Centre (LP) 西藏榕安成长投资中心（有限合伙）				8	2	25%
	Jinhua Honghe Equity Investment (LP) 金华弘合股权投资合伙企业（有限合伙）				16	2	13%
	Suzhou Jifeng Equity Investment (LP) 苏州济峰股权投资合伙企业（有限合伙）				1	0	0%
	Ningbo Meishan Bonded area - Hongdian Chichen Equity Investment (LP) 宁波梅山保税港区红点驰辰股权投资合伙企业				3	0	0%
	Suzhou Lirui Equity Investment Centre (LP) 苏州礼瑞股权投资中心（有限合伙）				3	3	100%
	Suzhou Industrial Park - Xinjianyuan Erqi VC LP 苏州工业园区新建元二期创业投资企业（有限合伙）				10	5	50%
	Suzhou Industrial Park - Yuandian Zhengze No. 2 Venture Capital LP 苏州工业园区原点正则贰号创业投资企业（有限合伙）				10	2	20%
	Ningbo Chuangshi (Phasel) Equity Investment Fund 宁波创世一期股权投资基金合伙企业				10	1	10%
	Shanghai Chenxi Venture Capital Centre LP 上海晨熹创业投资中心（有限合伙）				10	1	10%
	Wuhan Optics Valley Shengzhang Venture Capital LP 武汉光谷晟长创业投资合伙企业（有限合伙）				0	0	0%

Funds	Sub-funds (equity funds, VC funds, FOFs)	Size	Sector	Managing firm	Nov-17		
					Investments in portfolio	of which on FIEs	of which on FIEs (%)
Venture Capital Guidance Fund for Emerging Industries (EI Fund) - CICC Qiyuan LP 中金启元国家新兴产业创业投资引导基金 (有限合伙)	Ningbo Meishan Bonded Area - Yaowei Equity Investment (LP) 宁波梅山保税港区曜伟股权投资合伙企业 (有限合伙)	40 billion RMB	R&D and S&T services; ICT services; manufacturing; leasing and business services; wholesale and retail; culture and entertainment; finance	CICC Jiacheng Investment Management Co Ltd 中金佳成投资管理 有限公司	8	1	13%
	Suzhou Zhongding Longyu Venture Capital Centre LP 苏州钟鼎陇屿创业投资中心 (有限合伙)				8	0	0%
Venture Capital Guidance Fund for Emerging Industries (EI Fund) - SDIC Chuanghe LP 国投创合国家新兴产业创业投资引导基金 (有限合伙)	Beijing Huayao Zhongwei Venture Capital LP 北京华耀中纬创业投资合伙企业 (有限合伙)	20 billion RMB	R&D and S&T services; ICT services; manufacturing; leasing and business services; wholesale and retail; culture and entertainment; finance	SDIC Chuanghe (Beijing) Fund Management CoLtd 国投创合 (北京) 基金管理有限公司	7	0	0%
	Shenzhen Qingsong (III) Equity Investment Fund LP 深圳市青松三期股权投资基金合伙企业 (有限合伙)				11	0	0%
	Suzhou Fangguang Phase II Venture Capital (LP) 苏州方广二期创业投资合伙企业 (有限合伙)				4	0	0%
	Suzhou Bangsheng Yingxin Venture Capital Co. (LP) 苏州邦盛赢创新创业投资企业 (有限合伙)				9	3	33%
	Suzhou Tonghe Phase II Venture Capital LP Co. (LP) 苏州通和二期创业投资合伙企业 (有限合伙)				7	5	71%
	Jiangsu Tianhui Hongyou Medical and Health Industry Fund (LP) 江苏天汇红优医药健康产业基金合伙企业 (有限合伙)				4	2	50%
	Tianjin Lanchi Xinhe Investment Centre (LP) 天津蓝驰新禾投资中心 (有限合伙)				23	0	0%
	Guangdong Guoke Lanhai Venture Capital Co. (LP) 广东国科蓝海创业投资企业 (有限合伙)				4	0	0%
	Beijing Haiju Zhuli Venture Capital Centre (LP) 北京海聚助力创业投资中心 (有限合伙)				5	0	0%
	Zhong Dianke (Tianjin) Venture Capital LP 中电科国投 (天津) 创业投资合伙企业 (有限合伙)				0	0	0%
	Chengdu Qingdonghui Equity Investment Fund (LP) 成都青铜汇股权投资基金合伙企业 (有限合伙)				7	0	0%

Funds	Sub-funds (equity funds, VC funds, FOFs)	Size	Sector	Managing firm	Nov-17		
					Investments in portfolio	of which on FIEs	of which on FIEs (%)
Venture Capital Guidance Fund for Emerging Industries (EI Fund) - SDIC Chuanghe LP 国投创合国家新兴产业创业投资引导基金 (有限合伙)	Beijing Hexie Chaoyue Investment Centre (LP) 北京和谐超越投资中心 (有限合伙)	20 billion RMB	R&D and S&T services; ICT services; manufacturing; leasing and business services; wholesale and retail; culture and entertainment; finance	SDIC Chuanghe (Beijing) Fund Management CoLtd 国投创合 (北京) 基金管理有限公司	37	3	8%
	Suzhou Yuanhan Equity Investment LP 苏州源瀚股权投资合伙企业 (有限合伙)				2	0	0%
	Beijing Pufeng Yunhua Emerging Industries Venture Capital Centre (LP) 北京普丰云华新兴产业创业投资中心 (有限合伙)				1	0	0%
	Shanghai Puruan Chenhui VC Centre (LP) 上海浦软晨汇创业投资中心 (有限合伙)				13	N/A	N/A
	Qingdao Huaxin Chuangyuan VC Centre (LP) 青岛华芯创原创业投资中心 (有限合伙)				8	2	25%
	Suzhou Gebi Zhiying Venture Capital (LP) 苏州戈壁智盈创业投资合伙企业 (有限合伙)				26	1	4%
	Jiaxin Danqing Investment (LP) 嘉兴丹青投资合伙企业 (有限合伙)				10	3	30%
	Gongqing Chengyuanxi Investment Management LP 共青城元熙投资管理合伙企业 (有限合伙)				7	1	14%
	Beijing Defengjie Investment Fund Management (LP) 北京德丰杰龙脉投资基金管理中心 (有限合伙)				10	0	0%
	Hangzhou Hepu Lingjin Investment LP 杭州和谐领进投资合伙企业 (有限合伙)				35	3	9%
	Shenzhen Hechuang Smart and Health Industry VC 深圳市合创智能及健康创业投资基金 (有限合伙)				4	1	25%
	Suzhou Qianji Zekang Investment Centre 苏州千骥泽康投资中心 (有限合伙)				3	0	0%
	Suzhou Qingyan Automotive Industry VC LP 苏州清研汽车产业创业投资企业 (有限合伙)				27	3	11%
	Beijing Jiuhe Yunyong Investment Centre (LP) 北京九合云涌投资中心 (有限合伙)				27	0	0%

Funds	Sub-funds (equity funds, VC funds, FOFs)	Size	Sector	Managing firm	Nov-17		
					Investments in portfolio	of which on FIEs	of which on FIEs (%)
Venture Capital Guidance Fund for Emerging Industries (EI Fund) - Infotech LP 盈富泰克国家新兴产业创业投资引导基金 (有限合伙)	Shenzhen Huiyou Chuangjia Venture Capital LP (LP) 深圳市惠友创嘉创业投资合伙企业 (有限合伙)	10 billion RMB	R&D and S&T services; ICT services; manufacturing; leasing and business services; wholesale and retail; culture and entertainment; finance	Infotech (Shenzhen) Emerging Industries Investment Management Co Ltd 盈富泰克 (深圳) 新兴产业投资基金管理有限公司	1	0	0%
	Shenzhen Nanshan Chuangwei Information Technology Industry Venture Capital Fund (LP) 深圳南山创维信息技术产业创业投资基金 (有限合伙)				1	0	0%
	Jinan Jianhua Venture Capital LP Co. (LP) 济南建华创业投资合伙企业 (有限合伙)				2	0	0%
	Jilin Yinhe Biology Industry Venture Capital Fund (LP) 吉林省银河生物产业创业投资基金 (有限合伙)				0	0	0%
	Hangzhou Hetang Innovation Equity Investment (LP) 杭州荷塘创新股权投资合伙企业 (有限合伙)				1	0	0%
	Yunnan Nantian Infotech Information Industry VC LP 云南南天盈富泰克信息产业创业投资 (有限合伙)				4	3	75%
National Fund for Technology Transfer and Commercialisation (NFTTC Fund) - Venture Capital sub-funds 国家科技成果转化引导基金创业投资基金	Beijing Guoke Ruihua Strategic Investment Fund for Emerging Industries LP 北京国科瑞华战略性新兴产业投资基金 (有限合伙)	2.2 billion RMB	Manufacturing of high-end machinery, IT, Consumption and health industries	CAS Investment Management Co., Ltd. (CAS) 中国科技产业投资管理有限公司	13	4	31%
	Beijing Junlian Chengye Equity Investment Partnership LP 北京君联成业股权投资合伙企业 (有限合伙)	1.7 billion RMB	Smart manufacturing, professional services, TMT and innovative consumption	Legend Capital 君联资本管理股份有限公司	9	1	11%
	Tianjin Tianchuang Yingxin VC Partnership LP 天津天创盈鑫创业投资合伙企业 (有限合伙)	286 million RMB	Environmental protection and energy saving, ICT, advanced manufacturing	Tianjin Venture Capital Co., Ltd 天津创业投资管理有限公司	2	0	0%

Funds	Sub-funds (equity funds, VC funds, FOFs)	Size	Sector	Managing firm	Nov-17		
					Investments in portfolio	of which on FIEs	of which on FIEs (%)
National Fund for Technology Transfer and Commercialisation (NFTTC Fund) - Venture Capital sub-funds 国家科技成果转化引导基金创业投资基金	SDIC (Shanghai) TTC VC LP 国投(上海)科技成果转化创业投资基金企业(有限合伙)	10 billion RMB	Advanced manufacturing, green energy, biomedical, and results in areas covered by S&T Mega Projects	SDIC (Shanghai) Venture Capital Management Co Ltd 国投(上海)创业投资管理有限公司	5	3	60%
	SDIC Beijing-Tianjin-Hebei (Jing-Jin-Ji) TTC VC LP 国投京津冀科技成果转化创业投资基金(有限合伙)	1 billion RMB	IT, advanced manufacturing, biomedical industries	SDIC Venture Capital Management CoLtd 国投创业投资管理有限公司	1	0	0%
	New Energy Vehicle S&T Innovation (Hefei) Equity Investment LP 新能源汽车科技创新(合肥)股权投资合伙企业(有限合伙)	500 million RMB	New energy vehicles and relevant industries	Hefei Guoke New Energy Equity Investment Management LP 合肥国科新能股权投资管理合伙企业	0	0	0%
	Shanghai GTJA Yihai Investment LP 上海高特佳懿海投资合伙企业(有限合伙)	352 million RMB	Biomedical industry	Shanghai GTJA Investment Management CoLtd 上海高特佳投资管理有限公司	8	0	0%
	Suzhou Winfast Investment LP 苏州瑞华投资合伙企业(有限合伙)	1 billion RMB	Biomedical industry, electronic information, new materials	Jiangsu Winfast Venture Capital Management CoLtd 江苏瑞华创业投资管理有限公司	6	1	17%
	China Venture Capital Co. Ltd (Hunan) Venture Capital LP 中投建华(湖南)创业投资合伙企业(有限合伙)	300 million RMB	Environmental protection and energy saving, new materials, ICT, and other strategic emerging industries	CIC Jianhua (Hunan) Investment Management CoLtd 中投建华(湖南)投资管理有限公司	12	0	0%

Funds	Sub-funds (equity funds, VC funds, FOFs)	Size	Sector	Managing firm	Nov-17		
					Investments in portfolio	of which on FIEs	of which on FIEs (%)
National Fund for Technology Transfer and Commercialisation (NFTTC Fund) - Venture Capital sub-funds 国家科技成果转化引导基金创业投资基金	Shanghai Green Technologies Results VC Centre LP 上海绿色技术创业投资中心（有限合伙）	3.51 billion RMB	Energy-saving, environmental-friendly new materials, and other green technology fields	Shanghai Shuang Chuang Investment Management CoLtd 上海双创投资管理有限公司	N/A		N/A
	Anhui Ma'anShan Zhidian Technology Results Conversion No. 1 Fund LP 马鞍山支点科技成果转化一号投资管理中心（有限合伙）	2 billion RMB	New materials, advanced, energy-saving and environmental-friendly	Ma'anShan Zhidian Chuangke Tech Industry Investment Co Ltd 马鞍山支点创科科技产业投资有限公司	N/A		N/A
	Jiangsu Addor Capital Results Innovation VC Fund LP 江苏毅达成果创新创业投资基金（有限合伙）	1 billion RMB	Biopharmaceuticals, information technologies	Addor Capital 江苏毅达股权投资基金管理有限公司	4	2	50%
	Shanghai Richland Capital Venture Capital LP 上海沃燕创业投资合伙企业（有限合伙）	550 million RMB	New materials, high-end equipment, information technologies	Richland Capital 北京沃衍资本管理中心（有限合伙）	5	2	40%
	Qinghai Huifu S&T Results Conversion Investment LP 青海汇富科技成果转化投资基金（有限合伙）	300 million RMB	Electronic information, energy-saving and environmental-friendly, biopharmaceuticals, new materials	Qinghai Huifu Kunlun Venture Capital Management CoLtd 青海汇富昆仑创业投资管理有限公司	0	0	0%
National Fund for SME Development (SME Fund) - Shenzhen LP 国家中小企业发展基金（深圳有限合伙）	N/A	6 billion RMB	New energy vehicles; IT chips; advanced manufacturing; internet; energy and environment; drugs and healthcare; new materials and chemical engineering	Shenzhen Guozhong Venture Capital Co., Ltd. 深圳国中创业投资管理有限公司	39	3	8%

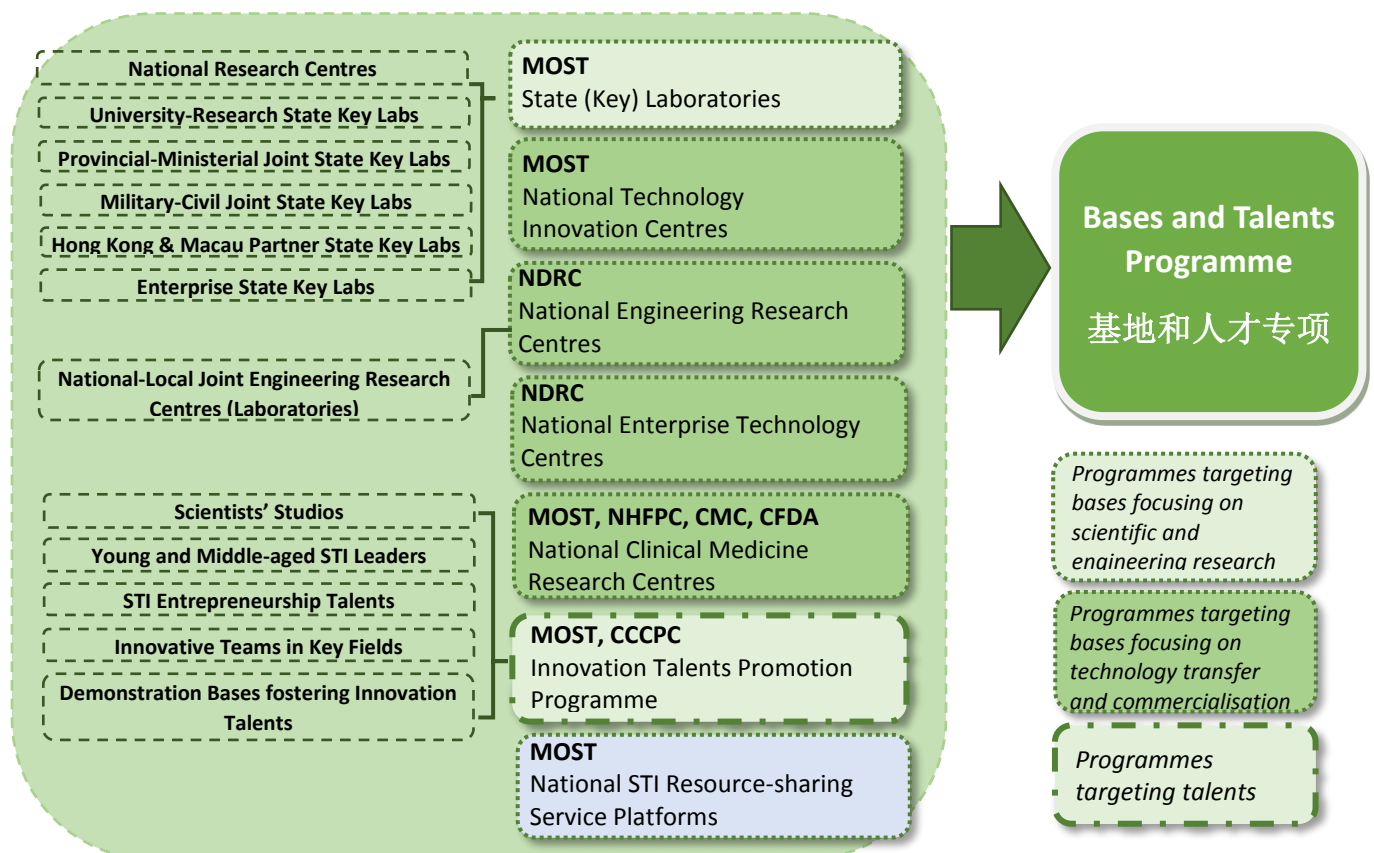
Funds	Sub-funds (equity funds, VC funds, FOFs)	Size	Sector	Managing firm	Nov-17		
					Investments in portfolio	of which on FIEs	of which on FIEs (%)
National Fund for SME Development (SME Fund) - Jiangsu LP 国家中小企业发展基金（江苏有限合伙）	N/A	4.5 billion RMB	IT; advanced manufacturing; clean technologies; drugs and healthcare; modern service industry	Addor Capital 江苏毅达股权投资基金管理有限公司	25	0	0%
National Fund for SME Development (SME Fund) - Shenzhen Nanshan LP 国家中小企业发展基金（深圳南山有限合伙）	N/A	4.5 billion RMB	IT; advanced manufacturing; clean technology; drugs and healthcare; modern service industry	THG Venture Capital Management (Beijing) Co., Ltd. 清控银杏创业投资管理（北京）有限公司	3	0	0%
National Fund for SME Development (SME Fund) - Jiangsu Nantong LP 国家中小企业发展基金（江苏南通有限合伙）	N/A	4.5 billion RMB	IT; smart manufacturing; new materials; drugs and healthcare; consumer industry	Shenzhen Zhonghe Ruimin Investment Management CoLtd 深圳市众合瑞民产学研投资管理有限公司	12	2	17%

6. Bases and Talents Programme

The Bases and Talents Programme – the fifth and last funding pillar – is **directed to universities, research structures, enterprises, and individual talents and teams**. Similarly to National Key R&D Programmes (third funding pillar) and the Technology Innovation Guidance Fund (fourth funding pillar), the Bases and Talents Programme emerged from a structural re-organisation and merging of several previously-existing programmes from MOST and NDRC.

The Bases and Talents Programme consists of seven main programmes, some of which are in turn organised into several sub-programmes. It supports the establishment of a series of **bases for scientific research** with international competitiveness, and the fostering of top-notch **innovative talents and teams**. Means of support generally include: subsidies for the establishment or operations of the research facility; priority in applying to national and local STI funding programmes (including those introduced in the previous sections of this guide); or tax deductions/exemptions for imports of R&D equipment.

Structure of the Bases and Talents Programme



Most of these programmes are currently undergoing deep structural reforms, i.e. re-organisation, re-classification and merging of existing bases so as to remove frequent overlaps and similarity of functions and objectives among them.⁹³ This makes the fifth funding pillar currently relatively

⁹³ These were mainly introduced by the [Plan for the Optimisation and Integration of National STI Bases](#) (国科发基〔2017〕250号) published at the end of August 2017 by MOST, NDRC, and MOF. A detailed abstract of the *Plan* is included in Annex 6.1.

inactive, especially when compared to other national STI programmes. Moreover, **not all the programmes under the fifth pillar are open to European actors.**

The functioning mechanism of the Bases and Talents Programme is very similar to the first three funding pillars, namely in that applicants apply to direct government funding/support for establishing certain facilities for conducting research or results commercialisation. No **pillar-wide regulations**, management measures or websites have however been created: each specific programme under the pillar has its own and independent management framework, benefits and application procedures; related information is not integrated on the National S&T Service Platform, and remains highly-fragmented and scattered among different websites and press releases.

In the next sections, the programmes under the Bases and Talents Programme to **which EU actors can potentially access** are introduced in detail, focusing in particular on the management regulations guiding their establishment and operations; their targets and areas of investments; and on instances of investments on foreign-invested entities.

State Key Laboratories

State Key Laboratories (SKLs) were created starting from 1984 to promote scientific basic research in a period of major structural economic reforms and development. They have now become essential bases and platforms for science, technology and innovation in China, promoting basic and applied research, gathering and nurturing innovative talents, and promoting scientific cooperation and exchanges, with the objective of realising breakthroughs in support to the country's development needs and priorities.

State Key Laboratories are under the authority of **MOST**. Other ministries (e.g. Ministry of Education for centrally-administered universities; or SASAC for state-owned enterprises), CAS or local S&T commissions and departments are the **main responsible bodies** for the labs' overall management – by formulating supporting policies, guiding their activities, approving their directors, and endorsing new candidate labs to MOST. The labs' planning, construction and daily operations lie in their **host units** (*yituo danwei*), i.e. legal entities to which labs or teams are affiliated and usually located.

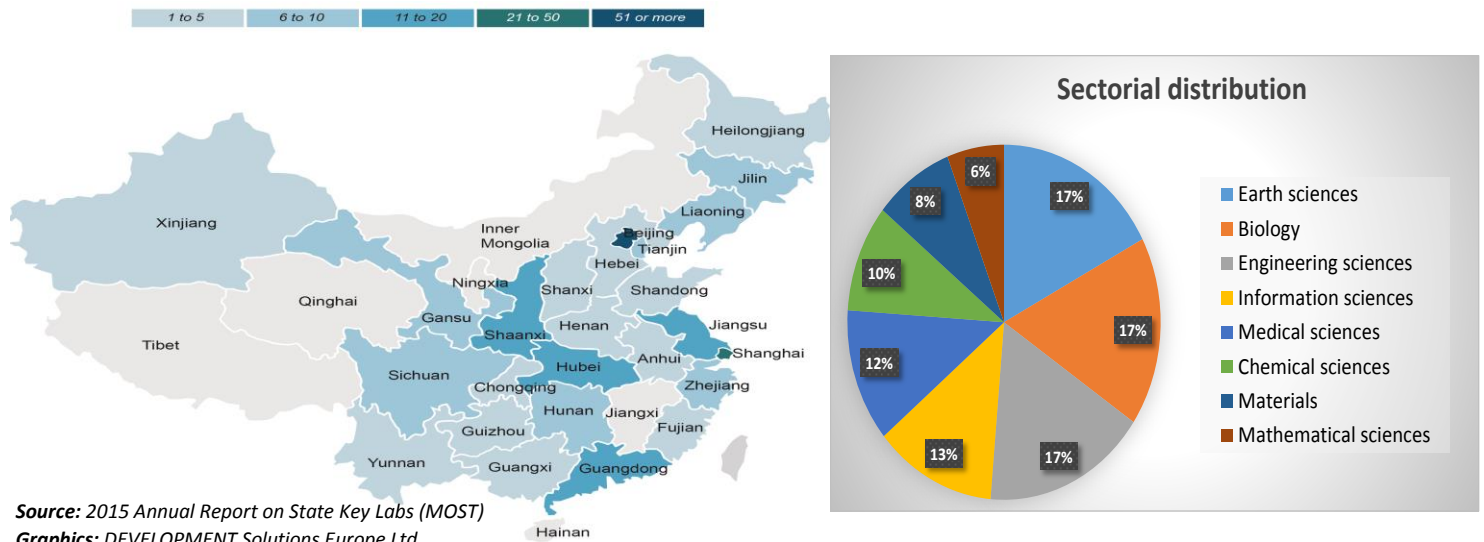
SKLs have expanded over the decades to **target different entities** (universities, research structures, and enterprises), reflecting increasingly diversified national and international innovation trends as well as the country's evolving development priorities and needs. They now feature a complex structure comprised of six different categories of laboratories.⁹⁴ Only the most active and those presenting opportunities to EU actors will be introduced below.

⁹⁴ Namely (i) **National Research Centres**: the highest level of research structure in China, conducting top-level cross disciplinary research. Six National Research Centres are currently existing ([link](#)); (ii) **University-Research SKLs**, introduced below; (iii) **Provincial-Ministerial Joint SKLs**: established by local governments within universities or research structures not administered by the central government, especially in less developed regions, focusing on regional specialties and regional needs and priorities. 26 of such labs currently exist; (iv) **Military-Civil SKLs**: established within military research structures and focusing on civil-military integration. 14 of such labs currently exist ([link](#)) (v) **Hong Kong and Macau Partner SKLs**: established within universities in Hong Kong and Macao SARs, in cooperation with SKLs in the mainland. 18 of such labs currently exist; and (vi) **Enterprise SKLs**, introduced below.

1. University-Research State Key Laboratories

University-Research State Key Laboratories SKLs are established within institutes of higher education and research structures for conducting pioneering and innovative research in areas of national priority, further supporting the country's technological and economic development

A total of **255 University-Research SKLs had been established** by the end of 2015. They mainly focus on earth sciences, biology and engineering sciences (17% each), information sciences, and medical sciences (12% each). Over half of these labs are managed by the Ministry of Education, while nearly one-third from CAS. **None is affiliated to foreign-invested universities or research structures.** In terms of geographical distribution, the majority of University-Research SKLs are concentrated in Beijing (79), Shanghai (32), Jiangsu province (20), and Hubei province (18).



Although the research output of University-Research SKLs varies, they are generally a very interesting target for European actors looking for research partners within the Chinese innovation ecosystem. In 2015 they were granted a total of 108 national-level S&T awards; 8,897 innovation patents; and 49,900 papers included in the Science Citation Index.

More information on the state of affairs of University-Research SKLs can be found in the **2015 Annual Report on State Key Laboratories**, published by MOST ([link](#)). The same document includes a full list of the 255 approved University-Research SKLs.

Benefits

There is a wide variety of benefits associated with being recognised as University-Research SKLs, mainly divided as:

- **Funding:** University-Research SKLs receive funding and subsidies from the central government for costs incurred for (i) **daily operations**; (ii) **research activities**; and (iii) **purchase or renewal of facilities and equipment**. In the first two cases, the amount of funding is allocated by MOST and MOF according to a classification of labs based on fixed-term performance evaluations, annual reviews, no. of projects under implementation, and lab size; in the latter case, funding is granted according to a work plan submitted by the lab,

generally every five years. More than 4 billion RMB were allocated by the central government in 2015.⁹⁵

- **Preferential treatment: particular priority is granted to University-Research SKLs when applying to local and national STI projects and funds.** For instance, in 2015 they were granted a total of 22,213 national-level STI projects (mainly from the Natural Sciences Foundation of China, NSFC), and 7,201 provincial-level STI projects, amounting to a total of 14.04 billion RMB (around 1.8 billion EUR) of government funds received.

Selection process

Applications to University-Research SKL are submitted by host units through their main responsible bodies (ministries/agencies under the State Council, CAS, or local S&T departments) to MOST. The process is summarised as follows:

1. MOST publishes application guidelines on its website. The time and frequency of new applications remain unclear (the last call was published in 2010, [link](#)), but it was announced that new ones will be launched during the 13th Five-year period (2016-2020)
2. Main responsible bodies organise, collect and review applications from host units under their jurisdiction, and submit to MOST
3. A shortlist of candidates is selected by MOST after peer review
4. The main responsible bodies of shortlisted candidates select the lab's director, and formulate a detailed roadmap for the establishment of the lab, which is then submitted to MOST
5. MOST evaluates the roadmaps and approves a list of labs to start their construction (pre-operation) period
6. At the end of the construction period, an evaluation is conducted by MOST. Labs which pass the examination officially begin their operations as State Key Laboratories

Eligibility requirements

Candidates for University-Research State Key Lab must meet the following requirements:

- Have been operating as Ministerial- or Provincial-level Key Lab for over two years, and engaged in basic or applied research;
- Have a research focus in line with those indicated in MOST's application guidelines;
- Possess strong research capacities, and high-level research teams (with a rational team age and composition balance). The last call in 2010 also required applicants to possess the authority to grant PhD titles (this requirement however is absent from the management guidelines and therefore might have been limited to that particular call);
- Possess good infrastructures and conditions for conducting research, including a facility with at least 3,000 m² of extension, and equipment with a value exceeding 25 million RMB, which should be open to the public.

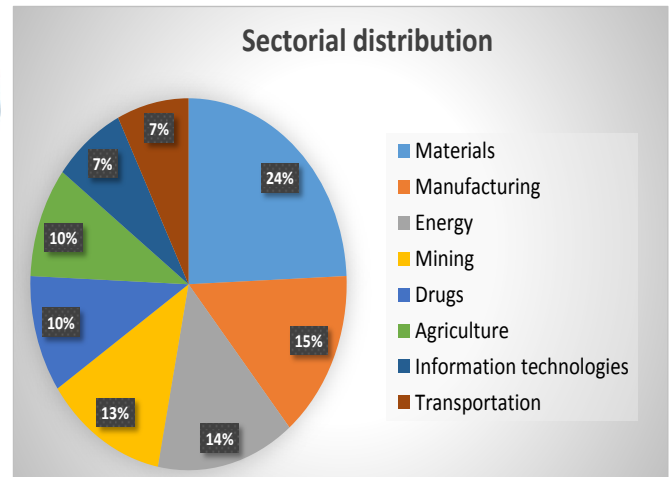
More information on the legal framework, benefits and selection procedures of University-Research State Key Laboratories can be found on: ***Measures for the Establishment and Operation of University-Research State Key Laboratories*** ([link](#)); and ***Measures for the Administration of Special Funding for University-Research State Key Laboratories*** ([link](#)).

⁹⁵ During the lab's construction phase (pre-operation period), no funding will be allocated from the central government; it must be ensured by the lab's main responsible body (ministries/agencies under the State Council, CAS, or local S&T governments) and host units.

2. Enterprise State Key Laboratories

Enterprise State Key Laboratories have started to be established following the publication of the *Outline of the National Medium- and Long-term Programme on Science and Technology Development (2006-2020)*, as a parallel and complementary leg of the University-Research SKLs. Enterprise SKLs conduct applied basic research and research on pre-competition generic technologies in areas of major interest and needs for the country's socio-economic development. They also significantly contribute to the formulation of international, national and industry standards

A total of **177 Enterprise SKLs had been established by the end of 2015**. They mainly focus on materials (23%); manufacturing (15%); energy (14%); and mining (12%). Around half belongs to State-owned Enterprises (SoEs), thus are managed by the State-owned Assets Supervision and Administration Committee; the remaining are managed by S&T departments of local governments. Nine labs (5% of the total) are affiliated with foreign-invested enterprises.⁹⁶ In terms of geographical distribution, the majority of Enterprise SKLs are concentrated in Beijing (37), Shandong province (17), Guangdong and Jiangsu province (13 each), and Shanghai (11).



Although the research output of Enterprise SKLs varies, they are generally a very interesting target for European actors looking for research partners within the Chinese innovation ecosystem. In 2015 they were granted a total of 18 national-level S&T awards; 2,881 national innovation patents, and 145 international innovation patents; nine New Drug Certificates; 317 Software Registration Copyright; 607 international, national and industry standards.

More information on the state of affairs of Enterprise SKLs can be found in the **2015 Annual Report on Enterprise State Key Laboratories**, published by MOST ([link](#)). The same document includes a full list of the 177 approved Enterprise SKLs.

Benefits

The benefits associated with being recognised as Enterprise SKLs are:

- **Funding:** Enterprise SKLs receive substantial funding from their **main responsible bodies** (ministries/agencies under the State Council, CAS, S&T departments of local governments).

⁹⁶ One example is **Yangtze Optical Fibre and Cable Joint Stock Limited Company**, a Sino-foreign joint venture which includes Draka Comteq B.V (former Dutch company now merged with the Italian Prysmian) as one of its key shareholders. More details on international participation in the following sections.

Unlike University-Research SKLs, however, it appears that Enterprise SKLs do not receive funding and subsidies from the central government for daily operations and research.

- **Preferential treatment: particular priority is granted to Enterprise SKLs when applying to national and local STI projects and funds.** For instance, in 2015 they were granted a total of 80 national-level STI projects, and 142 provincial-level STI projects, corresponding to a total of 3.61 billion RMB (around 468 million EUR) of government funds received.

Selection process

Applications to Enterprise SKLs are submitted by host units through their main responsible bodies (ministries/agencies under the State Council, or local S&T departments) to MOST. The process is basically the same as that for University-Research SKLs:

1. MOST publishes application guidelines on its website. The time and frequency of new applications remain unclear (the last two calls were published in [2014](#), and [2009](#)), but it was announced that new ones will be launched during the 13th Five-year period (2016-2020);
2. Main responsible bodies collect and review applications from host units, and submit to MOST;
3. A shortlist of candidates is selected by MOST after peer review;
4. The responsible bodies of shortlisted candidates select the lab's director, and formulate a detailed roadmap for the establishment of the lab, which is then submitted to MOST;
5. MOST evaluates the roadmaps and approves a list of labs to start their construction (pre-operation) period;
6. Within one month after the end of the construction period (which generally lasts two years), an evaluation is conducted by MOST. Labs which pass the examination officially begin their operations as State Key Laboratories.

Eligibility requirements

Candidates for University-Research State Key Lab must meet the following requirements:

- Have been operating as Ministerial- or Provincial-level Key Lab for over two years, with well-regulated and efficient management procedures;
- Have been conducting, for at least five years, applied basic research and research on pre-competition generic technologies in line with the country's policies and strategies;
- Possess strong research capacities and teams, with at least 50 full-time researchers, over one-third of which being scientists holding senior technology positions;
- Possess good infrastructures and conditions for conducting research (the last call published in 2014 required applicants to possess research facilities with at least 5,000 m² of extension, and equipment with a value exceeding 30 million RMB);
- Ensure, together with their main responsible bodies, enough funding for the establishment and operation of the Lab;
- Others (e.g. the 2009 call required applicants' R&D expenditure to exceed a certain proportion of their sales revenue in the previous year, ranging from 3% to 6% according to the value of sales; in addition, at least 60% of the R&D activities should have been conducted in Mainland China. Such requirements were however absent from the 2014 call).

More information on the legal framework, benefits and selection procedures of Enterprise SKLs can be found on: ***Measures for the Management of Enterprise State Key Laboratories*** ([link](#)).

Lastly, it should be noted that while the title "State Key Laboratory" indicates a real facility, in the majority of cases no new laboratories or facilities are built. The status is more often granted to existing departments or research teams that have done ground-breaking research in a specific area, with the purpose of allowing them to continue to do so.

National Technology Innovation Centres

National Technology Innovation Centres are a new category of national STI bases focusing on technology innovation, transfer and commercialisation. Through enterprise-led industry-university-research cooperation, they aim to realise breakthroughs in key technologies for national long-term development and industrial competitiveness, ultimately contributing to the country's move towards the upstream value chain. They will give full play to market forces and will only receive government funding depending on the completion of project deliverables and objectives.

No National Technology Innovation Centres had been established by December 2017. The first Centre was announced by MOST in January 2018 in Beijing.⁹⁷ Around 20 National Technology Innovation Centres will however be established by 2020 in:⁹⁸

- Areas at the frontiers of global S&T, including: big data, quantum communication, artificial intelligence, modern agriculture, synthetic biology, microbiomes, precision medicine, etc.
- Areas at the heart of global economic competitiveness, including: high-speed railway, mobile communication, smart power grids, integrated circuits, smart manufacturing, new materials, clean coal, oil and gas exploration and development, biological seeds, biomedicines, medical equipment, etc.
- Areas for national major needs and security, including: aircraft engines and gas turbines, large aircrafts, core electrical components, nuclear power, deep-sea equipment, etc.

Their objective is to stimulate the growth and expansion of a series of technology enterprises, and to cultivate numerous leading enterprises with global competitiveness. They further divided in:

- **Comprehensive National Technology Innovation Centres**, established in backbone leading enterprises in those areas with high industry concentration ratio, and focusing on the industrialisation and commercialisation of breakthroughs for long-term national development. Other enterprises, universities and research structures can also participate in the construction and operation of such Centres;
- **Specialised National Technology Innovation Centres**, established in other enterprises, universities or research structures in those highly-competitive areas with low industry concentration ratio, or in areas with non-mature markets. They focus on R&D of key technologies, formulation of standards, and technology transfer, demonstration and commercialisation for socio-economic development and industrial transformation.

Governments at all levels actively participate and support the establishment and operation of National Technology Innovation Centres, also by providing additional funding.

National Technology Innovation Centres will be highly-encouraged and supported in undertaking and leading research activities within local and national STI funding programmes, particularly National Key R&D Programmes (NKPs), and Major S&T Mega Projects. They will also actively **attract international talents** and promote cooperation and exchanges.

Judging from MOST's announcement of the first National Technology Innovation Centre, it seems that the participation of European actors can only be limited to a **minor cooperation role** during the Centre's establishment or operations.

⁹⁷ The Centre will focus on new energy vehicles:

http://www.most.gov.cn/mostinfo/xinxifenlei/fqzc/gfxwj/gfxwj2018/201801/t20180112_137698.htm

⁹⁸ Sources: *Guidelines on the Establishment of National Technology Innovation Centres* 科技部关于印发国家技术创新中心建设工作指引的通知 (国科发创[2017]353号, [link](#)); and *13th Five-year Plan for National STI Bases and Infrastructure Capacity Building* (国科发基[2017]322号, [link](#)).

National Engineering Research Centres

Introduced by the *Outline of the National Medium- and Long-term Programme on Science and Technology Development (2006-2020)*, **National Engineering Research Centres** are R&D entities established within universities, research structures, and enterprises to increase China's industrial indigenous innovation and core competitiveness. They aim at overcoming equipment- and machinery-related bottlenecks for industry re-structuring and development, and at providing key technological support to national major strategic tasks and engineering projects. This is done in particular by achieving breakthroughs in industrial core technologies; launching experimental research in key technologies; developing prototypes and key components of major equipment; engineering, commercialising and applying technology results; and fostering engineering technology talents. They thus act as **bridges between research and industry**.

National Engineering Research Centres are under the authority of **NDRC**, and are managed by other ministries (e.g. SASAC for state-owned enterprises), provincial-level development and reform commissions, large backbone SOEs or other specifically-designed corporations.

National Engineering Research Centres are divided into different categories, all undergoing deep reforms and restructuring (footnote no. 93). Among these, one sub-category of national-local joint centres appears more promising for European actors:

1. National-Local Joint Engineering Research Centres (Laboratories)

National-Local Joint Engineering Research Centres (Laboratories) are established jointly by NDRC and local governments within universities, research structures and enterprises administered at the local level, rather than at the central level. Their purpose is to enhance regional innovation capacities and to boost regional economic development and transformation, by conducting market- and industry-oriented engineering research, verification, application and integration of key generic technologies, and R&D of core technologies.

A total of **896 National-Local Joint Engineering Research Centres (Labs)** had been established by December 2017.⁹⁹ Over half of them (58%) are affiliated to enterprises (both State-owned and privately-held), while the remaining are affiliated to universities and research structures (32% and 10% respectively). **Thirty-eight joint centres (5%) were affiliated to foreign-invested enterprises**, and one was **affiliated to the Chinese University of Hong Kong** (Shenzhen campus, [link](#)).

Benefits

- **Funding:** in addition to funding provided by their main responsible bodies, NDRC also provides funding according to the amount requested by the applicant during the application process. Funding is generally granted after the Centre officially enters operations, and does not exceed a maximum of 200 million RMB, mainly provided through: capital investment subsidies; loan discounts; direct investment and/or capital injections.
- **Preferential treatment:** National-Local Joint Engineering Research Centres (Labs) and their teams are also supported by the government when applying to STI projects and funds at all levels

Additionally, other types of support are often granted by NDRC to such facilities, for instance subsidies to joint centres or labs located in western regions.¹⁰⁰

⁹⁹ The last batch of 111 Centres was approved in December 2017 ([link](#)). The full list of all other approved facilities is available at: <http://gjss.ndrc.gov.cn/gjsqz/201707/W020170713363245414219.pdf>

¹⁰⁰ Source: http://www.ndrc.gov.cn/zcfb/zcfbtz/201406/t20140623_615996.html

Selection process

Applications to National-Local Joint Engineering Research Centres (Labs) are submitted by host units (legal entities to which the centres are affiliated) through their main responsible bodies (provincial-level development and reform commissions) to NDRC:

- NDRC publishes application guidelines and requirements on its websites. **Calls are published on a yearly basis**, with the last call published in July 2017 ([link](#); links to previous calls: [2016](#), [2015](#), [2014](#), etc.).
- Provincial development and reform commissions organise and collect applications from universities, research structures and enterprises within their jurisdiction; applicants should submit a detailed roadmap for the establishment of the joint centre (lab), in cooperation with qualified engineering design/consulting institutions entrusted by provincial development and reform commissions;
- Application materials are evaluated by provincial development and reform commissions, and submitted to NDRC;
- NDRC evaluates and approves final lists of winners.

Eligibility requirements

According to the latest call published by NDRC ([link](#)), candidate joint centres/labs should:

- Have been provincial-level engineering research centres/labs for at least one year, and have obtained clear funding and supporting plans from local governments;
- Focus on industries listed in the *Guiding Catalogue of Key Products and Services in Strategic Emerging Industries* ([link](#));
- Possess a staff of at least 50 employees, at least 30 of which being full-time R&D personnel;
- Possess good infrastructure and conditions for conducting research, including an R&D facility with at least 2,000 m² of extension, and R&D equipment with a value over 30 million RMB;
- Possess previous experience in leading or implementing national projects or in formulating industry standards;
- Have established long-term cooperation with at least one National Engineering Research Centre (above), National Enterprise Technology Centre (after this section), or National Technology Innovation Centres (previous section).

More information on the legal framework, benefits and selection procedures of National-Local Joint Engineering Research Centres (Labs) can be found in: ***Implementation Measures for the Establishment of National-Local Joint Innovation Platforms***, [link](#).

National Enterprise Technology Centres

National Enterprise Technology Centre is a status given to certain R&D structures which were established as a response to market competition by enterprises with strong innovation capacities and remarkable technology results. National Enterprise Technology Centres represent role models to the industry, and have the purpose of guiding the enterprise's innovation development, launching R&D of key industry technologies, generating and utilising IPs, and establishing technology standards. Such status guarantees a series of preferential policies and benefits, and is designed to further stimulate enterprises to increase and enhance their R&D and indigenous innovation capacities; it thus recognises the central role that enterprises play in the Chinese innovation ecosystem.

A total of 1,276 National Enterprise Technology Centres and several other branch centres had been established by the end of 2016, both in State-owned and privately-held companies.¹⁰¹ Among these, 123 centres (9%) are affiliated to foreign-invested enterprises, including some belonging (entirely or partially) to large foreign multinational companies such as **Shanghai Mitsubishi Elevator**, **SAIC Volkswagen**, **Pan Asia Technical Automotive Centre** (SAIC – General Motors), **Nantong Fujitsu Microelectronics**, **Whirlpool (China) Co., Ltd**, etc. No annual reports or statistics on the impact of such Centres are published by relevant authorities.

National Enterprise Technology Centres are jointly managed by NDRC, MOST, MOF, the General Administration of Customs (GAC), and the State Administration of Taxation (SAT). Among these, **NDRC** has the leading role in establishing new centres and conducting evaluations. **Provincial-level development and reform commissions** (or other bodies appointed by provincial People's governments) are the **main responsible bodies** for the overall management of National Enterprise Technology Centres – by organising applications from candidate centres within their jurisdiction, and by guiding their operations and management. The centres' planning, construction and daily operations lie in their **host units** (*yituo danwei*), i.e. legal entities to which centres are affiliated and usually located.

Benefits

National Enterprise Technology Centres receive different types of support:

- **Funding:** National Enterprise Technology Centres are supported by NDRC through several **ad hoc funding programmes**, such as the Innovation Capacity-Building Special Programme; and the Strategic Emerging Industries Development Projects.¹⁰²
- **Preferential treatment: particular priority is granted to National Enterprise Technology Centres when applying to local and national STI projects and funds.**
- **Tax deductions / exemptions for imported R&D products:** relevant regulations for the reduction/exemption of custom duties for imports of R&D-related products also apply to National Enterprise Technology Centre. Duty-free R&D imports can be also used by the Centre's subsidiaries located in other areas, as long as they are not separate legal entities.

¹⁰¹ The full list of approved National Enterprise Technology Centres is available [here](#). It should be noted that the *Guiding Opinions on Encouraging Private Investment in Promoting the Manufacturing Power Strategy* published at the end of November 2017 ([link](#)) explicitly call for a more central role of private enterprises in establishing National Enterprise Technology Centres.

¹⁰² The **Innovation Capacity-Building Special Programme** supports National Enterprise Technology Centres to expand their R&D activities by providing subsidies for purchasing relevant R&D equipment ([link](#) to latest call); the **Strategic Emerging Industries Development Projects** supports specific research activities in strategic emerging industries, by providing a research grant usually amounting to 60,000 – 150,000 RMB ([link](#) to latest call in 2017).

Selection process

Applications to National Enterprise Technology Centres are submitted by host units (legal entities to which the centre is affiliated) through their main responsible bodies (provincial-level development and reform commissions, or other bodies appointed by provincial People's governments) to NDRC. The process is summarised as follows:

1. NDRC publishes application guidelines and requirements that applicants must possess on its website. Calls are published on a yearly basis (last call was published in July 2017; links to past calls: [2016](#), [2015](#), [2014](#), etc.)
2. Main responsible bodies organise, collect and review applications from candidates within their jurisdiction, making sure that they meet the eligibility requirements indicated by NDRC in the annual application guidelines;
3. Main responsible bodies select a limited number of candidates to be recommended to NDRC (there are limits on the number of applications that can be recommended by each body);
4. NDRC entrusts third-party agencies to conduct a preliminary evaluation of applications;
5. Based on the preliminary evaluation, NDRC entrusts third-party experts to conduct a final round of evaluation of applications;
6. Based on the evaluation results, NDRC, MOST, MOF, GAC, and SAT decide the final list of winners, also taking into consideration national policies for industrialisation and import-related tax collection. The list of winners is published on NDRC's website.

Note: applications from subsidiaries whose parent companies are already certified as National Enterprise Technology Centres are not accepted, unless the two companies' lines of business are different (in such case the subsidiary can apply as "National Enterprise Technology Centre's Branch Centre"). Applications from parent companies of subsidiaries which are already certified as National Enterprise Technology Centres are recommended by relevant authorities (in such cases, as a consequence, the subsidiary's status will be either removed or changed "National Enterprise Technology Centre's Branch Centre").

Eligibility requirements

Candidates for National Enterprise Technology Centres must meet the following requirements:

- Operate in one of the key fields indicated by NDRC's annual application guidelines (in the last year particular priority was given to candidates focusing on Internet+, digital economy and strategic emerging industries, as well as those based within national mass entrepreneurship and innovation - *shuang chuang* - demonstration bases);
- Possess competitive advantage and high-level innovation capacities in their respective fields;
- Have been operating as provincial-level Enterprise Technology Centres for over two years;
- Annual R&D expenditure should exceed 15 million RMB;
- Have a technologically-advanced and experienced team leader/director; and a research team of at least 150 full-time employees.
- Possess good infrastructure and conditions for conducting research, with the value of R&D equipment exceeding 20 million RMB;
- Possess no negative records in the past three years with respect to customs, trade, taxation, judiciary or other administrative issues.

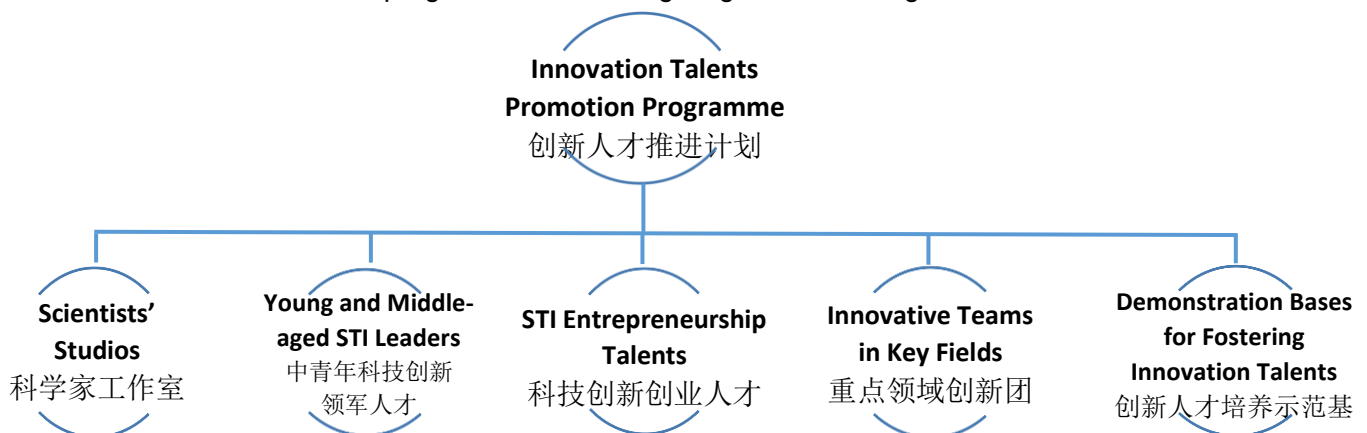
More information on the legal framework, benefits and selection procedures of National Enterprise Technology Centres can be found on: ***Measures for the Management of National Enterprise Technology Centres*** ([link](#)); and ***(Interim) Guidelines for the Evaluation Work of National Enterprise Technology Centres*** ([link](#)).

Innovation Talents Promotion Programme

Created in 2012 to contribute to the implementation of the *National Mid- and Long-term Talents Development Plan (2010-2020)*, the **Innovation Talents Promotion Programme** is one of China's foremost programmes for scientific talents and innovation teams. Through government funding and preferential policies, as well as safeguarding measures, it aims to nurture world-class scientists, top-notch technology and engineering leaders, outstanding innovative teams and entrepreneurs, as well as to establish demonstration bases for the cultivation of new talents.

Under the general guidance of the **Organisational Department of the Central Committee of the Communist Party of China**, **MOST** is the highest authority of the Programme. Ministries/agencies under the State Council (e.g. MOE; CAS; NSFC; etc.), S&T commissions and departments of local governments, industry associations or federations, and in some cases national high-tech zones (HNTZs), are the **main responsible** and **endorsement bodies** of applicants. Together with **host units** (institutions to which talents are affiliated), they will support financially all selected talents and teams.

The Innovation Talents Promotion Programme is the **only programme under the fifth funding pillar to explicitly target talents**. The programme is very active, with applications published on a yearly basis. Similarly to State Key Laboratories, the Innovation Talents Promotion Programme too is divided into several sub-programmes, each targeting different categories of talents or teams.



In the following sections, only the second and the third categories will be introduced.¹⁰³ All relevant information is extracted from the Innovation Talents Promotion Programme's legal framework – the ***Implementation Scheme of the Innovation Talents Promotion Programme***.¹⁰⁴

It should also be noted that the Innovation Talents Promotion Programme does not include the “**Thousand Talents Plan**”, which is explicitly directed to attract overseas Chinese and international scientists, and the “**Ten Thousand Talents Plan**”, which is directed to support top-tier Chinese-

¹⁰³ **Scientists' Studios** are not relevant to EU actors, as they target winners of the “Ten Thousand Talents Plan”, category of “Exceptional Talent”: i.e. the highest award that can be granted in China. As of November 2017, only six scientists have been recognised as such, meaning that only six Scientists' Studios have been established so far (full list in Chinese [here](#)). Although a total of 100 Scientists' Studios are planned to be selected by 2020, the pool of potentially eligible candidates remains extremely limited. No instances of EU actors were identified among the **Innovative Teams in key Fields**, which are oriented to support R&D teams already implementing STI programmes. The **Demonstration Bases for Fostering Innovative Talents** category is designed to establish, in universities, research structures, enterprises, and S&T parks, a series of special zones for implementing pilot institutional reforms and management mechanisms benefitting talents. Full list of the 156 established bases can be found on government websites ([2012](#); [2013](#); [2014](#); [2015](#); [2016](#)). No foreign-invested entities are present among the list.

¹⁰⁴ In Chinese: 创新人才推进计划实施方案（国科发政[2011]538号）：
<http://www.most.gov.cn/kjzc/gjkjzc/kjrc/201308/P020130823578459063528.pdf>

national scientists which are seen as potential Nobel laureates: these two programmes are entirely managed and selected by the Organisational Department of the Central Committee of the Communist Party of China.¹⁰⁵

1. Young- and Middle-aged STI Leaders

The **Young and Middle-aged STI Leaders** category supports a batch of young and middle-aged scientific talents, by cultivating their capacities to complete major scientific tasks, ultimately fostering them to lead and become shapers of the scientific development of their respective industries and fields. The category primarily targets emerging areas and frontiers of international science.

As of August 2017, a total of 1,395 Young and Middle-aged STI Leaders had been selected.¹⁰⁶ The majority (57%) are affiliated to universities; one-third are affiliated to research structures; one-tenth are affiliated to enterprises (both state-owned and privately-held). A very small part (12, representing less than 1% of the total) is affiliated to international research structures and foreign-invested enterprises. **All selected Leaders are Chinese nationals**.¹⁰⁷ A total of 3,000 Young and Middle-aged STI Leaders will be selected by 2020.

Benefits

There benefits derived from being recognised as Young- and Middle-aged STI Leaders are:

- **Funding:** central government guarantees financial support to selected Leaders through special funds. It is unclear however what the funding scale as well as the procedures are
- **Preferential treatment:** similarly to State Key Laboratories, **particular priority is granted to:** (i) Leaders currently implementing local or national STI projects, in obtaining other forms of support; (ii) Leaders currently not implementing any STI projects, in applying to local and national STI programmes; and (iii) Leaders' host units (institutions to which Leaders are affiliated) in applying to be recognised as State Key Laboratory or Engineering Centres

Selection process

Applications to Young and Middle-aged STI Leaders are submitted by the candidates' **host units**, under **recommendation of their main responsible bodies** (State Council's agencies/ministries; local S&T commissions and departments; industry associations; national high-tech zones or S&T parks; and by Demonstration Bases for Fostering Innovation Talents):

1. MOST publishes application guidelines on its website, indicating the requirements that applicants must possess. Applications are published every year ([link](#) to most recent call)
2. Candidates must receive the endorsement of their responsible bodies. In most cases, each responsible body also publishes application guidelines for the selection of candidates within their jurisdiction to be endorsed to MOST ([link](#) to an example). After the endorsement is obtained, applications to MOST are submitted by the candidates' host units through the National S&T Program Application Centre ¹⁰⁸
3. Applicants are evaluated through video interview with specifically-appointed experts, usually by the end of the year in which applications were submitted ([link](#) to an example)

¹⁰⁵ The Thousands Talents Plan has an official website: <http://www.1000plan.org/>. The latest call for 2017 applications can be found at: <http://www.1000plan.org/qjrh/article/70027>

¹⁰⁶ Full lists of selected Leaders can be found on MOST's website: ([2012](#); [2013](#); [2014](#); [2015](#); [2016](#)).

¹⁰⁷ One example is one researcher from the **Institut Pasteur of Shanghai**, Chinese Academy of Sciences. More information on international participation will be provided at the end of this section.

¹⁰⁸ In Chinese: 国家科技计划申报中心 ([link](#)). This is the predecessor of the National Science and Technology Information System, Public Service Platform, commonly referred to as "National S&T Service Platform", [link](#))

4. A shortlist of preliminary-selected candidates is published online for public comments ([link to an example](#))
5. After public comments are received, the final list of selected Leaders is published ([link to an example](#)). The entire process takes around one year

Eligibility requirements

Candidates to the Young and Middle-aged STI Leaders category must meet the following requirements:

- The applicant's research focus should be in line with scientific frontier developments, or belong to strategic emerging industries
- The applicants should be less than 45 years old, and should possess PhD title or hold vice senior job title (the job title requirement is not required for talents working in enterprises, and the academic degree might be loosened)
- Previous experience in leading major national or local-level STI projects
- Has generated high-level innovative research results, possess excellent performance results in his/her field, and is mainly devoted to scientific R&D activities
- Applicants attracted from overseas must have already returned to China for at least two years before the application, and should guarantee that they will remain working in the country for the next five years, for at least nine months per year

In addition, applicants must also meet a few other general requirements that apply to all the categories of the Innovation Talents Promotion Programme:

- Applicants which have already been selected by other categories of the Innovation Talents Promotion Programme are not eligible
- Applicants which have failed two times consecutively are not eligible
- Winners of the "Thousands Talents Plan" and "Ten Thousands Talents Plan" are not eligible
- Applicants' research activities should be in line with and fulfil the country's/region's needs
- The applicants' host units must guarantee the necessary supporting conditions to applicants
- Preference is given to candidates leading major national STI projects, or affiliated to major national bases such as State Key Labs or various Engineering Centres

As will be shown later, the Young- and Middle-aged STI Leaders offer **very good opportunities for European actors**. An average of around 300 Leaders per year are expected to be selected before 2020.

2. STI Entrepreneurship Talents

The **STI Entrepreneurship Talents** category is designed to support entrepreneurs founding S&T-based enterprises which mainly rely on independent IP or core technologies. Such Talents are considered to be major promoters of technology transfer and commercialisation, and play a significant role in forging a national innovation ecosystem where enterprises are the main actors.

As of August 2017, a total of 936 STI Entrepreneurship Talents have been selected, all of them being Chinese nationals.¹⁰⁹ Thirty-seven (4%) of selected entrepreneurs are affiliated to Sino-foreign joint ventures or start-ups.¹¹⁰ A total of 1,000 STI Entrepreneurship Talents will be selected by 2020.

¹⁰⁹ Full lists of selected entrepreneurs can be found on government websites: ([2012](#); [2013](#); [2014](#); [2015](#); [2016](#)).

¹¹⁰ One example is one Mr. Zhu Pengcheng, founder and chairman of **Eques Technology Co., Ltd**, a high-tech enterprise in smart home security hardware and software solutions, which is invested by Qualcomm.

Benefits

Same as the Young- and Middle-aged STI Leaders, see p. 116.

Selection process

Same as the Young and Middle-aged STI Leaders. Application guidelines are published on a yearly basis together with those for the other categories under the Innovation Talents Promotion Programme. See p. 116.

Eligibility requirements

Candidates to the STI Entrepreneurship Talents category must meet the following requirements:

- The applicant should be the main founder and current controller of the enterprise (first largest shareholder or legal representative);
- The enterprise should have been registered in mainland China for at least two years, with strong management practices, performance, growth potential, and innovation capabilities;
- The enterprise should possess core technologies and indigenous IP, at least one invention patent in its main business area, characteristic products or innovative business models, and an overall advanced technology level;
- Enterprises with over 5 years of age should have generated at least 5 million RMB of profit in the past two years (cumulative).

The *Implementation Scheme of the Innovation Talents Promotion Programme* – the legal framework of the Innovation Talents Promotion Programme – and past calls until 2015 ([link](#)) also mentioned that particular priority is given to applicants from enterprises which have received funds from the Technology Innovation Guidance Fund – the fourth pillar of the funding system. This priority was however removed from the most recent calls in 2016 and 2017, but it is expected that these still represent strong assets that will be taken into consideration during the evaluation of applications.

In addition, candidates should also meet the general requirements that apply to all the categories of the Innovation Talents Promotion Programme (see p. 117).

International participation: figures, challenges, and opportunities

China-based affiliated of EU entities which are well-renowned and appreciated for their achievements and contributions to the Chinese innovation ecosystem, are **well-positioned to become beneficiaries of these programmes under the fifth pillar**.¹¹¹

In fact, positive evidence was identified, as summarised in the table below.

The underlying assumption is that those programmes with evidence of international participation are considered to afford a certain degree of reciprocity. Most of these programmes are also undergoing a structural re-organisation and optimisation, which might in turn **result in increased opportunities for international participation**.

Additionally, although some programmes specifically target Chinese-national scientists or teams rather than foreign ones, EU entities can benefit from these by supporting their Chinese staff to apply to these.

¹¹¹ Other programmes not introduced here exclude international actors, as they target a very limited pool of needs and requirements which are *naturally* impossible to be met by them, e.g. the strengthening of the “One Country, Two Systems” for Hong Kong and Macau Partner State Key Labs; third-grade class A hospitals for National Clinical Research Centres, etc. This therefore is not considered to be as a result of non-reciprocity.

Summary of international participation under the fifth funding pillar						
Programme	Category	Target	Time and frequency of applications	Total granted	Internat'l actors	Examples
State (Key) Laboratories	University-Research State Key Labs	Universities; research structures	Last call in 2010. New calls expected during the 13 th Five-year period	255	0	N/A
	Enterprise State Key Labs	Enterprises	Last call in 2014. New calls expected during the 13 th Five-year period	177	5% (9)	<ul style="list-style-type: none"> ▪ Yangze Optical Fibre and Cable, a Sino-foreign JV with the formerly Dutch Draka Comteq B.V. The lab focuses on fabrication technologies of optical fibre and cable; <i>The majority are enterprises invested by funds or investors based in Hong Kong or Cayman Islands</i>
National Technology Innovation Centres		Enterprises; universities; research structures	First round of applications expected in the 2018	0	0%	<i>The predecessor of National Technology Innovation Centres – National Engineering Technology Research Centres – explicitly encouraged (i) foreign researchers in participating in the Centres' R&D activities; and (ii) foreign institutes jointly establishing such facilities with domestic institutions</i>
National Engineering Centres (Labs)	National Engineering Research Centres	Enterprises; universities; research structures	To be adjusted and re-organised. New calls expected	100	0	N/A
	National-Local Joint Engineering Research Centres (Laboratories)		Calls for applications published every year. No structural changes foreseen in the short-medium term	785	5% (39)	<ul style="list-style-type: none"> ▪ Chinese University of Hong Kong (Shenzhen campus); ▪ BP SunOasis (Prime) Co., Ltd., a JV between the energy giant BP and Xinjiang SolarOasis manufacturing solar components; ▪ Asymchem Laboratories (Tianjin) Co., Ltd, a global outsourcing company founded in North Carolina by an ethnic Chinese foreign national, providing integrated services in chemistry and medical areas; ▪ Atech Automotive (Wuhu) Co., Ltd, a joint venture between Rui Chang (75%) and Australia Atech Automobile (25%).
National Enterprise Technology Centres		Enterprises	Calls for applications published every year between May and July. No structural changes foreseen in the short-medium term	1,276	10% (123)	<ul style="list-style-type: none"> ▪ SAIC Volkswagen; ▪ Pan Asia Technical Automotive Center (SAIC – GM); ▪ Shanghai Mitsubishi Elevator; Shanghai Hitachi Electrical Appliances Co., Ltd.; Nantong Fujitsu Microelectronics; ▪ Whirlpool (China) Co., Ltd; ▪ Shanghai Jianshe Luqiao Jixie Shebei, a JV 80% controlled by the Swedish Sandvik; ▪ Casco Signal, a JV between the French Alstom (49%) and the SoE China Railway Signal & Communication Corp. (51%);

Summary of international participation under the fifth funding pillar						
Programme	Category	Target	Time and frequency of applications	Total granted	Internat'l actors	Examples
Innovation Talents Promotion Programme	Young and Middle-aged STI Leaders	Young and middle-aged scientists working in enterprises; universities; and research structures	Calls for applications published every year. Last call in December 2017.	1,395	1% (12)	<ul style="list-style-type: none"> Dr. Lan Ke, deputy director of Institut Pasteur of Shanghai, Chinese Academy of Sciences; Dr. Zhang Haiyang, from the Semiconductor Manufacturing International Corporation, a JV with Huawei Technologies, Imec and Qualcomm; Dr. Li Zhan, from C&O (Changao) Pharmaceutical Technology, a pharmaceutical R&D and manufacturer, subsidiary of the <u>Japanese Shionogi & Co., Ltd</u> and invested by the Hong Kong Bright Future Pharmaceutical Labs.
	STI Entrepreneurship Talents	STI entrepreneurs		936	4% (37)	<ul style="list-style-type: none"> Mr. Zhu Pengcheng, founder and chairman of Eques Technology, a high-tech enterprise in smarthome security hardware and software solutions, also invested by Qualcomm; Mr. Wang Yangbin, executive director of Vobile Inc, a US-based provider of AV content protection, measurement and monetization services.

According to these figures, the programmes which currently appear to present **more opportunities to EU actors** are:

- National Enterprise Technology Centres
- National-Local Joint Engineering Research Centres
- Enterprise State Key Laboratories

In particular, **National Enterprise Technology Centres** are the most attractive in terms of accessibility to EU actors, with 10% of such facilities belonging to foreign-invested enterprises, and with calls for applications published regularly on a yearly-basis. More importantly, many of the centres already established belong to large foreign multinational companies, in some cases also wholly or largely foreign-owned (e.g. **Shanghai Jianshe Luqiao Jixie Shebei Co., Ltd**, which is 80% controlled by the **Swedish Sandvik Group**). This is not the case with other programmes under the fifth pillar, where the absolute majority of cases of international participation are generally limited to small private equity investments in Chinese-controlled JVs, or to subsidiaries of groups based in Hong Kong or in fiscally-attractive areas such as the Cayman or British Virgin Islands.

Additionally, **European entities will largely benefit if their Chinese employees are awarded national-level talent programmes**, and should therefore actively support their application to such programmes: on the one hand, as host units of awarded talents, they will be supported in applying to national-level STI programmes (see benefits at p. 116) or to State Key Laboratories; on the other, they will also benefit in terms of image and prestige. They can also fully use such cases to demonstrate to authorities their commitment to foster national talents and contributing to the country's strategy of turning into a "Talents Superpower" (*rencai qianguo*).

In terms of what kind of **opportunities** exist for EU actors, these generally are:

- **Independent applications:**

EU entities can **apply independently** to any of the these programmes, as long as they meet the eligibility requirements indicated by the authorities (for the majority of programmes these include the prior government recognition of a centre/lab at lower levels, generally ministerial or provincial. The fulfilment of this condition must precede any efforts towards national-level programmes).

Although competition from domestic actors might be fierce, the examples provided in the right column of the table in the previous pages show some instances of success.

- **Joint applications with other partners:**

Large parts of the programmes under the fifth pillar also allow **applications to be submitted jointly with other partners**. This is particularly encouraged in University-Research State Key Labs, where several highly-specialised labs have been established as a cooperation among universities, the Chinese Academy of Sciences, or other research structures; and in Enterprise State Key Labs, where a series of labs have been established as a cooperation between two or more enterprises, or between one enterprise and one research structure.

It is believed that this form of cooperation might present the **highest possibilities of success**: firstly, concerns potentially arising from the presence of an international actor in the application will be counterbalanced by the presence of the domestic partner; more importantly, diversified resources, cross-discipline teams, and industry-university-research cooperation have been strongly encouraged and supported by Chinese authorities in recent years, as the main direction of S&T development.

- **Cooperation with already-established centres/labs**

Regardless of the interest that one EU actor has in applying to any programmes under the fifth pillar, already-established national labs or centres represent very interesting targets for anyone looking for **research partners in China**. This is mainly because such facilities gather the country's top-notch research and innovation teams in their respective fields, feature technologically-advanced equipment, and are backed by stable government support and funding. Their high level of specialisation and strong research capacities can be attractive for joint projects.

This form of cooperation will also **increase the EU actor's prestige** among the country's research community, resulting in **higher credit** and **trust** which might in turn benefit its relationship and interactions with government authorities – especially when applying to any government-funded projects. For instance, after years of fruitful cooperation, the Central South University's Xiangya No. 2 Hospital and Yale University are currently implementing a 2.35 million RMB project funded by the Natural Science Fund.¹¹² In the case of National-Local Joint Engineering Research Centres (Laboratories), such cooperation becomes a necessary requirement that applicants must possess before submitting an application.

Cooperation with such facilities therefore might be seen as a good initial “investment” from which starting one's journey to government funding in China.

¹¹² The Xiangya No. 2 Hospital is a National Clinical Research Centre (on metabolic diseases) approved by the central government (international actors cannot apply to this category of bases as the requirement is to be a third-grade class A hospital). The project was approved in 2015 (grant no. 81520108008), and is titled “*KLF3/5 Signal Channel-ncRNA Network Regulation in the formation of osteogenic blood vessels and its functional properties in aging and bone-loss*”.

Recommendations for EU stakeholders

As applications to any of the programmes under the fifth pillar are generally submitted through local “main responsible bodies” – i.e. ministries/agencies under the State Council, provincial S&T departments or development and reform commissions, large backbone SOEs, etc, which have jurisdiction over the applicant – the key lies in **establishing and cultivating a close and positive relationship with them, by showing serious commitment to regional strategies and needs.**

Depending on one’s involvement in the Chinese innovation ecosystem, a potential strategy that EU actors can adopt can start from one or more of the following points:

1. Identification of the most appropriate programme under the fifth pillar: each programme has its own features, needs and requirements – as well as benefits. A good idea is to start from those programmes which present higher rates of international participation, as shown in the chart on the previous pages. The same programmes at lower government levels will likely present higher rates of international participation; those with low (or zero) rate of international participation do not *necessarily* exclude international actors, but indeed might be harder to access.
2. Cooperation with facilities already established within the programme: as shown above (previous page), this form of cooperation will increase one’s credit and image among the local scientific community and authorities. Joint R&D activities, talents exchange and mobility programmes, joint demonstration and commercialisation of key scientific results, joint development of S&T service platforms etc, will show one’s commitment to fulfilling regional and national targets and growth. In some cases, such cooperation might also be an explicit requirement that applicants must possess in order to become eligible for application.
3. Application to talents programme: at the same time, significant efforts should be put in pushing the application of one’s senior scientists to relevant national programmes. **This is a key step** as an increasingly higher number of government R&D projects are being granted to such experts; it also shows real commitment to the country’s strategy of fostering top-notch talents and teams (*rencai qiangguo*). This should be done **simultaneously for Chinese scientists and foreign scientists** (there is no limit on the number of scientists from the same institution that can obtain these statuses), and should target programmes at different government levels (local-level programmes might be easier to access at first), with the ultimate aim of obtaining the national-level “10,000 Talents Plan” for Chinese scientists, and the national-level “1000 Talent Plan” for foreign scientists. The higher the number of awarded-talents in one’s team, the higher the chances to obtain important R&D tasks under other local or national projects.
4. Joint applications with local partners: after a certain level of commitment to regional or national strategies is shown, European actors can consider submitting an application with one of their local partners. As shown in the previous page, this is considered to present higher possibilities of success; many of the currently-established bases under the fifth pillar are, in fact, a result of joint applications between different actors.
5. Individual applications: individual applications are more likely to succeed if one or more of the above points was successfully concluded by the European actor. If not explicitly required, applicants are better positioned to start at the provincial- or ministerial-level before trying to apply to the national-level. Applications can also be simultaneously submitted for different programmes, and at different levels (in fact, many cases of actors possessing two or more of the programmes under the fifth pillar have been identified).

Annexes

The following annexes are included in this section:

- Annex 6.1 – *Plan for the Optimisation and Integration of National STI Bases*

Annex 6.1 – Plan for the Optimisation and Integration of National STI Bases

The **original structure of the fifth funding pillar**, as outlined by the State Council's 2014 reform of the Chinese national STI funding system, was different compared to that included in this study.

The programmes forming the original structure of the fifth pillar had been established at different stages throughout the past three decades, in response to the country's development priorities and needs, as well as to increasingly evolving and diversified national and international innovation trends. The first of such programmes – the University-Research State Key Laboratories – was initiated in 1984.

The continuous creation of new programmes however had not been accompanied by an adjustment of those that had been previously established. Shared jurisdiction in science and technology development among different government bodies, mainly MOST and NDRC, had also led to the creation of **parallel programmes** with non-clear and not well-defined distinctions of tasks and objectives.

The inevitable consequence was a disconnected network of bases with **overlapping competences** and **similar functions**, managed relatively independently and in an uncoordinated way by different government bodies, and resulting in an inefficient allocation of central resources.

In order to overcome such organisational inefficiencies, at the end of August 2017 MOST, MOF and NDRC jointly released the [*Plan for the Optimisation and Integration of National Science, Technology and Innovation Bases*](#) (国科发基〔2017〕250号), hereinafter referred to as “the *Plan*”.

The Plan outlines a **top-down structural re-organisation** of national STI bases. Its aim is to create, by 2020, a more integrated, rationally-distributed and optimised network of bases, each with distinct positioning and clear definition of tasks and objectives. Differentiated management models according to the bases' specific characteristics, and performance-based dynamic adjustment mechanisms would also be established.

Specifically, the new optimised network will be based on three new categories of national STI bases:

- **National STI bases focusing on scientific and engineering research**, targeting major frontier science, mega scientific tasks and large science projects, in line with the country's strategic objectives and aiming to reach global-level competitiveness;
- **National STI bases focusing on technology innovation, transfer and commercialisation**, targeting the country's socio-economic development needs, social governance, and national security. They promote technology transfer and commercialisation by conducting research on generic key technologies and engineering technologies;
- **National STI bases focusing on supporting infrastructures and conditions for research**, providing free, open-source data, information and resources for scientific research.

This new categorisation of national bases will be applied starting from the second half of 2017. Currently-existing national STI bases will be re-organised, merged and integrated within the three new categories, based on an extensive evaluation of their roles and performance.

Specifically, the **first** of the three new categories of national STI bases, focusing on scientific and engineering research, will receive stable central funding and will include:

- Newly-created **National Laboratories**, i.e. leading and irreplaceable large-scale comprehensive research bases representing China's top-notch STI capacities, and providing

core support to national interests. These will be established “only after the necessary conditions are mature”;

- Already-existing **State Key Laboratories**, which will be re-organised and adjusted as follows:
 - New National Research Centres will be established on the basis of currently-existing Pilot National Laboratories and research clusters;
 - Currently-existing University-Research State Key Labs and Enterprise State Key Labs will be evaluated, re-organised and adjusted. New labs focusing on frontier, emerging and cross-disciplinary research will be established;
 - Provincial-Ministerial Joint State Key Labs, Military-Civil State Key Labs, and Hong Kong and Macau Partner State Key Labs will be re-organised for a more coordinated development.

The **second** of the three new categories, focusing on technology innovation, transfer and commercialisation, will give full play to market forces and will receive government funding depending on the completion of project deliverables and objectives. This category will include:

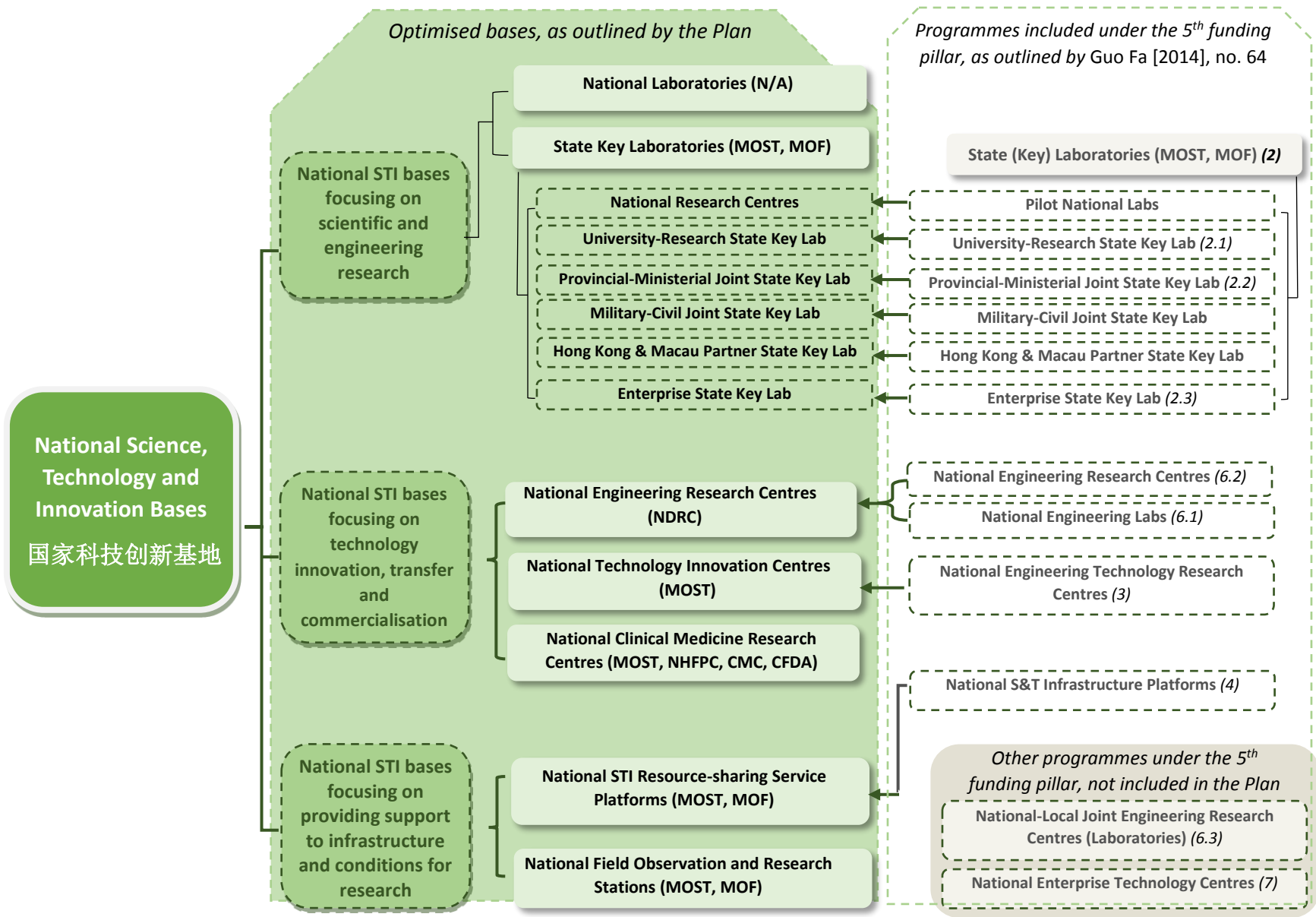
- Already-existing **National Engineering Research Centres**, which will be reformed as a result of their merging with currently-existing National Engineering Labs – which will in turn cease to exist. Their focus will be on realising breakthroughs in key technologies, producing core machinery, and conducting engineering verifications of research results within mega strategic tasks and key engineering projects;
- Newly-created **National Technology Innovation Centres**, which will focus on R&D of key generic technologies and products, as well as the application, demonstration and commercialisation of results in key industries. They will incorporate the already-existing National Engineering Technology Research Centres – which will in turn cease to exist;
- Already-existing **National Clinical Medicine Research Centres**, which will continue to be established within medical structures to conduct research on large-scale evidence-based medicine, translational medicine, prevention and control strategies, as well as transfer and popularisation of key medical research results (these stations are not part of the fifth pillar as outlined by *Guo Fa [2014], no. 64*).

The **third** of the new categories, focusing on infrastructures and conditions for scientific research, will receive stable central funding and will include:

- Newly-created **National STI Research-sharing Service Platforms**, which will be established within research structures and universities to provide extensive scientific data and resources to the scientific community, especially on biological species and human genetics. These new Platforms will incorporate the already-existing National S&T Infrastructure Platforms;
- Already-existing **National Field Observation and Research Stations**, which will be re-organised to provide more effective support to researchers in obtaining long-term field data in the areas of ecology, geosciences, agronomy, environmental sciences and materials sciences (these stations are not part of the fifth pillar as outlined by *Guo Fa [2014], no. 64*).

The new distributional layout outlined by the *Plan* is summarised in the following scheme:

**Comparison of the structure of the fifth funding pillar –
before and after the publication of the Plan for the Optimisation and Integration of National STI Bases**



The Plan therefore will have important implications on the funding pillar. The Plan's preamble explicitly specifies that it was formulated in order to further implement the overall blueprint outlined by the reform of the national STI funding system (*Guo Fa 2014, no. 64*); and by the fact that the Plan's very last paragraph specifies that, in 2018, "national STI bases will operate according to the re-organised and optimised Bases and Talents Programme".

This seems to suggest that the re-organisation work of national STI bases de facto corresponds to a re-organisation of the fifth pillar.

Nonetheless, a few important differences remain:

- **Not all the bases included in the Plan are part of the structure of the fifth funding pillar outlined by *Guo Fa [2014], no. 64*:** this is the case of National Laboratories, and National Field Observation and Research Stations;
- **Not all the bases under the fifth funding pillar (as outlined by *Guo Fa [2014], no. 64*) are mentioned by the Plan:** this is the case of the National-Local Joint Engineering Research Centres (Laboratories) and the National Enterprise Technology Centres. It is unclear therefore whether similar re-organisation is also planned for these two, and more in general what will their future developments be;
- **The fifth funding pillar also focuses on talents – which are not a direct focus of the Plan:** the Innovative Talents Promotion Programme is the only programme under the fifth pillar focusing exclusively on supporting individual talents or teams. Because of its focus on talents rather than bases, it was not included in the Plan and thus no substantial changes are foreseen in the future.

In conclusion, it can be said that the current structure of the fifth pillar is still uncertain. Although the re-organisation and optimisation of the national STI bases system is grounded on the broader reform of the national STI funding system (*Guo Fa 2014, no. 64*), the Plan does not specify that 'national STI bases' refer to the those of the 'Bases' and Talents Programme. It is therefore unclear whether the structure of the fifth pillar should be expanded to include new bases mentioned by the Plan (and removing those not mentioned).

What is certain is that the *Plan for the Optimisation and Integration of National Science, Technology and Innovation Bases* will have a high impact at least on large part of the fifth funding pillar of the post-reform national STI funding system. Any actors interested in applying to any of these programmes therefore will have to closely follow the developments and implementation status of the Plan.

Conclusions

Within the broader context of structural reforms across all areas of the economy and society, China has initiated and is currently undergoing an ambitious reform of its national funding system for science, technology and innovation (STI) as well as its institutional setup. The reform, combined with an increasing national budget allocated for Research and Development (R&D) – around 200 billion EUR in 2016 – aims to fully unleash China’s innovation-driven development strategy.

The five newly-emerged funding pillars offer numerous opportunities for participation to:

- China-based affiliates of European universities, research structures, or multinational companies
- EU-China joint universities, research structures or ventures
- European scientists and innovators working in European or Chinese institutions in China

Not all the programmes under these five main funding pillars are however equally open and accessible for the above actors. This Guide has introduced in detail those specific funding programmes which offer more concrete opportunities for participation, as a result of a measurement of the relationship between *de jure* requirements for participation, and the *de facto* situation. This was grounded on 18 months of daily collection and analysis of quantitative data, and supplemented by several dozen interviews and consultations with Chinese and European business executives, innovation directors, top scientists and researchers from universities and labs, as well as government representatives.

At the same time, throughout the project it has become extremely clear that all these funding programmes are closely linked to each other. In most cases, priority is explicitly granted to actors which have already been awarded R&D funding grants; in other words, access to one programme will consequently open the doors to other, often larger, programmes. This is the direct result of the new institutional structure adopted after the reform of the national funding system. A good strategy therefore is to identify and dedicate one’s time and resources to the most easily accessible programme, and gradually proceed from there to the top according to a well-planned long-term strategy. The Chinese idiom of “proceeding in an orderly way and step by step” (*xun xu jian jin*) perfectly embeds this strategy.

During this process, a few key recommendations should be kept in mind:

Top-down design serving national needs

Chinese market access in general, and access to funding in particular, typically follow strategic industrial policy goals. In many programmes (such as NSFC’s Key Programmes or Major Research Plan; or Mega Projects) and individual calls for applications this is an explicit condition that any proposals should meet. Intellectual property (IP) is also generally meant to serve national goals, as outlined by the country’s recent IP strategy documents.

Strong familiarity with Chinese development targets and needs in one field, as well as with the main actors on which the development is centred (e.g. enterprise-led industry-university-research cooperation; cross-disciplinary research rather than explorative research, etc.), is therefore required to formulate more effective proposals. The inclusion of ambitious IP-related deliverables specifically designed to meet these needs will also be weighted more heavily in the evaluation process.

Still reliance on “hardware” rather than “software”

Chinese decision-makers in many cases still tend to see industrial upgrading and technological transformation as a relatively technical task of developing and installing advanced equipment, products, facilities, and infrastructures for innovation, rather than innovation of operation and management processes. Moreover, evaluation experts need to know that a team behind a research proposal has good working foundations: laboratory space and equipment, funding obtained from other sources (e.g.

university; local governments; partner enterprises); location and logistics, etc. At the end of each project, a concrete product or equipment is expected to have been developed or commercialised.

Although very recently gradual recognition has also started to be granted to “software”, the development of “hardware” conditions for research can hardly be neglected in any research proposals. Highlight how solid a foundation one’s team has laid down for the proposed research. Include specific deliverables related to R&D, application or commercialisation of equipment and products in the research proposals (e.g. percentage of market share expected to have been reached by a newly-introduced product)

Proactivity and deeper integration with the Chinese innovation ecosystem

While many international actors, especially from industry, often complain about the several constraints and restrictions they face in terms of access to Chinese funding programmes, on many occasions the same international actors themselves do not appear to be truly and fully committed to the Chinese innovation ecosystem. This is a key issue to which Chinese decision-makers attach huge importance. As was noted during one interview with a director of R&D of a large European multinational company: *“you cannot just complain, you will not get funding “for free”: you have to do your own “homework”; only after you have shown your real efforts and intentions to the government, you will be able to do something together”*. This aspect will become even more important in the following years, especially in view of the strong efforts being put into creating a credit rating system where enterprises and individuals are ranked according to a score that they can gain or lose according to their actions.

More proactive contributions to local and national development needs, larger investments in establishing research partnerships with local actors, more sustained efforts in fostering talents and teams through exchange and mobility schemes, including work stations or scholarships in the company’s headquarters in Europe, as well as more systematic commercialisation of technologies and results, are only a few of the several measures that can be adopted to increase one’s “credit” and trust among local actors and decision-makers, ultimately resulting in higher chances of obtaining funding. Cooperation on joint projects with relevant actors already very active in the five funding pillars is also recommended, especially the bases under the fifth funding pillar – the Bases and Talents Programme.

Dialogue with local and national authorities, get yourself known

Lower success rate of European applicants, especially from industry, might be partly due to misconceptions and misunderstanding surrounding the concept of ‘multinational company’ that exist among numerous Chinese decision-makers and evaluators. In many cases, these have never worked in international environments but rather in large state-owned corporations or government institutions.

As part of the efforts to become more effectively embedded in the local innovation ecosystem (previous point), European actors should therefore increase their dialogue with authorities on the role and contributions that they play in promoting technological development, fostering talents and teams with international competitiveness, and in enhancing regional or national overall innovation capabilities. This could be done by inviting them to visit the company R&D facilities both in China and in Europe, taking part in seminars and competitions, actively providing feedback when calls for comments are published, etc.

Acknowledge China

China is putting forth incredible efforts in order to enhance its global image as a major innovative country. This is reflected in the increasingly higher number of foreign scientists and PIs who are assigned funding projects in China, as well as in the encouragement to publish papers in renowned international journals, or to file patents in developed countries.

For this reason, one should make sure that any patents filed, or publications published in international journals (better if those are included in the Science Citation Index) as part of or as a result of the project

clearly include an acknowledgement to China and to the funding programme through which these were generated. As was repeatedly stressed by various experts throughout the project, this will be highly-appreciated when submitting applications to future projects in China; failure to do so, on the contrary, might negatively affect one's successful application.

Hire legal/government affairs personnel or services

Not everyone is up to date with the latest changes in regulations affecting Chinese funding programmes, or with the increasingly wider range of funding and incentives of all types that can be obtained from administrations at all levels. This is particularly the case for start-ups or for small research laboratories. In addition, it has been found that even large MNCs do not allocate sufficient resources to monitoring of or preparing applications to funding programmes, especially when compared to Europe where large ad hoc teams are usually established for this purpose. Therefore recruiting relevant personnel becomes crucial in identifying and obtaining the most appropriate funding.

It is also noteworthy that there exists several Chinese consulting agencies offering similar services. Thanks to their deep knowledge in the field, their experience in formulating effective proposals, and – most importantly – their extensive network of contacts, these consulting firms are able to identify areas or programmes where applications are more likely to succeed. Quite a few European enterprises are currently using this scheme.

Resilience

Like elsewhere in the world, applying to Chinese funding is a complex process that takes time, energy, and resources. In the case of European researchers, the difficulties are exponentially amplified by the language and cultural barriers. One should always strive to learn from both international and Chinese colleagues, and read extensively not only about new progress in one's own field but also about successful and rejected application cases. This is particularly true for larger grants such as National Key R&D Programmes, or even Mega Projects.

Only after enough experience has been accumulated can one start to compete with other institutions which have been writing proposals for decades. It takes time – and some rejected proposals – to learn how to write a good proposal in the context of Chinese needs and values. At the same time, one should avoid submitting applications just for the sake of getting funding: there is a certain amount of risk associated (e.g. failure to deliver the project and consequent negative rating; costs exceeding the budget, etc); proposals should be submitted only for projects which would have been in any case implemented by the applicant (with some adjustments/modifications to match the tender guidelines).