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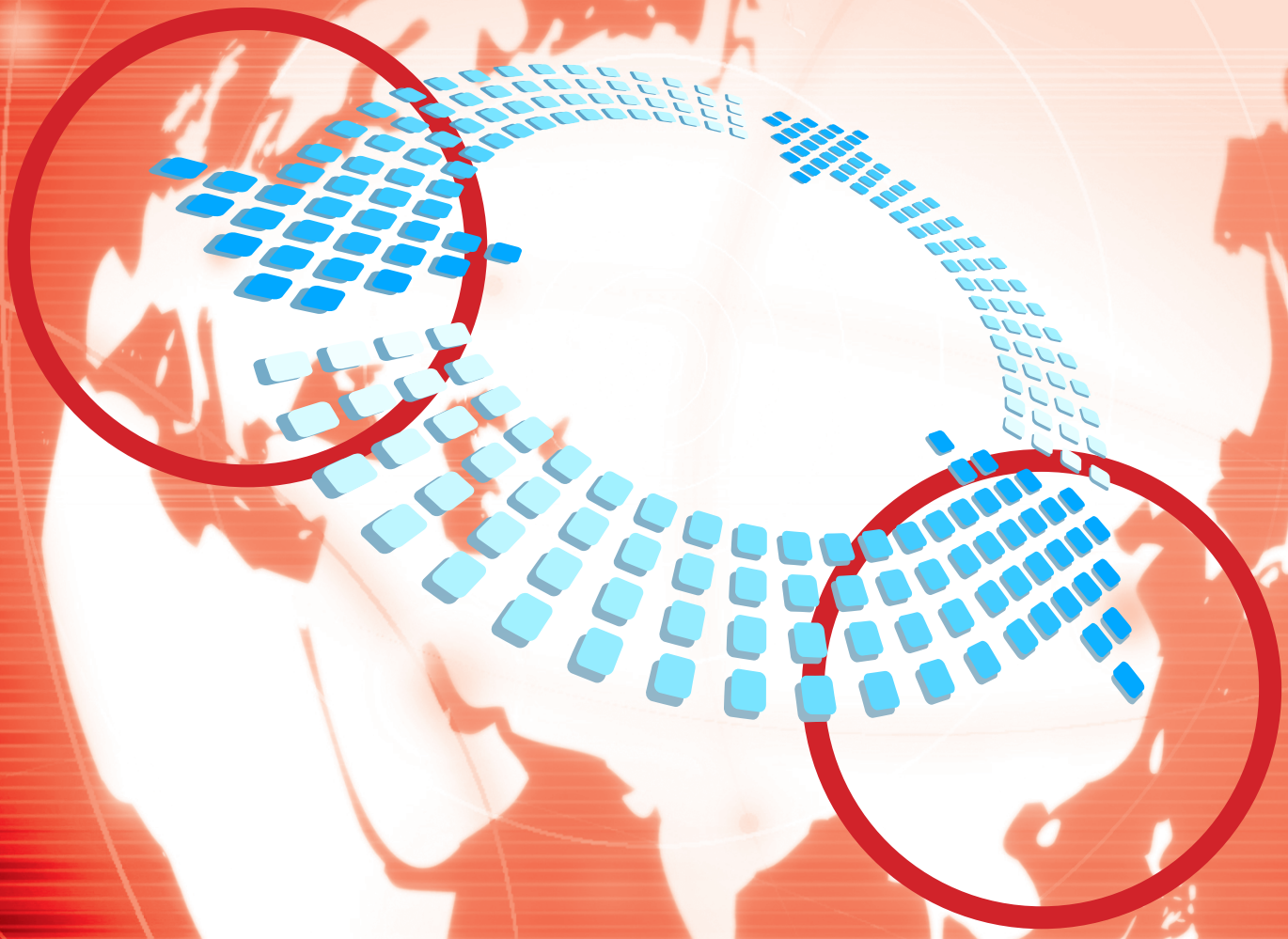

Review of the Science and Technology (S&T) Cooperation between the European Community and the Government of the People's Republic of China

Review of the Science and Technology Cooperation between the European Community and the Government of the People's Republic of China

Final Report

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EXECUTIVE SUMMARY

Background – Favourable condition and promising prospects

The EC-China S&T cooperation has achieved significant progresses since the EC-China S&T Cooperation Agreement was signed in 1998. The Chinese S&T and innovation system is developing extremely fast and dynamically and China has become a major new actor in the global system for the production of knowledge. This will strengthen the global S&T community and international cooperation in S&T between the EU and China has to be high on the agenda.

During the reviewed period 2004-2008, the 7th EU RTD Framework Programme (2007-2013) and China's Medium- and Long-term Science and Technology Development Plan (2006-2020) and the 11th Five-Year Plan (2006 - 2010) were launched. This concurrence forms an excellent basis for the move towards a strategic and equal partnership in key priority areas, which is probably the most important development in the course of the 10 years since the S&T agreement was signed in 1998.

Key conclusions – Progresses achieved and challenges ahead

- The EC-China S&T Cooperation Agreement has proven to be an important legal basis and an efficient tool for the regular S&T policy dialogue between the EC and China and it also has the potential to play an important role in the future strategic European framework for international S&T cooperation.
- Meetings of Steering Committee have greatly improved both regarding scientific content and participation of high level stakeholders.
- The move towards a strategic EC-China S&T partnership scheme with key priority areas is probably the most important development during the reviewed period. Coordination of calls for proposals, following the principles of co-evaluation, co-decision on selection and subsequent co-funding of projects will contribute to deepen EU-China S&T cooperation, and to achieve equal partnership and improved reciprocity. The experts support the idea that the European Commission and MOST shall support S&T cooperation activities based on FP7 of the EU and the 863 and 973 Programmes and other potentially feasible and appropriate research funding schemes of China.
- The participation of China in FP6 and FP7 shows a positive trend in terms of both increased number of participations and a broader coverage of thematic areas. However, in the experts' view the potential for the cooperation is certainly much higher, taking into account of the rapid growth in China's R&D capacity building as well as the larger scope of common and global issues faced by both the EU and China.
- There is clearly room for improvement of information and assistance of Chinese researchers on the possibilities of EU-China S&T cooperation, and at the same time a substantive need also on the European side to improve the information and assistance on the opportunities for S&T cooperation with China.
- Mobility of researchers from China to Europe has developed very well. The Marie Curie scheme is seen as an appropriate instrument. However, the mobility of researchers from Europe to China is not at all satisfactory and no progress can be seen in the reviewed period.

- The cooperation activities go beyond the participation in the Framework Programme or in Chinese research programmes. During EC-China Summits major initiatives preparing joint institutions have been launched such as EC2, ICARE, NZEC in the energy sector.
- To move from a science-driven towards a science-and-policy driven EC-China cooperation in S&T, the governance and institutional settings are of great importance, to shorten the distance between research agenda setting and policy agenda setting, as well as to narrow the gap between the scope of cooperation and the coverage of institutional interfaces. This can be achieved through increased openness in communication between the European Commission and MOST as well as possibly other Chinese S&T actors, improved coordination in horizontal actions and, when appropriate, flexible implementation arrangements.
- The bi-lateral S&T cooperation between EU Member States and China is steadily increasing. Collaborative arrangements are established with MOST, MoE, NSFC, CAS and others. While large Member States develop a broad spectrum of activities, smaller countries are taking a targeted approach to focus on specific areas and instruments.
- In the course of future joint programming initiatives, the experts see a great potential for the cooperation between the Commission and the Member States in variable geometry arrangements around areas of common interest, together with Chinese partner organisations. The experts are convinced that the S&T agreement can act as an umbrella for cooperation in different forms of joint initiatives and programmes between consortia of European Member States' S&T authorities and funding institutions and complementary partners in China.
- The ERA-NET Coordination Action CO-REACH is a useful pilot activity in that area and the lessons learned should be used when other activities will be developed for example in specific thematic areas in the future.

General recommendations – Continuity, awareness, capacity building and synergies

- The experts recommend renewing the EC-China S& Agreement, with the major contents unchanged and, where necessary and appropriate, some technical updating of the text to the state of 2008.
- In the frame of the planned ST partnership scheme, the ways and means of setting targets, implementation and follow-up activities have to be further developed. The annual road maps of activities bear the potential to provide an excellent framework for implementing and monitoring cooperative activities efficiently and effectively.
- Increasing awareness and information on the S&T Agreement outside the Steering Committee is still an area where improvements are possible. Member states and S&T experts should be better informed of the agenda and outcomes of Steering Committee meetings, and where appropriate involved in the preparation and follow up.
- The internal awareness and utilization of the S&T agreement amongst the Commission services within the 'research family' should be further enhanced and there seem to be rooms for improvement between S&T cooperation and the activities covered by other sectoral dialogues, e.g. environment and energy.
- The role of the EC S&T counsellor for promoting EU-China S&T cooperation should be clearly defined and has to be strengthened. Adequate resources should be made available for providing the first access point and gateway for user-friendly information for CN

partners on possibilities for S&T cooperation with the EU. The website of the EC delegation should be the major tool for that purpose.

- Due to the size of China, developing a multi-layered and professionalized network of contact points for information and assistance as well as for capacity building in EC-China S&T cooperation would be very useful. From the European side, National Contact Points should receive specific information and training on the Chinese science, research and innovation system and on the opportunities for supporting cooperation.
- For the purpose of improving mobility from the EU to China, the new "Science and Technology Fellowship (STF) Programme", launched by the EC Delegation in China is most welcome and should be carefully monitored. The same applies to the 'International Research Staff Exchange Scheme – IRSES' under the 'People' Specific Programme. For the future, the experts recommend to explore possible synergies between the 'Ideas' Specific Programme and the initiatives of the China Scholarship Council. Also bi-lateral intergovernmental S&T agreement between Member States and China should be included in such considerations.
- The experts recommend that a short review and analysis of the state and the future potentials of contacts of European Technology Platforms (ETPs) and Joint Technology Initiatives (JTIs) with China is performed, and that opportunities for ETPs and JTIs for the interaction and S&T cooperation with China are identified. European Technology Platforms and Joint Technology Initiatives should be encouraged to include the international dimension in their strategies and to explore and promote opportunities of EC-China S&T cooperation as appropriate.
- The Commission is invited to discuss with Member States their experiences and lessons learned in the cooperation with China. In the Steering Committee, the Commission and MOST should discuss possibilities for closer consultation and cooperation with MoE, NSFC, CAS and other S&T actors in China. The S&T agreement can act as umbrella for different forms of implementation arrangements.
- The experts also welcome the close cooperation and exchange of information and experience between the Member States' S&T counsellors and the S&T Counsellor at the Delegation of the European Commission in China. This cooperation should be further developed and deepened in support of both future joint programming activities in variable geometry arrangements as well as the development of a strategic European framework for international S&T cooperation.
- European science and technology still lacks visibility in China. At the same time, most S&T counsellors have only scarce resources available for their work. Therefore, the experts invite the Member States to consider establishing a European S&T House in Beijing supported by the Member States' S&T counsellors and embassies in China. Furthermore, it is suggested to consider the possibility organizing EU-China S&T Summits for increasing the visibility and the information on the EC-China S&T cooperation in China and in Europe.

1. Context, background and approach of the review

1.1. EC-China S&T cooperation in the overall context of EC-China relations

Objectives of EU-China relations

The European Union's (EU) relations with China were established in 1975 and are governed by the 1985 EU-China Trade and Cooperation Agreement. In 2007, to reflect the depth and breadth of today's strategic partnership, negotiations began to upgrade this to a Partnership and Cooperation Agreement. Today, the EU is China's second largest trade partner, with China being the EU's largest partner. Apart from regular political, trade and economic dialogue meetings, there are over 24 sectoral dialogues and agreements ranging from environmental protection to industrial policy or to education and culture.

The main objectives of EU policy towards China are to:

- broaden and deepen dialogue with China, both bilaterally and on the world stage (e.g. working together on global challenges such as climate change),
- support China's transition to an open society based upon the rule of law and respect for human rights,
- encourage the ongoing integration of China into the world economy and trading system, and support the process of economic and social reforms,
- raise the EU's profile in China, to aid mutual understanding. [1]

The architecture of EU-China relations – Summits and sectoral dialogues

Table 1 shows the 'multi-layered' architecture of EU-China relations.

Once a year, the EU-China Summit brings together the leaders of the EU and the People's Republic of China for discussions, negotiations, agreements and joint declarations on all issues currently at stake in the bilateral EU-China relations. For the joint declarations see[2]. Science and Technology (S&T) cooperation is always on the agenda of the Summits and items in the joint declarations address that sector of cooperation. As will be shown in the following, screening the joint declarations of Summits in the period of the present review shows that from a general supportive statement in the 2003 declaration the S&T issues has become more and more substantive and detailed underlining the growing importance of S&T cooperation in the EU-China relations.

In addition to the Summits there are ministerial meetings in different configurations as well as meetings of high level officials.

In all sectors relations between the EU and China have intensified in recent years and especially in the period covered by the current review. In general, this is due to China's development in economic terms and its important role as political power. In addition, it has to be emphasised that the bilateral relations and exchanges are also based on shared and complementary interests that exist between the EU and China at highest political level and also in many sectoral policies that are at least indirectly also relevant for S&T cooperation.

[1] From the European Commission, External relations, China Webpage: http://ec.europa.eu/external_relations/china/index_en.htm

[2] http://ec.europa.eu/external_relations/china/summits_en.htm

Sectoral dialogues in general

These exchanges are currently organised in more than 20 'sectoral dialogues'[3], see Table 1, (next Page). They form platforms for exchange at various hierarchical levels, from working level to ministerial level.

A variety of participants may be involved, including officials, politicians, and business organisations, and private companies.

The dialogues provide spaces also for establishing personal contacts and developing mutual understanding and trust between officials, getting acquainted with each others' policies, regulations, strategies and programmes as well as institutional settings. Proceedings are organized in different ways and take the form of annual formal meetings, working groups, workshops, conferences, or simply informal exchanges. In particular, specialists from Directorates General in the European Commission are involved in regular exchanges with their respective counterparts in China.

Sectoral dialogues have helped to develop a solid foundation for the EU-China relationship which is now characterised by increasingly close policy co-ordination in many important areas. The dialogues constitute an effective tool for further widening and deepening EU relations with China, for exploring new areas of common interest, for exchanging know-how, and for identifying areas of co-operation, for developing joint strategies and for agreeing on approaches for implementation. Sectoral dialogues and agreements are expected to play an increasingly important role in building a privileged EU-China relationship with important benefits for both sides.

The EC-China S&T agreement [4]

The EC-China S&T Agreement[5] is one element of the current architecture of EU-China relations and is one of the sectoral agreements.

General introduction

The EU-China dialogue on Science and Technology started in the early 1990s and was one of the first areas of cooperation between the European Commission and China. The first EC-China S&T agreement entered into force in late 1999 and it was renewed in December 2004. In the S&T area, China is becoming a new world power in the global system of knowledge production.

The EC-China S&T Agreement was signed on 22 December 1998 and entered into force on 14 December 1999 for a 5-year period. Article 11.b. of the EC-China S&T Agreement provides that *„This Agreement shall be concluded for an initial period of five years and may be renewed by common agreement between the Parties (tacit renewal) after evaluation during the penultimate year of each successive period."*. After being reviewed by a team of European and Chinese independent experts in 2003, it was renewed in December 2004 for an additional period of 5 years without any amendment.

[3] http://ec.europa.eu/external_relations/china/sectoraldialogue_en.htm

[4] AGREEMENT for scientific and technological cooperation between the European Community and the Government of the People's Republic of China. Official Journal of the European Communities (OJ), L6/40-45, 11.1.2000

[5] In the following referred to as STA

The S&T agreements offer a political, legal and administrative framework for coordinating and facilitating cooperative S&T activities between European legal entities and international partners,

Table 1: Current architecture of EU-China relations [6]
(European Commission, 1 December 2005)

Political Dialog

Summit (Annual)

Troika Ministerials (1-2/year)

Meeting between GAERC President and Chinese Ambassador in Presidency Capital (1 x / presidency)

Meeting between Chinese Foreign Minister and EU Heads of Mission in Beijing (1 x / presidency)

EU-China Strategic Dialogue at Vice Foreign Minister Level (1 -2 X / year)

Political Directors Troikas (1 x /year)

Regional Directors Troikas (1 x /year)

Expert level meetings on

High-level consultation on illegal migration and trafficking in human being (1x/ year)

Human Rights Dialogue (1x / presidency)

Asian Affairs

Non Proliferation (regularly)

Conventional Arms exports

Economic relations and sectoral dialogues

EC-China Joint Committee (1985 TCA, 1 x/year)

- Ministerial
- Senior Officials Meeting (SOM)
- Economic and Trade Working Group

EC-China development cooperation programme of 200 million Euros for the period 2003-2007

Sectoral agreement and dialogue

S&T ageement	Galileo	Costoms	Maritime tranport	Nuclear research	Turism ADS	
Enery WG/ Conference	Environment Dialogue/WG	Information Society	Enterprises / Industry /regulation	Trade Policy	Employment Social policy	Agriculture Dialogue
Education Culture	Competition Policy	Product safty, standard	IPR & geographic indications	Textile trade	Space S&T	Macroeconomy Financial market
Future dialogue regional Polocy	Future dialogue Civil Aviation	Future dialogue transport policy				

[6] http://ec.europa.eu/external_relations/china/docs/architecture.pdf

thereby strengthening the international dimension of the European Research Area. There is also an important focus on S&T policy dialogue.

These S&T cooperation agreements do not include specific provisions regarding the funding of cooperative research activities (which remains subject to the respective applicable laws/regulations, policies and programmes of the two Parties to the agreement). They do however set the principles regarding the management and sharing of the intellectual property created or used in the context of cooperative research activities.

Cooperation has increased substantially since the first S&T agreement was signed. Its aim was to promote mutually beneficial research activities in a variety of areas, such as food and environmental safety, the management of natural resources, the control of infectious diseases etc. Today, this cooperation shows growing dynamism as is demonstrated, for instance, by the growing numbers of participations of Chinese partners in cooperative research projects funded by the European Community's 5th, 6th and the 7th Framework Programme (FP5, FP6, and FP7) for research. The involvement of Chinese partners in EU projects increased from 154 participations in FP5 to 392 participations in FP6. After the first year of FP7, there are already more than 100 Chinese participations.

China is rapidly becoming one of the most active actors on the international research scene and in several areas it is already amongst the leading nations in the world – examples of the latter are nano-materials and energy components.[7] The new 7th RTD Framework Programme on the EU side (2007-2013) and China's 11th Five Year Plan (2006-2011) as well as new Chinese international research programmes in areas such as Traditional Chinese Medicine [8] and Renewable Energy[9] together form a favourable environment to intensified cooperation.

There are many areas where Europe and China are facing similar challenges like environment and climate change, renewable energy and efficient use of energy, transport, information and communication technology, urbanization, health, agriculture, food quality, and others. In different research areas, European and Chinese partners can benefit from the cooperation and learn from each others. In addition, it is important to bring together complementary expertise in order to be better prepared for addressing challenging complex and global problems.

It seems also a good occasion to further stimulate the launching of new strategic projects in S&T areas of mutual interest. As will be shown in the present report, the past period 2004 to 2008 was characterised by a dynamic development in S&T cooperation. However, there are still many further opportunities yet to be utilized.

A short reminder of main points of the EU-China S&T agreement[10]

At the moment, the European Community has signed S&T agreements with 18 countries[11]. The last S&T agreement has been signed with New Zealand on 16 July 2008.

[7] See e.g. the most recent OECD review on China's innovation system (OECD, 2008) as well as Keeyley and Wilsdon (2007) and Leadbeater and Wilsdon (2007) on the role of China in the global S&T community.
[8] International Traditional Chinese Medicine Program for Cooperation in Science and technology. Ministry of Science and Technology (MOST) of the People's Republic of China. 2006
[9] International science and technology Program on New and Renewable Energy. Jointly Issued by the Ministry of Science and Technology (MOST) and the National Development and Reform Commission (NDRC), People's Republic of China, 2007
[10] See also: Opening to the world: International Cooperation in Science and Technology. Report of the ERA Expert Group. Directorate-General for Research. EUR 23325 EN. 2008. Chapter 5, pp. 55ff.
[11] http://ec.europa.eu/research/iscp/index.cfm?pg=countries (negotiations with Japan and Jordan are under way)

S&T agreements between the Community and third countries are concluded when both parties agree on mutual benefits based on an overall balance of advantages of closer S&T cooperation. The basis for the conclusion of the S&T agreements is Article 170 (2) in conjunction with Article 300 of the EC Treaty. According to Article 170 of the EC Treaty, there is a clear connection between the S&T agreements and the EU RTD Framework Programme as the main Community financial instrument for funding RTD:

> *In implementing the multi-annual framework programme the Community may make provision for cooperation in Community research, technological development and demonstration with third countries or international organisations. The detailed arrangements for such cooperation may be subject of agreements between the Community and the third parties concerned, which shall be negotiated and concluded in accordance with Article 300.*

Thus, S&T agreements should be concluded to promote the European RTD policy as defined in Article 163 of the EC Treaty. S&T agreements are negotiated by the Commission after having been authorized by the Council. The Council may issue directives to the Commission for the negotiation. After consultation with the European Parliament, the decisions on the signature and the conclusion are adopted by the Council by a qualified majority on proposal of the Commission.

The agreements follow a common general structure as presented in Table 2.

Table 2: Common structure of the S&T agreements

1. Purpose 2. Definitions 3. Principles 4. Areas of cooperative activities 5. Forms of cooperative activities 6. Coordination and facilitation of cooperative activities	7. Funding 8. Entry of personnel and equipment 9. Diffusion and utilisation of information 10. Territorial application 11. Entry into force, termination and dispute settlement ANNEX: Intellectual Property Rights

According to the purpose of the STA (Article 1) 'the parties of the agreement shall encourage, develop and facilitate cooperative activities in areas of common interest by carrying out and supporting scientific and technological research and development activities'. Further, the S&T agreements are based on the principles of

a. mutual benefits based on an overall balance of advantages;
b. reciprocity of access to the activities of research and technological development undertaken by each party;
c. timely exchange of information which may affect cooperative activities;
d. appropriate protection of intellectual property rights.

Article 4 defines the areas of cooperative activities:

> *Cooperation under this Agreement may cover all the activities of research, technological development and demonstration, hereinafter referred to as 'RTD', included in the first activity of the framework programme under Article 130g of the Treaty establishing the European Community and all similar RTD activities in China in the corresponding scientific and technological fields.*[12]

[12] The EC-China STA, signed on 22 December 1998 refers to the Maastricht Treaty (1992)

In the following, emphasis will be on the EU-China STA. In the case of the Community the activities under Article 4 refer to the EU RTD Framework Programmes (FPs) and cooperation with third countries. For the current review exercise that means mainly EU RTD projects involving Chinese partners under FP6 (2002-2006) and FP7 (2007-2013). In the case of China, this refers mainly to the national programmes, such as the National High-tech R&D Programme 863[13] and the National Basic Research Programme 973[14] .

The areas of cooperative activities indicated under Article 4 correspond to the thematic programmes of the Fifth Community Research Framework Programme. Therefore, there is a need for a technical updating of this article when the S&T agreement will be renewed.

The STA does not affect the participation of China as a developing country, in Community activities in the field of research for development.

Article 5 defines the forms of cooperative activities, which provides an important basis for the review of the activities in the period 2004 to 2008:

> *(a) Subject to their applicable laws, regulations and policies, the Parties shall foster, to the fullest extent practicable, the involvement of participants in cooperative activities under this Agreement with a view to providing comparable opportunities for participation in their scientific and technological research and development activities.*
>
> *(b) Cooperative activities may take the following forms:*
> - *participation of Chinese research entities to RTD projects under the first activity of the framework programme and reciprocal participation of research entities established in the Community to Chinese projects in similar sectors of RTD. Such a participation is subject to the rules and procedures applicable in each Party,*
> - *pooling of RTD projects already implemented according to the procedures applicable in the RTD programmes of each Party,*
> - *visits and exchanges of scientists and technical experts,*
> - *joint organisation of scientific seminars, conferences, symposia and workshops, as well as participation of experts to those activities,*
> - *concerted actions,*
> - *exchanges and sharing of equipment and materials,*
> - *exchanges of information on practices, laws, regulations and programmes relevant to cooperation under this Agreement,*
> - *any other modality that would be recommended by the Steering Committee and deemed in conformity with the policies and procedures applicable in both Parties.*
>
> *The joint RTD projects shall be implemented when the participants have developed a technology management plan, as indicated in the Annex to this Agreement.*

Article 6 provides the framework for the implementation and management of the STA. The coordination and facilitation of the activities under the STA shall be accomplished on behalf of China, by the Ministry of Science and Technology of China (MOST) and on behalf of the Community, by the Commission services. The management of the implementation of the STA will be the task of a 'Steering Committee' consisting of an equal number of official representatives of each Party; it shall establish its own rules of procedure.

According to Article 6 (c):

> *The functions of the Steering Committee shall include:*

[13] http://www.most.gov.cn/eng/programmes1/200610/t20061009_36225.htm
[14] http://www.most.gov.cn/eng/programmes1/200610/t20061009_36225.htm

1. *promoting and overseeing the different cooperative activities as mentioned in Article 4 as well as those that would be implemented in the framework of RTD cooperation for development;*
2. *indicating, for the following year, pursuant to Article5(b), first indent, among the potential sectors for RTD cooperation, those priority sectors or subsectors of mutual interest in which cooperation is sought;*
3. *proposing, pursuant to Article 5(b), second indent, to the scientists of both Parties the pooling of their projects which would be of mutual benefit and complementary;*
4. *making recommendations pursuant to Article 5 (b),seventh indent;*
5. *advising the Parties on ways to enhance and improve cooperation consistent with the principles set out in this Agreement;*
6. *reviewing the efficient functioning and implementation of this Agreement;*
7. *annually providing a report to the Parties on the status ,the level reached and the effectiveness of cooperation undertaken under this Agreement. This report will be transmitted to the Joint Committee established under the 1985 Agreement on trade and economic cooperation between the European Economic Community and the People' Republic of China.*

(d) The Steering Committee shall, as a general rule, meet annually, preferably before the meeting of the Joint Committee established under the 1985 Agreement on trade and economic cooperation between the European Economic Community and the People's Republic of China, and according to a jointly agreed schedule; the meetings should be held alternatively in the Community and in China. Extraordinary meetings may be organised at the request of either Party.

The above quotations from the legal text of the STA have been extracted and included in the text of this report here, because they provide the main guidelines for the review and the assessment of activities under the STA.

1.2. Major recommendations of the previous review or impact assessment

In 2004, under a contract form the European Commission, a group of experts performed and Impact Assessment of the STA[15].

The 2004 Impact Assessment (IA) arrived at positive conclusions and recommended the renewal of the STA without any textual changes. However, the IA identified a lack of awareness and information amongst Member States' stakeholders and researchers on the STA and made a number of recommendations for fostering the effectiveness of the STA. Success stories of projects with Chinese partners should be made known widely. The Framework Programme has been opened for participants from Third Countries. However, it was noted that the available instruments are nor sufficiently appropriate to foster the involvement of Chinese partners. Also the funding of Chinese partners has to be clarified and a customer friendly guidance note should be published accompanying Calls for Proposals. It was also recommended to strengthen the role of the Steering Committee and that targeted initiatives should be designed and implemented. Based on the experiences during the SARS crisis, it was recommended that a contingency fund should be created so that a research response to particular crises or urgent issues could be organised in a timely and pragmatic way.

[15] P. Watson, K. Harrap, Xin Mingy, Shi Guangchang: An Impact Assessment of the S&T Agreement concluded between the European Community and the People's Republic of China. European Commission. Directorate-General for Research, International Scientific Cooperation Policy. 2004

1.3. Mandate of the expert group

The Terms of Reference for an expert group were set up by the Directorate General for Research of the European Commission to conduct a review of EC-China cooperation in the field of research, assessing in particular the implementation and impact of the agreement for scientific and technological cooperation concluded between the European Community and the Government of the People's Republic of China ('EC-China S&T Agreement') and taking into account similar agreements between EU Member States and China.

The objective of the expert group is to review the EU-China cooperation in the field of research, assessing in particular the implementation and impact of the Science and Technology Cooperation Agreement, taking into account of similar Agreements between EU Member States and China.

The expert group should identify issues related to the implementation of EC-China S&T cooperation agreement in the field of research (both at EC and where appropriate Member States level) and where appropriate make recommendations for addressing those issues. According to the Terms of Reference of the Expert Group *"the forms of cooperative activities foreseen under article 5 of the S&T agreement are essentially twofold: mobility of personnel and co-operation through joint research projects and participation in each other's research programmes on a project-by-project basis."* This clearly defines the main focus of the review with regard to the priority activities.

The expert group should also highlight and compare the impact of the EU-China cooperation agreement through appropriate indicators e.g. in terms of increase in level, intensity or quality of EU-China cooperative activities over the period 2004-2008.

Eventually the expert group will give its opinion also on the renewal of the EC-China S&T Agreement.

The expert group will undertake the following activities as part of the review of EU-China Science and Technology cooperation:

- to identify **success stories and flagships** amongst EU-China Science and Technology cooperative activities, highlighting where appropriate underpinning reasons for success;

- to analyse the Science and Technology cooperative activities over the period (2004-2008) in relation to the different specific programmes/thematic priorities of the EC Research Framework Programmes so as to draw up a **pattern of cooperative activities** both in terms of areas / topics and types of research (science led, technology led, trade led, global issues led), highlighting meaningful trends through a comparison with the previous period (1998-2003);

- to identify the Science and Technology areas / topics / actors for which there is a clear **prospect for further developing S&T cooperation** through more intense efforts, more integrated forms of cooperation, or new instruments e.g. coordinated calls for co-funded collaborative projects;

- to identify and document **bottlenecks and administrative / legal / institutional obstacles** to on-going S&T cooperative activities or their further development – in particular regarding different rules / practices of IPR management and access to raw data;

- to broadly review some **EU Member States bilateral cooperative activities with China assessing:**
  - their relative contribution and added-value in the wider EU-China S&T cooperation, through e.g. the range of projects involved and the measures to stimulate/promote collaborations;
  - **complementarities/synergies and overlaps between the different EU-China cooperative activities** (steered by the EC and Member States) and highlight possible remedies where appropriate;

- to analyse the **extent to which the EU-China S&T cooperation is mutually beneficial** in terms of reciprocity of access to funding schemes; networking of research performers; commercial exploitation of IPR generated etc. using an agreed set of indicators

- The Expert Group shall assess the **management of Intellectual Property Rights (IPR)** of research FP projects compared to the rules described in the annex to the STA. The Commission Services will provide access to relevant information and data. The broad objective is to assess the implementation of FP7 rules, and recommend actions to be taken by either party to ensure that IPR rules are complied with. More specifically, the Expert Group shall:
  - Give a general insight into IPRs (patents or otherwise) issued and how they are distributed across programme areas and technologies;
  - Identify the general development in which IPR are managed within the agreement, i.e. to what extent ownerships and rights are allocated more effectively over time by the parties and their participants;
  - Assess the usefulness and scope of Technology Management Plans and to what extent they address the key issues normally seen as critical in joint research projects;
  - Identify examples for infringements and derive common types of conflicts as well practices or contractual arrangements that may lead to infringements or conflicts, collaborative arrangements or practices in which agreed Codes of Practice are threatened
  - Assess the functionality of the conflict resolution practice.
  - The Expert Group is expected to provide recommendations for improvements of the contractual and other framework in which joint or collaborative research is conducted, with a view to ensure effective IPR and Codes of Practice management in future Science and Technology Agreements.

In the course of the review, it was decided to split the report in two parts and to present the IPR issue in a separate part.

1.4. Working methods and approaches of the expert group

The expert group took the following approach to undertake the review:

- Analysis of existing documentation (e.g. S&T Agreement, 2004 Impact Assessment, COM documents, Annual reports, minutes of the Steering Committee, minutes of meetings of Member States S&T counsellors, Joint Declarations of Summits, different briefing documents for Commissioner and high level Commission officials, statistics on participation in FP5, FP6 and FP7, reports and studies);
- Interviews with scientific officers in the Commission;
- Mission to China (M. Horvat and N. Lundin) for stakeholder interviews in China with high level officials in Chinese ministries, agencies and Academies of Sciences,

representatives of Chinese universities in Beijing, Shanghai, Hangzhou, Wuhan and Xi'an;

- Interviews with Chinese project participants during the China mission and 'mirroring' telephone interviews with the respective of coordinators of EU RTD projects;
- Telephone interviews with science counsellors of EU Member States;
- Interviews with project coordinators of coordination and support actions;
- Preparation of an interim report in the second half of October and discussion with Commission services;
- Delivering the commonly agreed Final Report by the end of October 2008.

The lists of interviewed persons in China and in Europe and the interview guidelines can be found in the Annex.

2. The EC-China S&T cooperation 2004-2008 – Political framework and the S&T dialogue

2.1. General developments of EC-China S&T relations 2004 – 2008

The period 2004 to 2008 was characterised by a steady intensification and broadening of EU-China activities in S&T cooperation. At the highest level, this is documented by the joint declarations and statements following EU-China summits where the issue of S&T cooperation gained increasingly more space. In the frame of the sectoral dialogues, S&T cooperation is an area with little reason for conflict and much room for common interests and mutual benefit. The meetings of the Steering Committee of the EU-China Science and Technology agreement played an important role in the follow up of summit joint declarations and the agreements from other high level meetings.

In the meetings of the Summits in the course of the years 2004 to 2008, there was a clear development from general expressions of satisfaction with the progress made in S&T cooperation towards concrete declarations on developing further collaboration through strategic projects in specific commonly agreed research areas and also towards the development of initiatives going beyond cooperation in the Framework Programme.

The EU RTD Framework Programme is the most important financial instrument supporting international S&T cooperation and providing means for funding EU-China S&T cooperation. However, it has to be noted that the range of China-Europe cooperation is continuously broadening beyond project cooperation in the Framework Programmes.

Highlights in the period reviewed in the course of the present exercise are the joint efforts and projects related to the SARS epidemic that started already in 2002 and 2003 but materialised mainly in the present reporting period. Furthermore, initiatives in the areas of biotechnology and health as well as energy and climate change have to be mentioned. Furthermore, AEROCHINA in the aeronautics sector and also ORIENT in IST can be mentioned as important FP6 activities. However, there is no systematic assessment available of FP6 projects with Chinese partners that could be used as the basis for a systematic description of especially successful projects.

A special aspect of this period is certainly that the quality of the cooperation changed because EC and Chinese leaders agreed to develop a more strategic – 'top-down' - approach complementing

the 'bottom-up' approach based on the general opening of the 7th Framework Programme and the initiatives of individual scientists. This means a real landmark in the development EC-China S&T relations. It will also be real achievement when the legal and administrative hurdles connected with the developing a new partnership scheme between two different S&T systems can be overcome.

Mid-term in the reviewed period fell the launching of the 7th Framework Programme (2007 – 2013) on the side of the European Union and on the Chinese side the 11th Five-Year Plan (2006 - 2010) and the Medium- and Long-term Science and Technology Development Plan (2006-2020) were adopted. Both the European Union and the People's Republic of China give highest priority to science, research, technological development and innovation. In addition, international cooperation is an integrated aspect of the 7th EU Framework Programme and the expansion of international S&T cooperation and communications is also a priority in the planning documents of China. Also MOST's international programmes on traditional medicine as well as on new and renewable energies have to be mentioned in this context. This situation opens new and promising opportunities for developing the EC-China S&T partnership.

Thus, based on the commitment of EU and China's leaders to strategic S&T cooperation and the mid- to long-term programmes and plans on both sides there is a favourable political framework for EC-China S&T cooperation for carrying out EC-China S&T cooperation of strategic importance.

2.1.1 The developments towards a strategic approach for EU-China S&T cooperation

During the reviewed period 2004 – 2008, landmarks in the development of the EU-China S&T cooperation towards a strategic approach were the EU-China Summits:

- 8 December 2004, The Hague,
- 5 September 2005, Beijing,
- 9 September 2006, Helsinki,
- 28 November 2007, Beijing.

In The Hague, the leaders agreed to convene the EU-China High-level Forum on Science and Technology (S&T) Policy and Strategy in May 2005 hoping to move towards mutual understanding on S&T development strategy and deepen the S&T co-operation relations between China and the EU. Meetings of the Steering Committee of the EC-China S&T agreement are instrumental for the follow up of the agreements achieved in the summits.

On **12-13 May 2005**, the European Commission and the Government of the China met for a **High Level Forum on S&T Policy and Development** in Beijing. A Joint Declaration on EU-China Research Cooperation **"Building a Knowledge for Growth Pact"**[16] was signed. Both sides underlined the strategic nature of the RTD partnership between the EU and China and their determination *"to adopt a strategy of 'reaching out' for RTD cooperation and to promote thriving EU-China exchanges with research and technological innovation.*"

"We feel that the present cooperation should be further developed in the spirit of mutual benefit and progressive convergence of research policies so that it contributes directly to the

[16] http://ec.europa.eu/research/iscp/eu-china/pdf/joint_declaration_en.pdf
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/05/1091&format=HTML&aged=0&language=EN&guiLanguage=en

improvement of economic competitiveness and to the achievement of common solutions to problems faced by our societies."

"Our pact is our determined commitment to bring Europe and China together. It is the formal translation of European and Chinese expression of a common willingness to lay the basis for a dynamic and harmonious cooperation that ensures sustainable prosperity and welfare for our societies."

In the course of the forum it was agreed to launch a small number of strategic projects by 2008. The cooperation will be based on two guiding principles:

- Expanding the scope of our RTD cooperation to the knowledge based economy,
- Ensuring mutual interest and overall balance between China and Europe.

Both parties agreed on the following objectives:

- Developing joint EU -China RTD projects and large research infrastructures in key technology areas such as information technology, biotechnology, nanotechnology etc ..;
- Developing global scientific knowledge, through mobilising a wide range of stakeholders from research, industry and financial institutions in Europe and China, and a more proactive use of the EU -China S&T Cooperation Agreement;
- Increasing public and private investment in EU -China RDT cooperation projects;
- Accelerating and leveraging the implementation of China's and Europe's internal RTD strategies;
- Mobilising all EU Member States to get critical mass and improve coordination between national and Community actions;
- Ensuring mutual interest and balance of the EU -China RTD cooperation and its proper adaptation to scientific, environmental, social and economic evolution.

The two sides agreed that strategic cooperation shall be implemented through different instruments and actions such as for example:

- Fully exploit the possibilities of the EU RTD Framework Programme and of the Chinese programmes (863 and 973) for international cooperation;
- Stimulate and develop common initiatives in fields such as environment, nanotechnologies, hydrogen, aeronautics, etc. through e.g. an increased cooperation with China in the European Technology Platforms;
- Based on improved S&T knowledge, standardisation for the development of key technologies and approaches should be promoted by cooperation.
- For projects related to industrial application particular attention should be paid to IPR issues.
- By increasing mobility of researchers between China and Europe, including through improved visa conditions for long and short term stays, formulating an EU-China Scientists Exchange and Access Programme.

The two parties agreed that there is a need to enhance measures for informing and mobilising for European and Chinese S&T communities. For following the development of strategic EU-China S&T cooperation and its impact appropriate monitoring measures will be necessary.

At the **8th EU-China Summit** on **5 September 2005**, this Joint Declaration was endorsed by the leaders of the European Union and the People's Republic of China. The launching of the **CO-REACH** initiative laid the foundation for furthering the EU-China cooperation based on the coordination and cooperation of China related activities and programmes of EU Member States. Furthermore, the leaders agreed to create the appropriate conditions for a series of high impact Science and Technology events in China and Europe starting in 2006 to prepare for a **"China-EU Science and Technology Year- CESTY"**. Later in this report, CO-REACH and CESTY will be discussed in more detail.

In 2006, both in the EU and in the People's Republic of China, the foundations for mid-term and long-term developments in the areas of science and technology were laid. In Europe the 7th EU RTD Framework Programme (2007 – 2013) was launched, and in China the Long-term National Plan for the Development of science and Technology (2006 – 2020) was adopted. During the **9th EU-China Summit on 9 September 2006**, leaders agreed that this forms a new opportunity for developing future collaboration in priority areas.

On **12 October 2006**, concluding the Meeting of the **Steering Committee for the EU-China S&T Agreement**, a **Joint Declaration on EU-China Science &Technology Cooperation**[17] was signed by Mr Silva Rodriguez, Director General DG RTD and the Mr Wu Zhongse, Vice-Minister of MOST. It was agreed to launch a small number of 'strategic' projects by 2008. For 2006-2007, both parties agreed on the following objectives:

- Explore the possibility of developing further collaboration through a few number of strategic projects in specific research areas;
- Strengthen mobility of researchers;
- Continue enhancing reciprocal participation in the activities of research and development of each party.

The **Communicatio**n from the Commission to the Council and the European Parliament dated **24 October 2006 "EU – China: Closer partners, growing responsibilities"** sets the context for taking Science & Technology co-operation forward, based on mutual benefit and reciprocal access and participation. Overall it recommends that EU and China should:

- Improve the visibility of our co-operation,
- Increase reciprocity
- Provide a basis for more effective co-ordination with Member States;
- Improve joint planning to ensure mutual benefit and
- Facilitate researchers' mobility.

As a follow up to the Joint Declaration from 12 October 2006, in a **meeting of DG RTD on 1 December 2006**, the new more targeted and strategic approach in the international cooperation with China and the way forward was discussed. It was agreed that for identifying research topics three criteria should be applied:

- Issues of global concerns,
- High level excellence,
- Research on topics favouring a better industrial/commercial environment.

[17] Joint Declaration on EU-China Science &Technology Cooperation: Building a Knowledge for Growth Pact. See: http://ec.europa.eu/research/iscp/pdf/eu-china-statement-2005.pdf

As an important move towards the implementation of the strategic approach it was agreed to a **road map** by thematic area.

Inputs on more concrete topical details should be provided by joint China-EU workshops involving experts from both sides. For strengthening the EU-China S&T cooperation the mere opening of the Framework Programme was seen as not sufficient also because of a lack of visibility in China. The selection of the strategic projects should be organised via launching **Coordinated Calls for proposals** that were seen as appropriate instruments for the strategic approach. The procedures should be based on the involvement of China in the whole process and on co-decision and co-funding.

On 25 April 2007 DG RTD / Dir Health and the Chinese Academy of Sciences (CAS) signed a joint statement on launching coordinated calls. The implementation, which was originally planned for Work programme 2009, has been postponed till the general approach for Coordinated Calls has been commonly agreed upon.

In **June 2007**, in order to move the EU-China S&T cooperation forward, DDG RTD Mr Jacob agreed in Rome with the Vice-minister SHANG Yong that:

1. Genuine partnership in Science & Technology means that the funding of research projects should be equally shared.
2. Priority areas of S&T cooperation between EC and China are:
   - Energy,
   - Environment and climate change,
   - Biotechnologies,
   - Health (including TCM, diabetes, infectious diseases, proteomics).
3. The joint statement signed on **25 April 2007** by DG RTD / Dir Health and the CAS should be "upgraded" to an "accord" between the government of China and the EU. On this basis, MOST and EC officials will work together in view of preparing a more "global" arrangement to be considered during the upcoming Steering Committee Meeting of the S&T Agreement (13-14 Nov 2007 in China).

In the **6th meeting of the Steering Committee for the S&T Agreement on 17 November 2007**, the European Commission and the Chinese Ministry of Science and Technology (MOST) agreed on launching joint projects in the following priority research areas:

- Health (including Traditional Chinese Medicine),
- Energy (including nuclear energy), Climate Change and Emissions Reduction and Environmental Protection, and
- Biotechnologies and Food security.

Inputs on more concrete topical details should be discussed in joint China-EC workshops involving experts from both sides. Expert workshops have been organised in the areas of Health in April 2007, for Biotechnologies in July 2007 already. In Energy and Climate Change was planned for and later on organised in March 2008. It was also agreed that coordinated projects will be co-funded from both sides and that both MOST and DG RTD will reserve 30 M€ each year for that purpose.

For the important issue how to organise calls, two options were discussed

- Option 1: Coordinated calls leading to joint projects,
- Option 2: Coordinated calls leading to twin projects.

No preference was given to either option. It was decided that further details should be discussed at technical level. It was planned to arrive at agreeable modalities by the end of 2007 and that a memorandum of understanding confirming these modalities should be signed at the beginning of 2008.

EC Directorate-General for Research had prepared a **"road map"** for the meeting in order to have a basis for the follow-up of common activities and actions to be carried out during the years to come.

At the **10th China-EU Summit on 28 November 2007**, the leaders welcomed the conclusions of the 6th Steering Committee meeting of the EU-China Science & Technology Agreement. The two parties agreed to move towards a more strategic scientific cooperation through the launch of EU-China joint research projects. These projects will be co-funded by both parties, in full respect of the EU and China funding principles, laws and rules. The leaders acknowledged the very important participation of Chinese researchers in the first calls of the 7th Research Framework Programme. They agreed to facilitate also the participation of European researchers in Chinese funded programmes and they encouraged programmes to assist the mobility of researchers.

On **25 April 2008**, Premier Wen Jiabao and President Manuel Barroso agreed to develop new strategic cooperation on science and research based on reciprocity and equal partnership and committed to sign this agreement at the latest at the next EU-China Summit. Among areas of joint research already identified are energy, climate change, biotechnology and health.

Summing up, it has to be emphasised that during the present reviewing period 2004 to 2008 the S&T relations between the EU and the People's Republic of China have consequently moved towards a strategic approach supported by the political leaders. For the next period, the foundations for substantive further strengthening and deepening the S&T cooperation are laid and can be utilized. It is hoped, that in the very near future the technical issues related to the implementation of coordinated calls between different S&T funding systems can be solved.

2.1.2 Meeting the challenges of implementing high level strategic objectives

In the 2006 and 2007 summits the leaders of the EU and People's Republic of China have agreed "*to move towards a more strategic scientific cooperation through the launch of EU-China joint research projects. These projects will be co-financed by both parties, in full respect of the EU and China funding principles, laws and rules"*. On 25 April 2008, Premier Wen Jiabao and President Barroso agreed to launch a new 'China-EC Science & Technology Partnership Scheme' leading to EC-China co-funded research projects following from identification of research priorities and open coordinated calls for proposals.

This initiative is of particular importance because when it will be successfully implemented in China it may well act as model for intensified S&T cooperation with high income countries and emerging economies. Partnership schemes and coordinated calls may provide appropriate tools for implementing activities that have been agreed upon in Steering Committees of S&T agreements. In addition, through the co-funding mechanism, coordinated calls are a suitable approach to the reciprocity requirement as defined in Article 3 of the S&T agreements.

Coordination of calls for proposals between the European Commission and the Ministry of Science and Technology (MOST) following the principles of co-evaluation, co-decision on selection and subsequent co-funding of projects will contribute to deepen of EU-China the cooperation, and to achieve the equal partnership in real terms. The experts support the idea that the European Commission and MOST shall carry out cooperation based on FP7 of the EU and the 863 and 973 Programmes and other potentially feasible and appropriate research funding schemes of China. These developments can be seen as a major step towards achieving reciprocity

as required by the S&T agreement. In addition, the equal and balanced support of the scheme by the main programmes of the two parties will create a new spirit of true partnering and help developing an integrated approach in line while at the same time respecting the formal requirements on both sides.

The experts fully support the structure and contents of the planned partnership agreement. The purpose, principles and ways of cooperation and management mechanisms are well defined and will provide a sound basis for the development of the future strategic S&T cooperation between Europe and China. Following a step by step approach will ensure that the programme will follow a development path of jointly learning from experience. Such an agreement will certainly become an example of best practice important also for other agreements on international S&T cooperation. However, such an effort may be only appropriate in cases where there are really substantial capacities for in-depth and long-term cooperation on both sides.

The involvement of experts from both parties in workshops providing input for the definition of the contents of the calls for proposals provides also the opportunity to establish and deepen the contacts and communication between high level European and Chinese experts that may lead to future cooperation. Taking into account the great technical complexity and comprehensiveness in the institutional and regulatory framework involved in research areas, such as for example environment, energy and climate change and health, the engagement of a broad spectrum of well-respected high-level experts from both sides needs to be ensured. This work had already been carried out for Health (April 2007, with the Chinese Academy of Sciences and Biotechnologies areas (July 2007, with the China National Centre for Bio-technology Development (CNCBD)). A workshop was organised in Guangzhou on 6-7 March 2008 to help identify priority topics for future cooperation in the areas of Energy (including nuclear energy) and Climate Change in the fields for "Climate Change, Mega-Cities and Emissions", "Impacts and Adaptation in Vulnerable Regional Sectors", "Renewable Energy (Wind, Solar and Biomass Gasification)", "Carbon Capture and Storage" and "Energy Efficiency and Savings". For the future implementation of the EC-China partnership scheme it will be important to consider the lessons learned form these workshops.

The prospect that the Memorandum of Understanding on China-European Commission S&T Partnership Scheme as well as a working document for the implementation of the scheme will be agreed upon by the European and Chinese leaders during the forthcoming EU-China Summit in Lyon is very promising.

However, the experts are fully aware of the difficulties to be overcome when designing the framework conditions and procedures for coordinated S&T activities of S&T systems that are substantially different with regard to policies, strategies, programmes and programme implementation mechanisms. Therefore, it is very well appreciated that a commonly agreed approach will be found. The rigorous efforts of both parties' officers that prepared the memorandum of understanding and the working arrangement for the implementation of the scheme at the technical level officers characterised by commitment combined with flexibility are very much appreciated. This new scheme will certainly form a landmark in the S&T relations between Europe and China.

Originally, based on the interpretation of the rules for participation in the EU RTD Framework Programme, two options were identified as being possible in principle: coordinated calls leading to joint projects, or coordinated calls leading to coordinated projects. Both options are feasible and are also in line with the S&T agreement, Article 5 (b) *"Cooperative activities may take the following forms (last indent): "any other modality that would be recommended by the Steering Committee and deemed in conformity with the policies and procedures in both Parties"*. It is expected that both sides will come to an agreement on the most suitable approach. In addition, it

has to be ensured that governance structures and mechanisms provide the frame for learning by experience and for adapting the schemes as needed and appropriate. The Steering Committee of the S&T agreement should get a central role in the implementation of the programme.

It will be important that close cooperation will be ensured through the whole programming cycle from the identification of priorities of common interest to the formulation of the coordinated calls for proposals and the appropriate procedures for evaluation and selection of proposals. This scheme has the potential to substantially deepen and broaden the EU-China S&T cooperation. It will be beneficial for the Chinese and European scientific communities but also for the S&T policy level due to the joint learning processes during the implementation and further development of the scheme. The new scheme bears the potential that it will be implemented on the basis of joint 'ownership' by both parties.

2.2. The role of the EC-China S&T Agreement and its management

The activities under the EC-China S&T agreement are coordinated on behalf of the People's Republic of China by the Ministry of Science and Technology (MOST) and, on behalf of the European Community, by the European Commission services. Both institutions act as executive agents. For the management of the agreement a Steering Committee has been established consisting of an equal number of official representatives of each Party.

In general, the EC S&T agreements have the potential to play an important role also in the frame of the implementation of the future strategic European framework for international S&T cooperation. Especially in the context of developing strategic partnerships with key third countries the S&T agreements will provide a stable legal framework for regular consultation and cooperation.

Compared to 1998-2003, meetings of Steering Committee have greatly improved both regarding scientific content and participation of high level stakeholders. Directorates of the 'research family' and the department for international cooperation of MOST provide input to the preparation of the annual meetings of the Steering Committee. High level officials of both parties participate in the meetings. In the course of the preparations of the last two Steering Committee meetings this has become especially important because the new strategic approach requires careful preparations for the annual road map to be presented to and discussed by the Steering Committee. This has certainly led to a new quality of the cooperation between the thematic directorates and the directorate for international cooperation of DG RTD and to also to a greater importance of the S&T agreement. The exercise to develop annual road maps would, however, certainly gain even more value if the decisions on the road map would be taken jointly by the representatives of the Commission and MOST in the meetings of the Steering Committee. It will be an important objective that all initiatives and activities launched and supported by the Steering Committee would be based on joint ownership by the two involved parties.

The EU-China Summits have regularly referred to and supported the outcomes and agreements reached in meetings of the Steering Committee frequently organised close to the dates of the Summits. On the other side, it seems important, that decisions and conclusions of the Summits related to EU-China S&T cooperation are systematically implemented and monitored with the support of the Steering Committee.

Increasing awareness and information on the S&T Agreement outside the Steering Committee, however, is still an area where improvements are necessary and possible. At the European side:

- Member states and S&T experts should be better informed of the agenda and outcomes of Steering Committee meetings, and where appropriate also actively involved in their preparation and follow up;
- Information on the main outcomes of Steering Committee meetings should be widely spread amongst S&T stakeholders of the Member States (e.g. via CREST or a possible future forum for international S&T cooperation) and National Contact Points (NCPs);
- The preparation and implementation of the road maps could be used to intensify the exchange of information and the cooperation between the Commission and the Member States;
- Also ERAWATCH could be used as one of the information channels.

The involvement of Member States' representatives and of experts in the preparation of Meetings of the Steering Committee as well as in the dissemination of information on the outcomes of the meetings especially the road maps has of course be organised in formats that are in accordance with the rules of the Steering Committee. Certainly, also the Chinese side will be able to develop appropriate means for raising awareness and improving information amongst relevant stakeholders and scientific communities. However, the possibility of realising such an intensification of the EC-China interaction in the frame of the S&T agreement would certainly require that the appropriate resources for the management if such process would be available on both sides.

Members of the Steering Committee appreciate the open and outspoken character of the deliberations in the committee. This is the basis for further developing a spirit of real partnership and joint ownership. That is an extremely important quality of the work in the Committee which must in no case be compromised. It might be interesting to explore and possibly learn from the approaches taken by other sectoral dialogues close to the S&T cooperation, for example the information society or environment dialogue or the energy working group.

This leads also to another area with opportunities for improvement that is the interaction, exchange of information, coordination and cooperation between the S&T agreement and sectoral dialogues where appropriate. Possible examples are environment and energy.

A final aspect related to the management of the S&T agreement is the monitoring as well as the (annual) reporting of the activities under the S&T Agreement. The Commission services provided the experts with a large number of relevant documents who also were informed in meetings and in the course of the interviews on all possible details of the developments in the reporting period. The work of the reviewers was supported excellently in every respect. However, it was still not an easy task to develop a comprehensive overview of the activities because no systematic reporting system is in place. It took quite an effort to put the pieces of the 'jigsaw puzzle' of information together to arrive at an overview allowing a thorough review of the activities. The experts are aware of the scarce of resources available for the management of the S&T agreement and the implementation of the activities agreed upon in the Steering Committee. Therefore, it is recommended to organise and design the annual road maps in a way that they can form the basis for annual reporting as required also by Article 6 (d) 4 of the S&T agreement as well as for continuous monitoring and annually reviewing of the progress of initiatives. This will certainly become even more important in the context of the forthcoming EC-China S&T partnership scheme.

The EC S&T Counsellor plays a central and most important role in the communication and cooperation between the Community and China. The tasks of the EC S&T counsellor for promoting EC-China S&T cooperation should be clearly defined and has to be strengthened also regarding the appropriate resources. The S&T counsellor has a most relevant diplomatic role for

continuously maintaining and cultivating the contacts with the main S&T stakeholders in China and ensuring an atmosphere of mutual trust and understanding while also monitoring the developments of S&T in the partner country. This is a challenging task requiring a spectrum of knowledge, capacities and skills.

2.3. EU-China S&T cooperation in the EU RTD Framework Programmes and in the Chinese 863 and 973 Programmes of MOST

The main aim of the EC-China S&T agreement remains the strengthening of S&T cooperation by using the available instruments such as the EU RTD Framework Programme. In Chapter 3, detailed quantitative overview of the participation of China is provided. In general, the analyses of FP6 and FP7 show a positive trend, in terms of both increased numbers of participation and a broader coverage of thematic areas. However, when reviewing the EC-China cooperation in the Framework Programmes it is difficult to judge if the level of cooperation achieved during the reviewed period is satisfying or not because there are no defined targets.

The principle of reciprocity as defined in Article 3 of the S&T Agreement (Principles) opening not only the EU RTD Framework Programmes for the participation of Chinese entities but ensuring also access of EU researchers to Chinese funded research programmes has to be still fully materialised. So far, that access is virtually nonexistent. However, this might change in the near future because in the Joint Statement of the 10th China-EU Summit it says: *"The leaders acknowledged the very important participation of Chinese researchers in the first calls of the 7th Research Framework Programme. They agreed to facilitate also the participation of European researchers in Chinese funded programmes. The leaders encouraged programmes to assist the mobility of researchers. the Joint declaration of the 10th EC-China Summit leaders that also the participation of European researchers in Chinese funded programmes will be facilitated."*[18]

It has to be well understood, that in the course of these promising prospects for further developments in the very near future IPR issues will be taken into account in accordance with the respective provisions in the S&T agreement and in the rules for participation under FP7 at European side as well as the Chinese rules and regulations on the other side. An encouraging IPR environment is an important requirement for positive future developments.

2.4. Going beyond the EU RTD Framework Programme and the Chinese 863 and 973 Programmes of MOST: Other initiatives supported by the S&T Agreement

The activities initiated under the S&T agreement are, however, not limited only to cooperation in the EU RTD Framework Programme. During the period 2004-2008 also other initiatives were discussed and are being prepared. These initiatives go beyond project cooperation and indicate the willingness to move forward towards long-term institutional cooperation. A summary list of the cooperative initiatives for EC-China S&T cooperation, beyond the cooperation in the EU RTD Framework Programme is presented below and more detailed information is provided in Chapter 3:

Institute for Clean and Renewable Energy (ICARE): A letter of intent for this initiative has been signed during President's Barroso's visit to China in April 2008.

The Euro-China Energy Centre (EC2): A the financial agreement is envisaged to be signed later this year, hopefully during the 2008 Summit.

[18] Joint Statement of the 10th China-EU Summit Beijing, 28 November 2007, p.12

Near Zero Emission Coal project (NZEC): The EC-China agreement for this project was signed at the 2005 EU-China Summit as part of the EU-China Partnership on Climate Change.

In that context, also the mutual access to and cooperation in large research infrastructures is a very interesting and important development area. It is most welcome that the Chinese Academy of Sciences (CAS) offers the opening of its large facilities to European scientists. That is certainly an interesting opportunity that should be further explored. In addition, the European Strategy Forum for Research Infrastructures (ESFRI) might explore the possibilities of partnership between European infrastructure initiatives and Chinese partners.

In addition to current practices, the full range of cooperation activities as defined in Article 5 of the Agreement (Forms of cooperative activities) should be used. Opportunities for exchange of information as well as for twinning or pooling of projects in the same thematic area funded separately at Member States and Community level in Europe and by different organisations and at different levels in China could be organised where appropriate. This would provide extended spaces for better linking the scientific communities from Europe and China.

The experts are convinced that the future cooperation will be further strengthened and will go beyond the cooperation under the new EC-China S&T partnership scheme that is supported by the project-oriented EU Framework Programme and Chinese research programmes. Joint long-term institutional settings for S&T cooperation as well as an integrated governance and policy-making approach should become major aspects in the process of further deepening and broadening the EU-China S&T cooperation

2.5. Awareness, information and assistance for EU-China S&T cooperation

There is clearly room for improvement of information and assistance of researchers on the possibilities of EU-China S&T cooperation both in Europe and in China. During their visits to universities and research organisations in the course of their mission to China the experts received positive opinions on the activities of the China-EU Science and Technology Co-operation Office (CECO), which has been established by MOST and later on also supported by the European Commission's International Cooperation Department[19]. However, the experts realised that due to the size of China as well as the enhanced S&T capacity at both the national and regional levels in China, there is an emerging and great need for developing a multi-layered and professionalized network of contact points for information and assistance as well as for capacity building in EC-China S&T cooperation would be very useful.

Support activities should not be limited only to information on the Framework Programme and the support for the preparation of proposals. General information on the S&T system(s) and structures in Europe would also be most appropriate. In many cases, the experts found strong interest in working with Europe but also a lack of information on the European research area. In leading positions at universities and research institutes there are in many cases a larger number of scientists that have been trained or worked in the US compared to the number scientists with professional experience and contacts in Europe.

On the other side, there is a substantive need also on the European side to improve the information and assistance on the opportunities of S&T cooperation with China both in the Framework Programme but increasingly also in Chinese programmes. National Contact Points should receive specific information and training on the Chinese science, research and innovation

[19] http://www.ceco.org.cn; see also: Communication actions for enhanced participation of Third Countries in FP6: Promotion Bureau for EU-China Research collaboration. European Commission, 2005

system and on the opportunities for supporting cooperation. The forthcoming ACCESS4EU supporting action may contribute to such activities.

European Technology Platforms (ETPs) and Joint Technology Initiatives should be encouraged to include the international dimension in their strategies and to explore and promote opportunities of EC-China S&T cooperation as appropriate[20].

The China-Europe Science and Technology Year (CESTY) 2006 and 2007 was a most welcome joint initiative of the Ministry of Science and Technology (MOST) and the Directorate-General of the European Commission. CESTY contributed to raising the awareness on the huge potential of strengthening EU-China S&T cooperation. It is recommended that the two parties jointly review the experiences with CESTY as well as its impact. On the basis of the results of such a review similar initiatives could be considered also for the future.

The visibility of European S&T activities, including the Framework Programme in China is still limited. In the experts' opinion more joint activities of Member States and the European Commission would be useful. It is suggested to consider the possibility organising EU-China S&T Summits around the general EU-China summits.

Adequate resources should be made available to the EC S&T counsellor in China for providing the first access point and gateway for user-friendly information for Chinese partners on possibilities for S&T cooperation with the EU. The website of the EC delegation should be the major tool for that purpose. For other operational promotion activities in China the BILAT-SILK scheme should be utilized in clear coordination, division of labour and cooperation with the EC S&T counsellor.

2.6. Conclusions and recommendations

1. The Chinese S&T and innovation system is developing extremely fast and dynamically and China has become a major actor in the global system for the production of knowledge. This will strengthen the global S&T community and cooperation has to be high on the agenda.
2. During the reviewed period 2004-2008, the EC-China S&T Cooperation Agreement has proven to be an important legal basis and an efficient tool for the regular S&T policy dialogue between the EU and the People's Republic of China. The experts recommend renewing the agreement, with the major contents unchanged and, where necessary and appropriate, some technical updating of the text to the state of 2008.
3. In general, the EC S&T agreements have the potential to play an important role also in the frame of the implementation of the future strategic European framework for international S&T cooperation[21]. Especially in the context of developing strategic partnerships with key third countries the S&T agreements will be conducive for building mutual understanding and deepening the cooperation. The ways and means of setting targets and implementing activities have to be further developed, based on mutual benefits as well as taking into account region- and country-specific contexts. The development towards strategic cooperation under the EU-China S&T Cooperation Agreement is most welcome and can act as a very good example in that respect.
4. During the reviewed period the 7th EU RTD Framework Programme (2007-2013) and China's Medium- and Long-term Science and Technology Development Plan (2006-2020) and the 11th Five-Year Plan (2006 - 2010) were launched. This concurrence forms an

[20] For more details see Chapter 3.6
[21] See: COM(2008) 588 final, 24.9.2008

excellent basis for in-depth dialogues on how to utilize possible synergies and complementarities between the policy frames from both sides.

5. Compared to 1998-2003, meetings of Steering Committee have greatly improved both regarding scientific content and participation of high level stakeholders. Regarding the systematic follow-up of S&T related aspects addressed during the EU-China Summits, there seems to be some room for improvement.

6. The move towards a strategic partnership in key priority areas is probably the most important development in the course of the 10 years since the S&T agreement was signed in 1998. Furthermore, the annual road maps of activities will provide an excellent framework for implementing cooperative activities efficiently and effectively. This is certainly a real advancement towards higher efficiency and effectiveness of the work of the Steering Committee. Annual road maps could also be used as input to annual reporting as required by Article 6 (d) 4 of the S&T agreement as well as for continuous monitoring and annually reviewing the progress of initiatives. The exercise to develop annual road maps would certainly gain even more value if the decisions on the road map would be taken jointly by the representatives of the European Commission and MOST in the meetings of the Steering Committee.

7. Increasing awareness and information on the S&T Agreement outside the Steering Committee is still an area where improvements are possible. Member states and S&T experts should be better informed of the agenda and outcomes of Steering Committee meetings, and where appropriate involved in the preparation and follow up. Information on the main outcomes of Steering Committee meetings should be widely spread in formats that are in accordance with the rules of the Steering Committee amongst S&T stakeholders of the Member States (e.g. via CREST or a possible future forum for international S&T cooperation) and National Contact Points (NCPs). The preparation and implementation of the road maps could be used to intensify the exchange of information and the cooperation between the Commission and the Member States. Also ERAWATCH could be used as one of the information channels.

8. Some directorates of the 'research family' have shown substantial involvement in the interaction with China on S&T-related issues. Thus, the internal awareness and utilization of the S&T agreement amongst the Commission services have been enforced. However, there seem to be rooms for improvement between S&T cooperation and the activities covered by other sectoral dialogues, e.g. environment and energy. The exchange of information, coordination and cooperation as appropriate between S&T cooperation and sectoral dialogues in other policy areas deserves continuous attention. Possible synergies should be utilized wherever possible.

9. Coordination of calls for proposals between the European Commission and the Ministry of Science and Technology (MOST) following the principles of co-evaluation, co-decision on selection and subsequent co-funding of projects will contribute to deepen EU-China S&T cooperation, and to achieve the equal partnership in real terms. The experts support the idea that the European Commission and MOST shall carry out cooperation based on FP7 of the EU and the 863 and 973 Programmes and other potentially feasible and appropriate research funding schemes of China. These developments can be seen as a major step towards achieving reciprocity as required by the S&T agreement. The prospect that a Memorandum of Understanding on China-European Commission S&T Partnership will be signed during the forthcoming EU-China Summit in Lyon is most welcome. The experts are fully aware of the difficulties to be overcome when designing joint efforts of different S&T funding systems and it is very well appreciated that a commonly agreed approach can be found. Therefore, the

rigorous efforts combined with flexibility of the officers that prepared the agreement at the technical level are very much appreciated.

10. The experts fully support the structure and contents of the planned strategic partnership. The purpose, principles and ways of cooperation and management mechanisms are well defined and will provide a sound basis for the development of the future strategic S&T cooperation between Europe and China. Following a step by step approach will ensure that the programme will follow a development path of jointly learning from experience. Such an agreement will certainly become an example of best practice important also for other agreements on international S&T cooperation. However, such an effort may be only appropriate in cases where there are really substantial capacities for in-depth and long-term cooperation on both sides.
11. The involvement of experts from both parties in workshops to give input for calls for proposals provides also the opportunity to establish and deepen the contacts and communication between high level European and Chinese experts that may lead to future cooperation. Taking into account the great technical complexity and comprehensiveness in the institutional and regulatory framework involved in research areas, such as environment, energy and climate change and heath, the engagement of a broad spectrum of well-respected high-level experts from both sides needs to be ensured.
12. The role of the EU S&T counsellor for promoting EU-China S&T cooperation should be clearly defined and has to be strengthened. The S&T counsellor has an important diplomatic role for continuously maintaining and cultivating the contacts with the main S&T stakeholders in China and ensuring an atmosphere of mutual trust and understanding while also monitoring the developments of S&T in the partner country.

3. EU-China S&T cooperation 2004-2008 – The EU RTD Framework Programme and beyond

The analysis performed in this Chapter is to draw up the pattern of S&T co-operation activities, with a focus on the Chinese participation in the Framework Programmes, over the period 2004-2008. The key elements that are highlighted in the pattern of co-operation include:

- A detailed description of the participation of China in both Framework Programme 6 (FP 6), which covered the period 2002-2006 and a first look at the most recent participation in Framework Programme 7 (PP7, 2007-2013), which launched its first call in December 2007;
- The quantitative change over time, in terms of number of projects, participations and partners;
- The structural shifts in the participation, observed from the changes in thematic distribution and type of participating organisations.
- Based on the quantitative as well as the structural changes observed, the underlying driving forces and the potential impacts will also be brought to light in terms of:
- What is the strategic importance of the observed changes?
- What are the implications for future S&T co-operation between the EC and China?

3.1. General statistical overview of EC-China cooperation in FP6[22]

In FP6, there were in total 392 Chinese participations in 209 projects. The most attractive thematic priorities for Chinese participation were Information Society Technologies, Food Quality and Safety, and Sustainable Development. In terms of specific activities, the Chinese participants were also active in International Co-operation Activities (INCO). In addition, China also had a relatively large number of successful applications in the areas of Human Resources and Mobility (Marie-Curie actions), Research for Policy Support and Research Infrastructures. The diversity in the thematic orientations suggests that the motivation for Chinese participation was not only targeted at scientific research co-operation, but aimed also at capacity building in terms of human resources, physical infrastructure and even policy development.

The success rates across different thematic priorities and other activity areas had a noticeable variation. In general, the success rate of FP projects with Chinese participation is similar to the average level of FP 6 as a whole, with the following distinguishing features:

- In the thematic area of nanotechnologies and nanosciences, the projects with Chinese participation had a much higher success rate, than the average (21,7% versus 16,7%);
- Despite the highest number of FP projects with Chinese participation (totally 102 participations in 44 projects), the success rate of proposals in the field of information society technology was not significantly higher than the average (i.e. around 18%);
- The success rate of the FP projects with Chinese participation in the fields of sustainable development was significantly higher than the average (30,2% versus 21,9%). This was largely due to the high success rate of the projects in the fields of energy systems (about 48% and totally 32 participations in 18 projects were involved);
- There was a large number of applicants in the fields of food quality and safety (128 applicants). However, the number of successful participations as well as the number of projects were rather low (totally 28 participations in 18 projects).
- Surprisingly, the number of applications in the fields of life science, genomics and biotechnology, in which China has been "catching-up" rapidly, had a rather low number of participations (totally 42). This low level indirectly resulted in a rather high success rate compared to the average success rate of projects with Chinese partners, which was about 23,8%, that was, however, slightly lower than the FP6 average.

Table 3: Chinese participation in FP 6- success rate by thematic priorities

Thematic area	No. of Applicants (A)	No. of Participation (B)	No. of projects	Success rate B/A	Success rate B/A (FP 6 average)
1. Life sciences, genomics and biotechnology for health	42	10	10	**23,8 %**	**25,4%**
2. Information society technologies	545	102	44	**18,7 %**	**18,4%**
3. Nanotechnologies and nanosciences, knowledge-based multifunctional materials and new production processes and devices	97	21	12	**21,7 %**	**14,7**
4. Aeronautics and space	60	17	8	**28,3 %**	**36,1**
5. Food quality and safety	128	28	18	**21,9 %**	**22,0**
6. Sustainable development	215	65	40	**30,2 %**	**21,9**
7. Citizens and governance in a knowledge-based society	17	4	3	**23,5 %**	**17,4**

[22] Data were provided by the Commission services

New and emerging science and technology (NEST)	11	2	2	**18,2 %**	**23,4**
Specific SME activities (SME)	14	1	1	**7,14 %**	**11,4**
International Cooperation Activities (INCO)	513	57	24	**11,1 %**	**14,5**
Joint call (Thematic priorities 4, 6a, 6b)	48	11	7	**22,9 %**	
Research for policy support	62	36	16	**58,1 %**	**15,7**
Research and innovation	10	3	2	**30,0 %**	**28,6**
Human resources and mobility	90	14	14	**15,6 %**	**15,9**
Research infrastructures	22	13	5	**59,1 %**	**37,8**
Science and society	15	8	3	**53,3 %**	**14,1**
Sum	**1889**	**393**	**209**		

With respect to success rates, the capacity building-oriented projects in general had a higher success rate, in particular for research for policy support (58,1%), research infrastructure (59,1%) and science and society (53,3%);

In terms of funding, FP6 provided 34,7 million Euro to the Chinese participants, accounting for 4,3% of the EC contribution to the FP6 projects with at least one Chinese consortium partners, which was 812,9 million Euro. The interpretation of the level of EC contribution to Chinese participation can be twofold:

- Firstly, it is still considered remarkable when the participation of third countries, such as China can be covered, even though the share of the budget of the Chinese participation is generally low. Exceptions with a rather high share of funding for Chinese participants include surface transport (12,9%) and International Cooperation Activities (19,6%) as well as some capacity building activities, such as research for policy support and science and society;
- Secondly, the level of the coverage of participants' cost for China is rather high, above 70% on average. However, in some research fields that are close to the market, such as in information society technologies and nanotechnology and materials science, the percentage of EC contribution for China in the total participant cost were lower (57% and 43% respectively).

Table 4: Chinese participation in FP 6- EC contribution by thematic priorities

Thematic priorities	No. Projects	No. Participants	Project EC Contribution (Euro)	Participant EC Contribution (Euro)	Percentage of the EC contribution for China vs. the whole EC contribution	Percentage of the EC contribution for China vs. participant total cost
1. Life sciences, genomics and biotechnology for health	10	10	63 593 499	1 480 553	2,3 %	74,4%
2. Information society technologies	44	102	221 325 806	7 706 916	3,5 %	57,2%
3. Nanotechnologies and nanosciences, knowledge-based multifunctional materials and new production processes and devices	12	21	29 810 946	1 107 658	3,7 %	42,7%
4. Aeronautics and space	8	17	48 179 343	1 693 305	3,5 %	82,4%
5. Food quality and safety	18	28	139 698 970	4 629 854	3,3 %	84,4%
6. Sustainable development, energy systems	18	32	52 935 145	2 681 759	5,1 %	82,0%

6. Sustainable development, surface transport	2	4	2 355 016	303 120	12,9 %	100%
6. Sustainable development, global change and ecosystems	20	29	136 268 461	2 405 665	1,8 %	63,1%
7. Citizens and governance in a knowledge-based society	3	4	2 113 600	251 750	11,9 %	86,5%
New and emerging science and technology (NEST)	2	2	2 114 540	231 900	11,0 %	100%
Specific SME activities	1	1	860 992	0	0,0 %	0,0%
International Cooperation Activities	24	57	36 481 827	7 025 091	19,6 %	97,0%
Joint call (Thematic priorities 4,6a,6b)	7	11	31 905 283	838 692	2,6 %	56,2%
Research for policy support	16	36	22 165 826	3 417 823	15,4 %	66,4
Research and innovation	2	3	3 018 255	76 121	2,5 %	70,9%
Human resources and mobility	14	14	6 215 163	115 560	1,9 %	-
Research infrastructures	5	13	12 070 412	525 705	4,4 %	93,4%
Science and society	3	8	1 811 973	227 366	12,6 %	100%
Sum:	**209**	**392**	**812 925 057,59**	**34 718 836,80**	**4,27 %**	**71,8%**

With regard to EC contribution across different thematic priorities, due to either the large number of projects, or the relatively large size of individual projects, the EC contribution to Chinese participants were highly concentrated in information society technologies (22,2% of the total participant EC contribution), food quality and safety (13,3%), international cooperation (20,2%) and research for policy support (9,8%).

In terms of the distribution of EC contribution across different types of participants, the largest recipient groups were from the (governmental) research institutes (RES + REC) and the higher education sector (HE + HES). A total of 166 participations from the research institutes received about 43% of the participant EC contribution in FP6. The corresponding figures for the higher education sector were 130 participations and about 36% of participant EC contribution. On the other hand, the participation from the industrial sector was limited with 53 participations and received 8% of EC contribution to Chinese participation.

Table 5: Chinese participation in FP 6- EC contribution by type of organizations

Organisation Activity Type	No of participation	Participant Total Cost (A)	Participant EC Contribution (B)	EC contribution in total cost (B)/(A)	Share in total EU contribution
HE	100	11 949 565	10 125 104	85%	29%
HES	30	3 345 436	2 601 145	78%	7%
RES	152	18 036 948	13 660 179	76%	39%
REC	14	1 638 619	872 380	53%	3%
IND	53	6 647 469	2 810 200	42%	8%
OTH	43	6 732 610	46 49 830	69%	13%
Total:	**392**	**48 350 647**	**34 718 837**	**72%**	**100%**

A closer look at the participants from different sectors in FP6 revealed the following main findings:

- The top universities in China, in particular Tsinghua University in Beijing and Fudan University in Shanghai were the most active participants in FP6. The top universities, in the fields of medicine, agriculture, aeronautics, IST and transport were all participants with at least 2 FP6 projects;
- The Chinese Academy of Science (CAS) and The Chinese Academy of Agriculture Science (CAAS) were the most important participants from the research institute sector.

CAS alone had 74 participations and received 20% of participant EC contribution. Specialised in agriculture, the CAAS alone had 8 participations in the thematic priority of food quality and safety, and a total of 15 participations in FP6.;

- The participation from the industrial sector was dominated by multinationals in China in the IST sector. Nokia, Siemens and France Telecom were the most active ones. The domestic IST giant Huawei was very active and participated in 3 FP6 projects.

Table 6: Top Chinese participants in FP 6 – Universities

Participant Legal Name	No of projects	Location
TSINGHUA UNIVERSITY	22	Beijing
FUDAN UNIVERSITY	9	Shanghai
BEIJING UNIVERSITY OF POSTS AND TELECOMMUNICATIONS	8	Beijing
PEKING UNIVERSITY	7	Beijing
SHANGHAI JIAO TONG UNIVERSITY	6	Shanghai
BEIHANG UNIVERSITY	5	Beijing
CHINA AGRICULTURAL UNIVERSITY	5	Beijing
SUN YAT-SEN UNIVERSITY	5	Guangdong
BEIJING NORMAL UNIVERSITY	3	Beijing
NANJING AGRICULTURAL UNIVERSITY	3	Jiangsu
OCEAN UNIVERSITY OF CHINA	3	Beijing
UNIVERSITY OF HONG KONG	3	Hong Kong
UNIVERSITY OF SCIENCE AND TECHNOLOGY OF CHINA	3	Beijing
ZHEJIANG UNIVERSITY	3	Zhejiang
EAST CHINA NORMAL UNIVERSITY	2	Shanghai
HUAZHONG AGRICULTURAL UNIVERSITY	2	Hubei
NANJING UNIVERSITY	2	Jiangsu
PEKING UNION MEDICAL COLLEGE	2	Beijing
SHANDONG UNIVERSITY	2	Shangdong
TONGJI UNIVERSITY	2	Shanghai

Table 7: Top Chinese participants in FP 6 – CAS

Thematic	Participant Total Cost	Participant EC Contribution	No. of projects
1. Life sciences, genomics and biotechnology for health	652 866	65 2866	3
2. Information society technologies	1 278 940	774 780	9
3. Nanotechnologies and nanosciences	314 570	286 570	4
4. Aeronautics and space	83 000	83 000	2
5. Food quality and safety	429 960	266 960	3
6. Sustainable development	3189 752	2431583	8
Human resources and mobility	0	76 560	8
International Cooperation Activities	51 7548	385 548	4
Joint call (Thematic priorities 4,6a,6b)	36 394	36 394	1
New and emerging science and technology (NEST)	195 000	195 000	1
Research for policy support	2 806 724	1 524 946	11
Research infrastructures	205 100	205 100	5
Science and society	31 502	31 502	3
CAS total	**9 741 356**	**6 950 808**	**74**
FP total	**48 350 647**	**34 718 837**	**392**
CASS share in FP total	**20,1%**	**20,0%**	**18,9%**

Table 8: Top Chinese participants in FP 6 – CAAS

Thematic	Participant Total Cost	Participant EC Contribution	No. of projects
5. Food quality and safety	1 918 660	950 635	8
International Cooperation Activities	51 900	36 060	4
Research for policy support	4 6500	46 500	3
CAAS total	**2 017 060**	**1 033 195**	**15**
FP total	**48 350 647**	**34 718 837**	**392**
CASS share in FP total	4,2%	3,0%	3,8%

Table 9: Top Chinese participants in FP 6 –Industrial sector

Thematic	Participant Legal Name	No. of projects
Information society technologies	NOKIA (CHINA) INVESTMENT CO. LTD.	4
Information society technologies	SIEMENS LIMITED CHINA	4
Information society technologies	FRANCE TELECOM R&D BEIJING COMPANY LIMITED	3
Information society technologies	HUAWEI TECHNOLOGIES CO. LTD	3
Information society technologies	PHILIPS (CHINA) INVESTMENT CO. LTD	2
Nanotechnologies and nanosciences	SHANGHAI YANGTZE NANOMATERIALS CO. LTD	2

In terms of geographic distribution, the participations in FP6 were, not surprisingly, highly concentrated in Beijing and Shanghai. However, there were also a few emerging "hot spots" that also had a significant number of participations, such as Guangdong, Shandong, Hubei, Jiangsu, Liaoning and Zhejiang and others, as shown in Table 10.

Table 10: Chinese participation in FP 6- regional distribution of participations

Region/city	No. Of participation	Share in Total %
BEIJING	224	57,1
SHANGHAI	53	13,5
GUANGDONG	14	3,6
SHANDONG	14	3,6
HUBEI	11	2,8
JIANGSU	9	2,3
LIAONING	7	1,8
ZHEJIANG	7	1,8
SICHUAN	6	1,5
GANSU	5	1,3
HONG KONG	5	1,3
ANHUI	4	1,0
HENAN	4	1,0

HUNAN	4	1,0
SHANXI	4	1,0
YUNNAN	4	1,0
HEILONGJIANG	3	0,8
TIANJIN	3	0,8
CHONGQING	2	0,5
HEBEI	2	0,5
GUANGXI	1	0,3
JIANGXI	1	0,3
JILIN	1	0,3
LHASA	1	0,3
MACAU	1	0,3
SHAANXI	1	0,3
QINHAI	1	0,3
Total	**392**	**100,0**

3.2. First results regarding EC-China cooperation in FP7

The first call of FP7 was launched in December 2007. The analysis is based on information as of 20 July 2008, which is the latest statistical information available to the Review. There were significant structural changes in the FP7, aiming at increasing the international dimension of research co-operation by integrating this aspect into the thematic priorities

It is therefore important to see how such structural changes may have affected the participation from China. Due to the still early stage of the implementation of FP7 no detailed analysis with regard to the different facets of the international dimension in FP7 can be given. It is also important to bear in mind that it is difficult to observe the new development in the FP7 based only on information from the first call. Nevertheless, from the information available, the following trends emerge:

- The number of applications with Chinese partners in FP seems to increase, with the increased openness in the "Co-operation" Specific Programme. Environment, health, ICT were the most attractive themes and, there are already 87 main-listed participations in 63 projects involving 77 Chinese participant organisations.
- The transport theme had the highest success rates in terms of main-listed participations (57,1%). Food, Agriculture and Biotechnology (FAB) also had relatively high success rate (24,1%).
- On the other hand, the success rates of the nanotechnology and energy themes seem to be rather low. Similarly the success rate of environment was also relatively low, despite the largest number of participations in project applications. (This is the opposite of the situation in FP6, which might be due to the fact that there is a lack of comparability between FP6 as a whole and FP7 based on only the first call)

Table 11: Chinese participation in FP 7- success rate by thematic priorities*

	Number of Applicants (A)	Number of Participations (B)	Number of projects	Success rate B/A
Co-operation				
Health	93	14	8	15,0%

FAB	53	13	13	24,1%
ICT	89	13	12	14,6%
NMP	29	5	5	17,2%
Energy	49	5	2	10,2&
Environment	144	17	10	11,8%
Transport	21	12	7	57,1%
Socio-economic	43	8	6	18,6%
Security	1	0	-	0
Space	-	-	-	
Total	**523**	**87**	**63**	17%
Ideas				
	3	0		
People				
	45	**17**	**17**	37,8%
Capacity				
Capacity				
Activities of interaction cooperation	**18**	1	**1**	5,5%
Research for SEMs	**4**	1	**1**	25%
Research infra	**26**	0		0
Science in Society	**3**	1	**1**	33,3%

* Reference date: 20 July 2008

In terms of the distribution of types of organisations and top participants, and different from FP6, the higher education sector, i.e. universities had the largest number of participation in the first call. This was due to both the large participation in the "Co-operation" Specific Programme (totally 52 compared to 21 from research institutes) and the large participation in the "People" programme (totally 15 compared to 5 from research institutes). With regards to top participants, so far, it were still those most active universities, together with CAS and CAAS that dominated the participation.

Table 12: Chinese participation in FP 7 - by type of organizations

Organisation Activity Type	No of participation in cooperation	No of participation in ideas	No of participation in people	No of participation in capacity	Total
HES	52	-	15	1	**68**
RES		-	2	2	**4**
REC	21	-	-	-	**21**
IND	6	-	-	-	**6**
OTH	8	-	-	-	**8**

Table 13: Chinese participation in FP 7 - top participants

Applicant Legal Name	No. of project
Tsinghua University	5
Fudan University	3
CAAS	3
Beijing Forestry University	2
Beijing University of Posts and Telecommunications	2

COSCO CONTAINER LINES	2
Peking University	2
The Chinese University of Hong Kong	2
Tongji University	2
Zhejiang University	2
CAS-related research institutions	13

3.3. Changes in EC-China cooperation from FP5, FP 6 to FP7

The overall increase in participation in the Framework Programme

The comparison across FP5, FP6 and FP7 in terms of both the participation of China and its relative size, in relation to the FP has a whole has shown the following quantitative changes:

- In absolute terms, the Chinese involvement has increased significantly by 2,5 times, in terms of both the number of project and the number of participations, from FP5 to FP6. Based on data from the first call of FP 7, the participation of China is expected to continue to increase in future calls.
- The relative importance of Chinese involvement in FP has also increased. Projects with at least one Chinese participant accounted for 2,1% of the total number of projects and 0,53% of participation in FP6 and represented an increase by a factor of 4 and 3, respectively in comparison to FP5.

Table 14: The increases in participation FP 5 - FP7

	FP5	FP 6	FP7
China			
Number of projects	81	209	83
Number of participations	154	392	107
Total			
Number of projects	16,553	10,058	-
Number of participations	84,267	74,400	-
China' share in total			
Projects	0.49%	2.1%	
Participation	0.18%	0.53%	

*Reference date: 20, July, 2008

Links with EU Member States:

A simple comparison of the links between China and EU Member States in FP5, FP6 and FP7 show a clear trend that, despite the high concentration of a few big players, such as France, Germany, the UK, Italy and Spain, there is a large increase in cooperative activities between China and a number of smaller countries, such as Demark, Sweden, the Netherlands, Belgium and Poland.

Table 15: Links of China to selected EU Member States - from FP 5, FP6 to FP 7

Participant Country	Number of Participants FP5	Number of Participants FP 6	Number of Participants FP 7*	Increase FP5-FP6	Growth FP5-FP6 %
Belgium	39	139	40	**100**	256,4%
Denmark	10	121	15	**111**	1110,0%
France	65	298	59	**233**	358,5%
Germany	75	420	102	**345**	460,0%
Italy	41	291	68	**250**	609,8%
Netherlands	28	221	55	**193**	689,3%
Poland	12	75	14	**63**	525,0%
Spain	31	200	57	**169**	545,2%
Sweden	23	101	28	**78**	339,1%
United Kingdom	56	405	105	**349**	623,2%
Total number of links with EU MS	**514**	**2 776**	**660**	**2 262**	440,1%

* Reference date for FP 7 statistics is 19 June 2008

3.4. Mobility: The Marie Curie Action

The Maria Curie Actions aim to promote mobility based on various host-driven, individual-driven and excellence promotion instruments. It has undergone substantial structural changes, from FP6 to FP7, and the structural outlines to illustrate the changes are given In Table 16.

Table 16: Marie Curie Actions from FP 6 to FP 7

FP 6 - Maria Currie Action	FP 7 People - Maria Currie Action
Host Driven	**Networks for initial training (ITN)**
Research Training Network (RTN)	RTN + EST + EXC + SCF
Fellowship for Early State Training (EST)	
Fellowship for Transfer of Knowledge (TOK-IAP &TOK-DEV)	
	Life-long training &Career development
Individual Driven	Intra-European Fellowship (EIF)
Intra-European Fellowship (EIF)	European Reintegration Grants (ERG) + OIF
Outgoing International Fellowship (OIF)	Co-funding national programme
Incoming International Fellowship (IIF)	
	International dimension
European Reintegration Grants (ERG)	International Outgoing Fellowship (IOF)
International Reintegration Grants (IRG)	International Incoming Fellowship (IIF)
	International Reintegration Grants (IRG)
Excellence promotion	International Research Staff Exchange
Chair (EXC)	
Conferences and training Course (SCF)	**Specific actions**
Awards (EXA)	
Grants (Teams) (EXT)	**Capacities SP**
	IDEAS: ERC- Europe Research Council

Source: Presentation of DG RTD at the kick-off meeting

FP6 Host & Excellence Actions

In the FP 6 Host and Excellence Action **164 Chinese researchers** have been supported to date, which accounts for 12% of all the fellows from Third Countries, in form of:

- 1 Excellence Team Leader: received €1.16m in funding to establish a research team in a German institute;
- 121 Early Stage Researchers were recruited, of which 48 to RTN projects, 67 to EST projects and 6 to EXT projects;
- 42 Experienced Researchers were recruited: 18 to Research Training Networks (RTN) projects, 14 to Transfer of Knowledge projects and 10 to Excellence Team (EXT) projects.

In addition **177 Chinese researchers** benefited from research training at conferences and courses funded through the Series of Events (SCF) and Large Conferences (LCF) actions.

FP 7 Host & Excellence Actions

There are two host driven actions in FP7: Initial Training Networks (ITN) and Industry-Academia Partnerships and Pathways (IAPP). The projects already funded are only starting to recruit researchers. Chinese research institutes in either the public or private sectors may apply jointly with EU Member States or Associated Countries as partners of ITN and IAPP projects. As China is an ICPC[23] country, Chinese participants can benefit from full funding. In the first three calls of FP7, 4 Chinese institutes have applied, 1 in ITN which was not funded and 3 to the second IAPP call, 1 of which was successful and is currently in contract negotiation.

Individual Driven Actions in FP6 and FP7

The individual driven actions take the form of both incoming and outgoing international fellowships In total 59 scientists (46 incoming fellows + 8 postgraduates and 5 post-docs) were from China in the FP 6 Marie Curie Actions. China is one of the most active third countries that make use of the EU mobility schemes and the number of incoming scientists in FP 6 was just behind Russia and the U.S.

In FP7, there are already 13 incoming fellows from China. Another interesting observation is that, in the new and highly competitive ERC mobility scheme, 2 Chinese researchers have succeeded in achieving ERC Starting Grants to work in European research institutions. However, both of them were actually already based in Europe instead of new comers from China.

Table 17: Active incoming nationalities from 3rd countries in FP6

Rank	1	2	3	4
Nationality	Russia	U.S.	China	India
Number of incoming	95	87	59	45

[23] International Cooperation Partner Country

scientists				

Table 18: A comparison of incoming and outgoing fellowships

	Submitted proposal		Contracts conclude	
FP 6	**All**	**China**	**All**	**China**
Incoming international Fellowship	**2300**	**-**	**382**	**46**
Outgoing international Fellowship	**1541**	**13**	**302**	**1**
FP7 2007				
Incoming international Fellowship	**341**	**74**	**-**	**13**
Outgoing international Fellowship	**693**	**-**	**-**	**.**
ERC (Starting grants?)	**-**	**45**	**-**	**2**

While both the host driven and individual driven instruments have been actively and rather extensively utilised by Chinese researchers to come to Europe, the outgoing fellowship for European researchers to go to China is still very poorly utilised. In the FP6 there was only 1 outgoing fellowship from the EU to China (a French research fellow). The poor reciprocity in the mobility of researchers reveals the fact that while interests in going to universities and research institutes in English-speaking countries, in particular to the UK and the US is strong among European researchers; the interest in going to China needs to be further developed based on better information on the opportunities of EC-China S&T cooperation.

3.5. Summary of the patterns of EC-China S&T cooperation in the Framework Programme

The conclusions that can be drawn from the statistical analysis in this chapter are as follows:

- In terms of the quantitative changes, the participation of China has indeed increased substantially during the period 2004-2008. However, the increase needs to be put into the Chinese context, in terms of both the size of the country as well as the recent repaid development of S&T capacity building. In other words, there is still a huge potential for using FP as an instrument for strengthening the EU-China S&T cooperation;
- In terms of thematic distribution, the increased diversity suggests that there are multiple driving forces underneath the increased participation of China, namely capacity- and science driven (e.g. nanotechnology), market- and technology driven (e.g. ICT) and policy-driven (e.g. environment, heath and sustainable development, and research for policy support), or a combination of these aspects. The diversity provides a favourable condition to enlarge the scope of the EU-China S&T cooperation through complementarity, in region- and country-specific comparative advantages, as well as via joint efforts concerning common and global issues;

- Concerning the type of participant organisation, while research institutions, such as CAS and CASS, are still the most important participants in FP a relatively large number of universities in different geographic areas, in addition to Beijing and Shanghai, are playing a more active role. This trend is not only important for increased cooperation in research between the EU and China, but also has the potential to promote mobility when the international co-operation in education and research is linked at an institutional level;
- In terms of European partners, there is also an increased diversity in that, not only large but also smaller Member States have intensified their S&T co-operation.

Finally, this size of the funding for the Chinese participation observed in FP6 is an argument for the move towards the co-funding scheme to pursue a more equal partnership for at least two reasons:

- It is difficult to involve the Chinese partners to take a more equal role in the implementation as long as the allocation to Chinese consortium partners account only for a small share of the total budget. I.e. in the project design and by definition, the Chinese partners do play a limited role;
- Even though the coverage for Chinese partners' participant total cost is rather high, in practice, many Chinese participant organisations still experience considerable difficulty in obtaining matching funding from domestic funding agencies which may lead to delay as well as distract from the implementation of the project. In a survey on the Chinese participations in FP 5 and FP6 conducted recently, one of the main recommendations from the Chinese research community to the MOST and other national funding agencies is to pay more attention to and provide more support for the participation in FP projects.

3.6. EC-China S&T interaction and cooperation in European Technology Platforms (ETPs) and Joint Technology Initiatives (JTIs)

In the reviewed period, specific industry-led European technology Platforms (ETPs) were launched: *"European Technology Platforms focus on strategic issues where achieving Europe's future growth, competitiveness and sustainability depend upon major technological advances. They bring together stakeholders, led by industry, to define medium to long-term research and technological development objectives and lay down markers for achieving them. The achievements of these objectives will significantly improve the daily lives of the European citizens"*[24].

In March 2007, the European Commission published the "Third Status Report on European Technology Platforms – At the Launch of FP7"[25] that provides a comprehensive overview of the state of this important European initiative. With regard to international cooperation The Third Status Report says (p. XI): *"The SRA research priorities are not only pursued by the ETPs within the confines of the EU or the ERA. It is therefore essential to establish appropriate relations with entities from third countries on a mutually-beneficial basis (exchange of experiences, definition of strategic research needs). Such international contacts are expected to help platforms better position their research strategies and identify more accurately the promising areas, such as the opportunities for potential lead markets."*

[24] Brochure "European Technology Platforms. Knowledge for Growth." European Commission.
[25] Third Status Report on European Technology Platforms – At the Launch of FP7. European Commission. Directorate-General for Research. EUR 22706. March 2007

In the Third Status Report, the present state of development of 31 European Technology Platforms (ETPs) is described. In the following eight ETPs, China is explicitly mentioned in the specific paragraph devoted to international cooperation:

- Advanced Engineering Materials and Technologies (EuMaT);
- European Road Transport Research Advisory Council (ERTRAC);
- European Technology Platform on Industrial Safety (ETPIS);
- European Photovoltaics Technology Platform (Photovoltaics);
- Sustainable Chemistry (SusChem);
- Mobile and Wireless Communications (eMobility);
- The European Construction Technology Platform (ECTP);
- Zero Emission Fossil Fuel Power Plants (ZEP).

In EC-China Summits, it has been emphasised that the ETPs are important for identifying priority areas for cooperation for strengthening the cooperation with China. Already in the EC-China High-tech Forum in May 2005, it was recommended that contacts with China should be established by ETPs in areas, such as environment, nanotechnology, hydrogen and aeronautics. At the time when this report is being prepared no updated information is available on the international dimension of ETPs in general and the interaction with China in particular.

The recent Evaluation of the European Technology Platforms[26] concludes that international cooperation of ETPs is still hampered by several factors: lack of national resources, competition rules, differences in legal systems, and differences in standards and calls for support of ETPs in developing the international dimension. However, European Technology Platforms are certainly activities with interesting potentials for further developing EC-China S&T cooperation that should be further explored and exploited.

In FP7, under the Cooperation Specific Programme, new initiatives were launched: European Technology Initiatives (JTIs)[27]: "In a very limited number of cases, the scope of a RTD objective and the scale of the resources involved justify setting up long-term public private partnerships in the form of Joint Technology Initiatives." These initiatives result mainly from the work of ETPs. In the meantime, five JTIs have been established as Joint Undertakings under regulations according to Art. 171 of the EC Treaty have been established:

- The Embedded Computing Systems Initiative – ARTEMIS (Advanced Research and Technology for Embedded Intelligence and Systems; this JTI will sustain Europe's world lead in embedded systems, specialised computer components dedicated to a specific task that are part of a larger system);
- The Nanoelectronics 2020 Initiative – ENIAC (European Nanoelectronics Initiative Advisory Council; this public-private partnership aims at implementing large European research and technology development projects in Nanoelectronics);

[26] Evaluation of the European Technology Platforms (ETPs). Final report. IDEA Consult. Brussels, August 2008. See: ftp://ftp.cordis.europa.eu/pub/technology-platforms/docs/evaluation-etps.pdf

[27] DECISION No 1982/2006/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 concerning the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007-2013). Official Journal of the European Union. L 412, 1-41. 30.12.2006, p. 9

- The Innovative Medicines Initiative - IMI (this programme will support the development of new knowledge, tools and methods in order to bring better and safer medicines quicker to the market);
- The 'Clean Sky' Initiative (Aeronautics and Air Transport Joint Technology Initiative; this JTI will develop breakthrough technologies to significantly improve the impact of the air transport on the environment);
- FCH - The Fuel Cells and Hydrogen Initiative (the FCH JTI is to deliver robust hydrogen supply and fuel cell technologies developed to the point of commercial take-off).

For JTIs, in general, the Regulations are tailor made for each JTI JU and that holds also for the possible openness to third countries for organizations from third countries[28]. In the case of ARTEMIS or ENIAC the Regulations are open to the accession of third country members taking into account the relevance and potential added value of the applicant for the achievement of the objectives of the ARTEMIS or ENIAC Joint Undertaking. In the other JTI JU Regulations, no such explicit regulatory provision for third country membership is made. For the participation in project activities, for each JTI JU specific rules launched under calls for proposals will be defined.

As in the case of ETPs, also for JTIs the potentials for interaction and cooperation with China have still to be explored. Therefore, the experts recommend that a short review and analysis of the state of the interactions of European Technology Platforms and Joint Technology Initiatives with China is performed, that bottlenecks and possibilities for ETPs and JTIs for the interaction and S&T cooperation with China are identified.

3.7. Flagship initiatives related to the EC-China S&T agreement

In the following, only some examples are given on major initiatives that were initiated during EC-China Summits or in the Steering Committee of the S&T agreement. Regarding special success cases of FP6 project with Chinese participation no specific assessments were available for the experts. Therefore, the respective information is of a rather haphazard nature.

For the reviewed period, the following major initiatives can be mentioned in connection with the Steering Committee of the S&T agreement:

- The Europe China Science and technology year (CESTY);
- CO-REACH (see Chapter 6);
- The Euro-China Clean Energy Centre (EC2), and
- The Institute for Clean and Renewable Energy (ICARE), and
- The EC-China Near Zero Emissions Coal initiative NZEC,
- BI-LAT SILK (see Chapter 4);
- STF – The Science and Technology Fellowship Programme;
- ERA-LINK;
- NERE-Link.

CESTY has been positively evaluated and is certainly an activity that can act as a model that can be applied in possibly modified form also in the future. As underlined also in other parts of the

[28] For more details see: Opening to the world: International Cooperation in Science and Technology. Report of the ERA Expert Group. Directorate-General for Research. EUR 23325 EN. 2008. Chapter 5, pp. 40ff.

report, the awareness on the EC-China S&T cooperation and particularly on the Chinese S&T system in Europe and the European S&T system in China is an issue that will deserve attention also in the future.

CO-REACH is the ERA-NET Action devoted to the S&T cooperation between a number of Member States with China on the basis of the coordination and cooperation of their bi-lateral programmes with China. CO-REACH is discussed in detail in Chapter 6.

The Euro-China Clean Energy Centre (EC^2) is supposed to act as focal point in China for Europe activities in the energy sector. The overall objective is to collaborate with China in its effort to shape a more sustainable, environmentally friendly and efficient energy sector. EC^2 will have the purpose to enhance the adoption of clean energy through improved access to European experiences and best practices. The project is already advanced in the formulation phase and RELEX/AIDCO envisages that the financial agreement between the EC and the Chinese Government should be singed later this year, possibly at the forthcoming EC-China Summit.

During President Barroso's visit to China in April 2008, a letter of intent has been signed for the **Institute for Clean and Renewable Energy (ICARE)** addresses the need to develop the engineers and technicians in the areas of clean and renewable energy. It is focusing on the academic and vocational training for existing and future Chinese engineers at will offer:

- A Master Programme for post-graduate students (ICARE Master), and
- A vocational training center for existing energy professionals (ICARE Training Center).

During 2008, an identification mission for ICARE has been launched with the following main objectives:

- to assess whether the idea for the Euro-Chinese ICARE project consistent with the development priorities of China's and EC development cooperation with the country;
- to assess the relevance and likely feasibility of this new project.

This project is at a very early stage of preparation. EC financial contribution would be mobilised from RELEX /AIDCO cooperation fund and the ICARE project will probably be further discussed during the EC-China Summit in December 2008.

The EC-China agreement for the **Near Zero Emission Coal project (NZEC)** was signed at the 2005 EU-China Summit as part of the EU-China Partnership on Climate Change. The agreement has the objective of demonstrating advanced near zero emissions coal technology through carbon capture and storage (CCS) in China and in the EU by 2020. NZEC is not appropriate for funding under the Framework Programme, but there are close links to research activities such as the FP6 project COACH (Cooperation action within CCS China-EU). In 2008 EC-China meetings progress has been achieved. A political commitment from both sides to proceed rapidly with the next phases of the project would be an important signal for the development of CCS technology. It can be expected that also the NZEC project will be on the agenda of the EC-China Summit in 2008.

BILAT SILK[29] is a new coordination and support action for enhancing the EC-China S&T cooperation, with a focus on the promotion of Framework Programme. It is one of the forthcoming BILAT coordination and support actions in FP 7. BILAT SILK is presented in detail in Chapter 4.

In 2008, a new fellowship programme was launched for young EU researchers willing to spend two years working in China. The **Science & Technology Fellowships (STF) Programme** offers

[29] "Bilateral Support for the International Linkage with Kina"

them the opportunity to come to China, train during 6 months in Chinese language and culture, then work in a research organisation in China for 18 months. Thanks to the STF China Programme research institutions from EU member states can develop a stable partnership with a Chinese research institution!

This programme is a pilot action, financed through a special fund derived from a European Parliament amendment (MEP James Elles). Its objective is to promote EU's interest in its relationship with China. It does not belong to the Framework Programme for Research and it is meant to be complementary to Marie Curie Actions.

The programme targets young researchers with at least two years of experience or with a doctoral degree. They must identify a sending organisation in the EU and a host organisation in China and present a research project. There is no mandatory return phase.

The deadline for application was 5 September 2008. Applications had to be sent to the EC Delegation in Beijing. The EC Delegation of China and Mongolia received an impressive number of project proposals from a wide range of disciplines, including environmental projects, medical science as well as physics, from more than 10 member states. The volume of applications exceeded the original expectations. The first step in the selection process was completed in Beijing on September 17**.** In the second step individual interviews and group assessments were performed in Brussels in early October. Those applicants who were successful in the pre-selection process are about to be notified.

In 2008, 30 European young researchers will be selected for a fellowship in China. This number is expected to increase in the years to come. The fellows will receive 1800 EURO/month and an allowance for their installation and travels.

Following the positive experience with a similar initiative in the USA and Japan, the European Commission is currently looking into establishing **ERA-LINK** as a global network with specific branches in other countries and regions of the world.

With such momentum behind the initiative, the Directorate General for Research and the Delegation of the European Commission to China in collaboration with the Embassies of the EU Member States in China launched a study to establish whether there would be demand for such a Network in China among: European researchers currently working in China, European researchers who travel to China frequently (so called “commuters”), European researchers who are interested in working with China in the future.

In early 2008, the Directorate-General for Research commissioned a study for getting further insight into the opinions and perceptions of European researchers.

A total of 758 researchers responded to the survey. 85% of these respondents are currently based in Europe. Their motivation for getting involved in research activities with China stems from the fact they are working on collaborative research projects. 50% of European based researchers have been or are currently involved in one or several collaboration activities with China.

There is a great deal of enthusiasm about the ERA-LINK network among European researchers in China. Over 80% of respondents to the survey are interested in being kept up-to-date with the development of the network and a similar number have already given their consent to being included in a contact database of European researchers with links to China. European researchers are very keen to develop their network of contacts in relation to China and seek assistance in developing their careers and to fund their research. There is an obvious need for support services for European researchers working in China including provision of information for establishing new contacts, identifying opportunities for EU-China cooperation and discovering sources of funding.

The very positive response to the study representing different types of researchers makes a strong case for the viability of offering information and services targeted at European researchers in China. As a side result, the study shows also that there are good prospects for arriving at a reasonable flow of researchers from Europe to China. It is recommended that work on establishing the ERA-Link network should commence.

The European Commission is also launching actions addressing the scientific diaspora of Third Countries in Europe, the Non-European Researchers in Europe-Link – **NERE-LINK**. This new action aims at promoting interaction between non-European researchers from the same region active in Europe, as well as with their countries/regions of origin. The action aims to enhance the attractiveness of Europe to non-European researchers, and foster collaborative research relationships beneficial to both the Member States and associated countries on the one hand and the countries and regions of origin on the other hand. Also this action is supported by the experts and they invite the Commission to take this action further.

The overview of the selected number of initiatives supported by the EC-China Summits, the Steering Committee of the EC-China S&T Agreement and the European Commission services in Brussels and in the EC Delegation in Beijing are contributing to the development of a supporting environment for EC-China S&T cooperation in many respects also going beyond cooperation in the Framework Programme or in Chinese S&T programmes.

3.8. Conclusions and recommendations

1. One main aim of the EC-China S&T agreement remains the strengthening of S&T cooperation by using the available instruments such as the EU RTD Framework Programme. The participation of China in FP6 and FP7 shows a positive trend, in terms of both increased number of participation and a broader coverage of thematic areas. However, in the experts' view the potential for the cooperation is certainly much higher, taking into account of the rapid growth in China's R&D capacity building at both national and regional levels, as well as the larger scope of common and global issues faced by both the EU and China.
2. When reviewing the EU-China cooperation in the Framework Programmes it is difficult to judge if the level of cooperation is satisfying or not. Therefore, in the annual road maps, it should also be considered in the Steering Committee to agree jointly on targets or to define criteria for success which reflect both the level and the quality of FP participation, as well as the intensity of EU-China cooperation in an overall context. This would certainly also support monitoring and impact assessment of the activities.
3. From the meetings and interviews with Chinese and European project participants the experts were able to draw positive conclusions on the scientific quality and the mutual benefit of the cooperation in joint projects. These findings are to a large extent also supported by the outcomes of the detailed studies on the EU-China cooperation in FP6 performed independently by Chinese and European evaluation experts. The evidence of mutual benefits of the cooperation for the scientific communities of the EU and China is very encouraging and forms an excellent basis for further developing the partnership.
4. Mobility of researchers from China to Europe has developed very well. The Marie Curie scheme is seen as an appropriate instrument. However, the mobility of researchers from Europe to China is not at all satisfactory and no progress can be seen in the reviewed period. The new 'Science and Technology Fellowship (STF) Programme' in China launched by the Delegation of the European Commission in China is most welcome and should be carefully monitored. The same applies to the 'International Research Staff Exchange Scheme – IRSES' under the 'People' Specific Programme. However, to support a successful

development of this initiative more awareness and information on the opportunities for S&T activities in China will be necessary.

5. For the future, the experts recommend to explore possible synergies between the 'Ideas' Specific programme and the initiatives of the China Scholarship Council. Also bi-lateral intergovernmental S&T agreement between Member States and China should be included in such considerations. Due to the different forms of fellowships a spectrum of possibilities could be presented in a systematic way. Fellowship programmes should also be used in more strategic ways for developing and deepening the long-term S&T cooperation between the institutions sending and receiving scholars.
6. The experts recommend that a short review and analysis of the state and the future potentials of contacts of European Technology Platforms and Joint Technology Initiatives with China is performed, and that bottlenecks and possibilities for ETPs and JTIs for the interaction and S&T cooperation with China are identified.
7. European Technology Platforms and Joint Technology Initiatives should be encouraged to include the international dimension in their strategies and to explore and promote opportunities of EC-CN S&T cooperation as appropriate.
8. The activities initiated by the EC-China Summits going beyond the EC-China S&T cooperation in the Framework Programme and Chinese research programmes are supported by the experts. The perspectives that the next EC-China Summit will bring a major step forward in the implementation of these collaborative initiatives are most welcome.
9. The China-Europe Science and Technology Year (CESTY) 2006 and 2007 was a most welcome joint initiative of the Ministry of Science and Technology (MOST) and the Directorate-General of the European Commission. CESTY contributed to raising the awareness on the huge potential of strengthening EU-China S&T cooperation. It is recommended to consider similar initiatives also for the future.
10. The new actions ERA-LINK and NERE-LINK that are being developed by the European Commission will support the strengthening of contacts and collaboration between the EU and China. Therefore, the experts support their further development and implementation.
11. The visibility of European S&T activities not only of the Framework Programme in China is still limited. In the experts' opinion more joint activities of Member States and the European Commission would be useful. It is suggested to consider the possibility organising EU-China S&T Summits around the general EU-China summits.

4. Success factors and obstacles to ongoing EC-China S&T cooperation activities

From the statistical overview in the previous chapter, EC-China S&T cooperation activities, in particular in terms of the participation of Chinese researchers in the Framework Programme have shown an increasing trend. This quantitative increase is an encouraging development, which points to increased interests and enhanced capacity of the research communities in both the EU and China to pursue S&T cooperation, with a broader scope and deepened collaboration.

Based on in-depth interviews with stakeholders involved in various aspects and fields in the EC-China S&T cooperation, the success factors and obstacles to ongoing EC-China S&T cooperation are identified and analysed at three different levels:

- At research/implementation level - the experiences of FP project coordinators in the EU and of Chinese participants;
- At intermediate/facilitation level - the experiences of administrative, funding and promotion agencies for international S&T cooperation in both the EU and China;
- At policy level - the perception of the state of play and strategic thinking for future development in policy-making in both the EU and China.

With an integrated approach to include stakeholders at these different levels from both sides, the potentials as well as barriers to EC-China S&T cooperation can be addressed through improvement of project implementation and strengthening of institutional framework, as well as the development of a more strategic approach for EC-China S&T cooperation.

4.1. Success factors and obstacles identified by FP co-ordinators and participants

The success factors and obstacles in participation of FP projects are identified by "mirrored interviews" of totally 10 FP6 projects with participation of Chinese partners .The project coordinators in the EU were interviewed by telephone interviews and the Chinese participants were interviewed during the mission to China at their respective affiliated research institutes and universities.

The 10 interviewed FP projects may not be a representative sample of the 209 FP6 projects with Chinese participation, due to the time and organisational constraints when performing the interviews during the Review. Nevertheless, the interviews cover the key thematic areas for the EC-China S&T cooperation, such as IST, energy, environment, sustainable development, agriculture and food, and health. In terms of EU coordinators, the interviews covered both large EU Member States, such as Germany, France, the UK, and Italy, as well as smaller EU Member States, such as Austria, Belgium, and Denmark. From the Chinese side, the participants were interviewed, not only in the well-known institutes in Beijing and Shanghai, but also in more remote cities, such as Wuhan and Xian. More importantly, the in-depth information collected from the mirrored interviews from both the EU and Chinese sides on the same FP6 projects reflect a more mutual perception on both quality of project implementation and scientific performance.

The overall assessment of the co-operation from the EU and the Chinese sides:

Among all interviewed projects, 10 of 9 projects expressed their positive experiences in and satisfaction with the co-operation, in terms of the management of and the involvement in the projects as well as the outcome of the co-operation. The Framework Programme is considered a good instrument to promote and facilitate the S&T co-operation between EC and China. All these 10 projects expressed their willingness to continue with their co-operation, either in forms of FP projects, or in other forms of co-operation, e.g. bilateral co-operation supported by bi-lateral schemes between EU Member States and China. In fact, one of the FP6 projects on sustainable surface transport (SIMBA project) has already initiated the second project as continuation in FP7.

Despite the differences in the scale and in the subject-specific and project-specific characteristics of the interviewed projects, there are common experiences from the co-operation through FP from both sides that can be summarised as the follows:

The China-specific experiences through FP co-operation expressed from the EU side

From the perspective of European researchers and co-ordinators, ***the motivations of involving Chinese partners*** in their consortiums are diversified, not only because of the China-specific focus and resources in their research fields, but also increasingly driven by the fact that the integration of China into the global economy is turning China-specific issues into global issues, in particular in the fields of climate, environment, energy and health. In other application and market-oriented fields, such as IST, the involvement of Chinese partners are motivated by both the need for developing cutting-edge technology as well as the access to the market.

The ***contribution made by the Chinese partners*** can be attributed to their scientific inputs based on their expertise in China-specific knowledge and access to unique research material and resources, as well as the role they can play when introducing European partners to a larger research network and facilitating the communication with stakeholders in China. In some cases the Chinese partners have also made efforts to draw on synergies between their national research programmes and the Framework Programme, to leverage some additional resources to overcome the budget constraints in their FP participation.

In terms of ***research priorities*** in the EU and China, some are indeed common between the EU and China (e.g. environment), and some are different between EU and China. Because of the country-specific context some research areas are more urgent for China than for the EU. But in both cases, it may imply opportunities for EU actors and organisations in the Chinese market and potential co-operation areas for the S&T co-operation in China.

The S&T development in China has been very rapid and dynamic, which can be observed in both research infrastructure and human resource capacity. In many European researchers' eyes, China is now moving faster than the EU in terms of expenditure on R&D infrastructure and support for strong research environments. However, the awareness of proactive and strategic actions for establishing research co-operation with China as well as the knowledge of the current development in China from the EU side is so far still rather limited in the research community.

The EU-specific experiences through FP participation expressed from the Chinese side

From the perspective of the Chinese participants, ***the interest and incentive in participating FP projects*** are motivated by various factors beyond the access to the financial resources for international co-operation. The funding from the FP projects still matters, in particular for young researchers and newly established research groups. But to enlarge their international research network, and to achieve capacity building and mutual policy learning are to an increasing extent more important objectives for the participation from the Chinese side.

The ***benefits from the participation in FP programmes*** have been achieved from several dimensions. From the perspective of knowledge management, the majority of interviewed participants do consider the FP a complex process, in which a large number of partners are involved and different financial management system have imposed considerable administrative burden. However, in the end, many of the interviewees appreciate the learning experiences of project and human resources management through the interaction with European co-ordinators and consortium partners. From the perspective of research activities, the introduction of research-driven and evidence-based policy making as well as methodology learning are considered the most valuable exchange with European partners.

In terms of ***China's domestic research priorities*** in relation to the priorities in international co-operation, there are indeed substantial gaps in terms of both identified thematic priorities and policy focuses. The orientation and priorities of research activities in China are to a large extent

driven by a few large-scale national S&T programmes, such as 863 and 973, and highly focused on strategic priorities in the domestic context, e.g. development of national standards in ICT-related services and national capacity building. To some extent, the Framework Programme is considered a window to the international research frontier, which is highly interesting for Chinese researchers.

The understanding of the EU S&T landscape in the Chinese research community is still rather limited, despite the increasing interests in S&T co-operation with European countries. Except a few large national research institutes and universities, in which there has been either an official or a historical collaborative relationship with Europe, the visibility of the research infrastructures and networks in the EU is lower, in particular in comparison to the U.S. For many Chinese researchers, Europe is still the "second best", in terms of international co-operation in research. However, this situation is gradually changing, through increased interaction between China and Europe in research, such as in the Framework Programme, and as a result of a larger number of researchers receiving their training and working experiences in Europe.

The success factors for implementation of FP projects

Based on the experiences from the cooperation in FP projects, several success factors as well as obstacles in common across different projects were repeatedly raised by both the Chinese and EU sides as of great importance during the implementation of the FP projects:

Existing long-term institutional partnership as a starting point: It is interesting to observe that very few of the interviewed projects started as a new partnership. Instead, there has either been a long-term institutional partnership through bilateral co-operation, or the partners were introduced to each other through existing personal contacts in the EU and China. Furthermore, the institutional partnership has been strengthened during the co-operation in FP projects.

The scientific excellence and research experiences as key criteria for an equal partnership: Even though the majority of the interviewed projects have a China and/or development focus, all the co-ordinators emphases the importance of having the right research profile and proven scientific performance as the basis for an equal partnership and equal quality. The China-specific dimension is considered a major part in the global issues, or in a comparative context with other developing and developed countries. From the Chinese side, similar views were expressed that Chinese partners are eager to move beyond the stage of "working only with somebody we know" and play a more active role to be involved in the stage of project design and in interactions with other consortium partners.

The capacity and willingness in mobilising and engaging a large network from both sides: the key to both the success and the sustainability of the co-operation, based on the experiences from the successful cases is the capacity of bringing large networks of European and Chinese researchers together and to mobilise the research interests and capacity from both sides, during FP implementation and beyond the boundary of the FP projects. As a result, many doors could be opened for European researchers both in the EU and China, and a common ground for future cop-operation could be created.

The obstacles to implementation of FP projects

The limited financial leverage in FP: for achieving a full "integrated" co-operation, the financial leverage is important. As long as the Chinese participation takes only a small portion of the budget, the possibility of engaging Chinese partners as an equal partner is limited. This indirectly addresses the needs for a new funding scheme, such as co-funding through joint- and co-ordinated calls. However, from the previous experiences (of one of the interviewed projects),

the complexity of involving two different funding systems, with different funding practices and timelines could impose substantial risks for project implementation.

The gap between project implementation and follow-up actions: The potentials, in terms of deepening the knowledge generated from the FP project as well as the impact on policy-making both in the EU and China, are often not fully utilized. This is partly because of the absence of follow-up actions, such as dissemination of results and communication with stakeholders, and partly because of insufficient interaction and communication with the EU Commission from the EU side and the policy makers from the Chinese side during the project implementation.

The flexibility in project implementation: In rapidly fast-changing policy and institutional context in many fields in China, such as energy, environment and health, flexibility is very important. It is not unusual that, by the time when the FP project was approved, the conditions and the policy-making structure in China had changed substantially compared to the project design stage. It is therefore difficult to cope with such circumstances, if there is no flexibility for modification and updates during the implementation.

The difficulty in finding "right" funding opportunities to continue collaboration: It is quite common among interviewed projects that the partners do not continue to collaborate in FP, even though the previous collaboration is considered highly successful and satisfactory. It is either because of open calls are too far from the research idea of the consortium, or the joint research ideas do not fit in the "European context", even if they may fit well in an "EU-China" collaborative research context (e.g. it is a frequently mentioned problems in research areas in agriculture). To continue the co-operation, the consortium needs to find, e.g. bilateral funding alternatives, which is not an easy task in practice. It also indirectly reflects the perception of the need for increased openness of the Framework Programme by the European coordinators who have been collaborating with China. The openness of the Framework Programme has indeed increased through the structural break to bring in a stronger international dimension, which is considered a significant improvement. However, the Framework Programme is also considered still not open enough for new ideas (instead of for established themes), and there is still a large gap between FP priorities and the need for and interest in promoting co-operation with third counties, such as China.

4.2. Success factors and obstacles identified in the facilitation and funding process

During the mission in China, totally 14 universities and research institutes in different regions, such as Beijing, Shanghai, Hangzhou, Wuhan and Xian were interviewed (See Annex 1 for a detailed list of interviews). From the in-depth interviews with their administrative units, which were involved in international co-operation activities as well as in S&T promotion at universities and research institutes in China, the success factors and obstacles, for ongoing EC-China S&T co-operation at the institutional level, and from an administrative viewpoint were identified.

The most apparent observations, is that the international dimension is becoming increasingly important for research capacity building and the national competitiveness of these interviewed organisations. The international co-operation offices have been systematically working on establishing "*strategic partnerships*" with foreign universities and research institutes, through joint academic degrees at different levels and in the form of student and faculty exchange. In this process, Europe is one of the most important strategic partners.

At the same time, the interviewed organisations emphasized the challenges of going beyond the exchange at the educational level and extending the "strategic partnership" to be more research-oriented. In other words, there are still substantial gaps between the top-down internationalisation strategy at the university level and the bottom-up research co-operation, which is taking place at

the department-level and is largely individual driven. Consequently, the participation in the Framework Programme and international S&T co-operation in a broad context is restrained as long as the gap remains due to various institutional and administrative obstacles.

Institutional barriers: For most large-scale universities and research institutes, offices of international co-operation/relations try to work closely with offices of S&T administration and promotion on international co-operation in research. However, in practice, it is difficult to transform various bilateral and multilateral international cooperation agreements into concrete research co-operation. While the offices of internal co-operation are aware of the increasing need to pass on research co-operation information to the research faculty, the lack of professional and scientific background makes this a difficult task. Another common organisational barrier is the funding administration system, in which national and international research funds are often managed by different administrative units. It is difficult to obtain an overview of how national and international research activates are related to each other and consequently, the opportunities for creating synergies are also limited.

Limited visibility of the Framework Programme: The visibility of FP is limited by several factors. First, the Framework Programme is only familiar to a limited group of researchers who have previous contacts with European partners and/or have European training and working experience. Secondly, the relative importance of Framework Programme, in terms of the amount of total research funding at the aggregate level is very small. For instance, even for some universities with a relatively high number of FP participations, its share in total was less than 5%. Finally, when the overlap between the priorities in the national programmes and the Framework Programme is too small, while the gap in the size of funding is substantial, it is difficult to attract established research groups to participate in FP.

Access to information and institutional capacity for supporting FP participation: The access to information on the Framework Programme varies substantially across different institutes, depending on their location and their previous experiences in European research activities and their contacts with CECO. In general, even for the institutions that have the highest numbers of FP participation, there is still a need for improved access to information on the Framework Programme to both scientist and S&T co-operation officers. Furthermore, the support that can be provided to faculty members who are interested in participation in FP, is to a large extent, limited to administrative tasks such as financial and contractual issues, while the support for seeking partners and other professionalised services, in terms of introduction to the FP procedure and funding system and guidance for proposal writing is, in most cases, not be offered. In the absence of a multi-layered and professionalised capacity building and service providing facility, it will be difficult to enhance the participation in FP, in term of scale, quality and impact, to reach not only national big-shots, but also regional hotspots.

Need for incentivising international co-operation: For Chinese researchers, the national programmes, such as 863 and 973 are far more important funding sources for their research and participation in these prestigious national research programmes are also important criteria for the assessment of academic performance. The participation in international research cooperation, such as in the Framework Programme plays in principle, a minor role in the performance assessment system.

Communication with EU coordinators: The information from co-ordinators is not always complete and transparent, which makes is difficult for the S&T officers to help the faculty members to deal with financial and contractual issues. Even as a partner, not a co-ordinator, the Chinese participants would also like to be more informed about the application procedure as well as more updated with the monitoring process, in terms of the results and impact the projects have achieved as a whole.

Practical difficulties associated with financial issues: A commonly addressed administrative obstacle is the complexity and difficulties caused by the different financial systems and regulations in the EU and China, which cause considerable difficulties for the Chinese participants. Examples include differences in salary systems, difficulty with subcontracting and temporary recruitment of researchers and large auditing costs in relation to the size of the budget. These problems often lead to delayed allocation of funds, which in turn leads to delays in project implementation. Furthermore, such financial obstacles are even more difficult for participants from the industrial sector, in comparison to academic institutions in China.

The above institutional and administrative obstacles to a large extent explain why the visibility, scale and impact of the Framework Programme, so far have been limited in China. At the same time, from a strategic viewpoint, the interviewed organisations underlined also the importance of enhancing the EC-China S&T co-operation both through increased participation in the Framework Programme as well as to draw synergies on bilateral co-operation initiatives, which will be potential and important success factors for the enhanced EC-China co-operation in the near future:

Targeted co-operation with targeted partners: Being aware of the fact that the bilateral co-operation agreements often do not lead to concrete follow-up actions, some Chinese universities are more actively and selectively pursuing a targeted co-operation with foreign partner institutions. One of the criteria for partnership is an explicit and well-developed "China strategy" at the foreign institute, which serves as a common ground for strategic cooperation with common interests and mutual benefits.

Targeted mobility of Ph.D. students and post-doctoral fellows: Supported either by a national funding scheme from e.g. the China Scholarship Council or, financed by the universities and research institutes themselves, targeted exchange programmes of faculty members at research level provide an important channel for initiating joint research and institutional co-operation between China and the EU.

European experts in Chinese research institutions: The benefits of some new and innovative bi-lateral exchange initiatives have already been observed. For instance, the researchers and policy experts who are recruited in the framework of the Germany Integrated Expert Programme are placed in Chinese universities, research institutes and even government agencies. With their research background and working experiences in the EU, combined with their presence in the Chinese research and policy-making environment, these German experts can play an active role to bridge gaps in the research and policy exchange.

Direct contacts with foreign funding agencies in China: Some interviewed universities have given very positive feedback on the contacts that the Beijing Office of Research Councils UK has initiated. The direct contact and communication are considered an efficient channel for identifying common research interests and match-making of research teams for the UK-China S&T co-operation.

4.3. Success factors and obstacles identified in institutional framework and policy-making

From the policy-making perspective, the implications for developing EC-China S&T co-operation towards a strategic partnership are twofold. Firstly, the Framework Programme *per se* needs to be continuously strengthened to be a more conducive and efficient instrument, based on common interests, mutual benefits and equal partnership. Secondly, a more strategic and policy-driven nature of co-operation implies also that, to achieve a strong and far-reaching *impact* of

S&T cooperation, the research cooperation in the Framework Programme needs to be extended and deepened through co-operation and interaction with other key policy areas.

To address both the capacity building as well as the institutional setting required for the strategic partnership and a proactive approach, policy-makers and policy officers were interviewed from both the EU and Chinese sides. During the mission in China, in-depth interviews were conducted with officials from government agencies at both the national and the regional levels, such as the Ministry of Science and Technology (MOST) and the Ministry of Education (MoE), as well as Science and Technology Commission of Shanghai Municipality. Within the Commission Services, a large number of interview were organised with programme officers and policy officers in the "research family", which include both different directorates inside DG Research and other DGs that DG Research has an increasingly close interaction with, e.g. DG TREN, DG Environment and DG Health. (See Annex 1 for detailed interview list).

Success factors/promising groundwork for the strategic partnership

The consensus on the identified priority areas and the principle of equal partnership: The mutual perception as most important strategic partner at the political level and the commitment to pursue an equal partnership from both sides, provide a promising groundwork for the development of the strategic partnership. In the process of developing co-ordinated calls, the four priority areas, environment, energy, climate change and health were mutually considered key areas covering common interests and reconciling national, regional and global development.

Increased interests in and commitment to capacity building: From both the EU and China sides, there is an increased awareness of and some concrete initiatives to address the capacity building and facilitation for the enhanced EC-China research cooperation. For instance, as universities, together with research institutes are more actively engaged in the Framework Programme, the Ministry of Education (MoE) of China has strengthened their support for promoting FP participation. The ongoing establishment of a comprehensive web based information platform and database aims to bridge the information gap between CECO and CORDIS as well as to provide a gateway for introducing research activities in Chinese universities and Chinese researchers to the European research communities. Such initiatives are encouraging gestures and useful tools for the establishment of strategic cooperation, as well as to create new channels for synergies with relevant supporting activities form the EU side, such as BILAT-SILK.

Creation of strategic mobility schemes: The key government and funding agencies, such as MoE and the China Scholarship Council (CSC) have set up mobility schemes to promote international mobility at the research level as a strategic investment for research capacity building following the strategic guideline of 3-top: "top Chinese students to top foreign institutes to be guided by top researchers". Some of the schemes have been jointly developed and implemented with funding organisations and research organisations of EU Member States, which not only promotes the mobility of Chinese researchers to EU Member States, but also facilitates the mobility of European researchers to China. While the performance of outgoing fellowships in the Marie Curie programme of FP has been poor, the new Chinese mobility schemes as well as joint schemes by China and Member States may improve the situation.

Increased openness in the FP for research cooperation with third countries: In FP7, international S&T cooperation is following a new approach especially through measures such as[30]:

[30] See Chapter 4 "The international dimension of Community RTD instruments" in: "Opening to the world: International cooperation in Science and Technology" Report of the ERA Expert Group. Directorate-General for Research, EUR 23325 EN, Brussels, 2008

- FP7 is generally open for third country participation,
- FP7 offers the opportunity for targeted opening,
- offers the opportunity for targeted opening,
- The themes in FP7 have the possibility of Specific International Cooperation Actions (SICAs),
- The IDEAS Specific Programme attracts excellent starting or advanced scientists from all over the world,
- The PEOPLE Specific Programme has a special international line for supporting incoming but also outgoing researchers,
- The CAPACITIES Specific Programme offers schemes supporting S&T policy dialogue with third countries and regions (INCO-NET), as well as support actions for promoting the cooperation with third countries (BILATs).

The obstacles in implementation and institutional setting

A more balanced and strategic S&T co-operation is welcomed from both sides and is backed by high-level political commitment. However, there are obstacles in the implementation process of moving from a science-driven to a more science-and-policy driven EC-China co-operation, in particular related to governance and institutional settings that need to be removed through increased openness in communication and, when appropriate, flexible implementation arrangements.

The gap between the overarching priority areas and implementation of a co-ordinated approach: Three priority areas for co-ordinated calls have been identified and workshops with experts from both sides have also been organised with the purpose to identify more detailed input for research topics. However, considerable difficulties have emerged from both sides and, in turn, delayed the process of coordinated calls. A fundamental problem is to specify the common interests at the detailed-level, which represents common interests and/or complementarities, in the framework of FP, and at the same time reflecting focuses in the Chinese national programme, e.g. 863 and 973. Based on the experience of joint calls of some Member States the need for efficient communication in the very beginning and the difficulty with the coordination is often underestimated. Secondly, from both sides, the information about the existence of as well as the outcome of the workshops has not been sufficiently accessible to involved parties. Finally, the operational and mutual understanding of the research programme and funding systems of both sides has been insufficient at the beginning. However, these problems seem to be overcome and there are prospects that an agreement on the implementation procedures will be reached till the next EU-China summit in December this year.

The gap between the research agenda-setting and the policy-making: The need for addressing policy-relevance in the research is a well recognised strategic dimension in S&T co-operation but involves a great complexity, not least with an international dimension and in the fast-changing global and national contexts. It is particularly a challenge, for research fields such as climate change and energy. For instance, the interactions between DG research, DG environment and DG TREN will not only bridge the gap between science-based research and the urgent need for policy exchange between the EU and China, but also facilitate strategic co-operation through the transformation from the research stage to demonstration and large-scale application. Nevertheless, the coordination of short-term operations with long-term objectives needs to be further strengthened. At the current stage, FP serves as an important tool to initiate some key research topics with strong policy-dimension, e.g. global climate regimes, energy supply and cross-broad environment impact assessment etc. However, how the EC-China S&T

cooperation on important topics can be more closely linked to the EC-China dialogues and decision-making processes in other policy areas in the face of fast-changing policy contexts is still a challenge.

The gap between the scope of co-operation and the coverage of institutional interfaces:

Another important implication of the strategic co-operation is the required horizontal actions to cover a broad range of institutional interfaces. For instance, in the highly complex climate change issue, it requires integration and coordination with existing, as well as the creation of new institutional interfaces. In order to cover the broad scope of co-operation it requires mandates and engagement in the fields of environment, energy and transport, etc. involving both scientific research and regulatory frameworks. From the EU side, it has been a time-consuming learning process of governance, in which both clear labour division as well as flexible and efficient coordination are necessary ingredients. Another example is health, in which the common interests between the EU and China is not only related to the science-based disease discovery and control, but also in broad policy contexts, such as public health. For strategic co-operation based on an integrated approach including both scientific and policy dimensions it requires that the partners have the right interfaces, covering the large scope that the strategic co-operation involves. So far, the integration approach and the new institutional setting for international co-operation that apply to both the EU and Chinese sides are still at a premature stage of development.

4.4. BILAT SILK – a new attempt for future improvement?

In the context of both the success factors as well as obstacles identified in the ongoing EC-China S&T cooperation, there is an urgent need for support activities, through which, Chinese partners can be more actively involved and at the same time, the reciprocity issue will be more effectively addressed. BILAT SILK is one of the forthcoming BILAT coordination and support actions in the FP 7. Its objective is to raise the science and technology profile of the EU, with a focus on promotion of Framework Programme in China, as well as to initiate the promotion of Chinese research programmes in Europe.

In contrast with FP 6, together with four European partners (from Sweden, Italy, Greece and the U.K.), CECO is eligible as consortium partner from China and received a considerable portion of the budget for the implementation of supporting actions.

The consortium represents a strong supporting capacity from the European side, which consists of three National Contact Points (NCPs) and EU RTD promotion agencies (Vinnova in Sweden, project coordinator, APRE in Italy and FORTH in Greece) as well as research and advisory experiences in the application of technology assessment in S&T policy advisory (CPE of University of Lancashire, U.K.)

The substantive *deliverables/ work packages* of the coordination and supporting activities include:

- The improvement of the participation of Chinese organizations in FP activities by awareness raising and capacity building.
- Identification of joint priorities and encouragement of S&T cooperation between EU and China.
- Promotion of collaboration in S&T policy advisory
- Capacity enhancement of the Chinese NCP, i.e. CECO.

- Creation of regional networks.

The strength of BILAT-SILK is the intrinsic "reciprocal" thinking and strategy in the project design. From the European side, there is highly specialized expertise in the daily practicalities of NCP activities, as well as rich promotion experiences in a broad range of thematic areas, targeting both research community and industrial sectors. Based on the experiences accumulated since its establishment, from the Chinese side, CECO plays an important role to introduce the European partners to the research community as well as make the European FP facilitation and promotion infrastructure, e.g. NCPs more visible in China. Through the co-operation, there is great potential for a deepened integration of the Chinese NCP in the European NCP network, which in turn, can be an important promoting factor, for the increased "reciprocity" in the EU-China research cooperation. The integration, as described in the project plan, can take place in highly practical and functional forms, such as:

- Restructuring the existing Chinese NCP website to create better access to links with NCP websites in EU Member States.
- A Chinese Help-desk for FP7.
- Partner search support for both Chinese and European partners.

An important novelty in BILAT-SILK is the regional dimension in capacity building. Six geographic areas have been identified (Five provinces: Heilonjiang, Jiangsu, Hubei, Shangdong and Shaanxi and Shanghai municipality) as targets for establishment of Regional Contact Points (RCPs). Both regional thematic strength and the region-specific need for capacity building will be defined and specialized training in specific FP 7 issues will be provided accordingly. The regional dimension of capacity building can be the first step to build up a multi-layered FP promotion infrastructure in China. Recognizing the difficulty in direct contact with and capacity building for a large number of researchers and organizations, what type of organizations should be selected to be the RCPs, how to set up a sustainable infrastructure through "organizational capacity building" as well as how the RCPs can reach a broad interface and provide sufficiently specialized services to support regional needs deserve careful consideration. The existing experiences in the field of establishment of regional networks and co-ordination between the national and regional networks within the Consortium will provide useful reference.

One of the interesting and also difficult tasks of the BILAT-SILK is to identify 6 research areas of interests between the EU and China, with the aim to provide inputs, in form of joint research topics for future Work Programs, to the EU Commission. A step-wise approach will be taken as follows:

- **Step 1: Mapping in China:** Identification of FP 7 research areas of interests, mainly involving Chinese researchers
- **Step 2: Selection of 6 research themes:** Second selection through consultation by EU stakeholders and with involvement of Chinese researchers
- **Step 3: Identification of joint research topics:** Workshops and international Forum to involve main actors in Europe and China in research and S&T policy

Previous experience of CO-REACH as well as at the EU Commission when identifying common research interests in co-operation with China have shown that this is a complex and challenging task. In addition, the potential synergies and complementarities in relation to the priority areas of future coordinated calls, i.e. in the field of health, energy and climate change, biotechnology may also be of importance to take into consideration. Furthermore, the experiences achieved from similar initiatives and ongoing activities of CO-REACH will provide also valuable input and exchange in the course of the implementation of both projects.

Finally, despite some experiences in promoting FP in third countries, in general, the European NCPs in the consortium have rather limited previous experience in working with China. This in turn, imposes potential difficulty in interactively identifying the need for capacity building in China as well as more directly introducing cooperation opportunities in China to Europe. In this sense, the BILAT-SILK opens an additional, but important channel, through which the EU-China S&T cooperation can be enhanced on a more operational and specialized basis.

4.5. Conclusions and recommendations

1. The overall experiences in participating in Framework Programmes projects, are positive, from the viewpoints of both the project coordinators in the EU, and the project participants in China. There are strong interests and incentives to continue and deepen the cooperation from both sides. At the project level, the long-term institutional partnership and scientific excellence in research fields with common interests as well as the capacity and willingness in mobilising large networks, are considered most important success factors in the project implementation. At the institutional level, to narrow the gap between top-down strategic partnership and bottom-up and individual driven research activities is underway to become a key element of internationalisation strategy at top research institutes and universities in China.
2. There is clearly room for improvement of information and assistance of researchers on the possibilities of EU-China S&T cooperation. During the visits to universities and research organisations in the course of their mission to China the experts received positive opinions on the activities of CECO. However, the experts realised that due to the size of China developing a multi-layered and professionalized network of contact points for information and assistance as well as for capacity building in EC-China S&T cooperation would be very useful. Support activities should not be limited only to support for the preparation of proposals. Also general information on the S&T system(s) and structures in Europe would be most appropriate. In many cases, the experts found strong interest in working with Europe but also a lack of information on the European research area. In leading positions at universities and research institutes there are in many cases more scientists that have been trained or worked in the US compared to scientists with professional experience and contacts in Europe.
3. On the other side, there is a substantive need also on the European side to improve the information and assistance on the opportunities for S&T cooperation with China. National Contact Points should receive specific information and training on the Chinese science, research and innovation system and on the opportunities for supporting cooperation.
4. Project with Chinese partners should be monitored and success stories and flagship projects should be identified and widely published in the EU Member States and Associated Countries and in China.
5. Adequate resources should be made available to the EC S&T counsellor in China for providing the first access point and gateway for user-friendly information for CN partners on possibilities for S&T cooperation with the EU. The website of the EC delegation should be the major tool for that purpose. For other operational promotion activities in China the BILAT-SILK scheme should be utilized in clear division of labour and cooperation with the EC S&T counsellor.

5. Member States' S&T activities in collaboration with China: complementarities, synergies and overlaps with EC-China S&T cooperation

5.1. Introduction

The activities of the Member States contribute substantially to the S&T cooperation between Europe and China. The challenge for the future will be how to find the right balance between competition and cooperation in order to make best possible use of both diversity and specialisation as well as integration of activities. Furthermore, it will be important to identify synergies and areas where coordination and cooperation between the Community and Member States' activities and initiatives would create added value in EU-China S&T cooperation.

In this section, a general overview of Member States' bilateral cooperation is given to highlight the following key aspects in the bilateral co-operation between EU Member States and China, as well as their implications for the EU-China co-operation, in the lights of both potential for synergies as well as existing difficulties and barriers:

- New trends in Member States' policy and strategies towards an intensified S&T co-operation with China;
- Diversified national approaches and experiences in S&T co-operation with China and their relative contribution and added-value in the wider EU-China S&T cooperation;

5.2. New trends in Member States' policy and strategies

Germany, France, the UK and Italy are traditionally most active Member States in bilateral co-operation with China. However, also smaller Member States, e.g. Austria, Denmark, Finland, The Netherlands, and Portugal have intensified their co-operation with China. To further intensify the international S&T cooperation with a specific focus on strategic partners in third countries, such as China, a few countries have already developed government strategies for international S&T strategies. For instance, Germany has recently published its 'Strategy of the Federal Government for the Internationalisation of Science and Research'[31]. Norway[32] and Denmark[33] have presented specific China strategies specific China strategy. Other countries like Finland, Ireland and Sweden have, to various extents, integrated the international dimension of S&T in their new innovation strategies.

Consequently, not only has the Chinese participation in the EU RTD Framework Programmes increased substantially from FP5 to FP7. Also the bilateral S&T co-operation between EU Member States and China has developed rapidly in recent years. The number of bilateral inter-governmental agreements between Member States and China is continuously increasing. Joint activities supporting the mobility of researchers are expanded and strengthened. New schemes for collaborative research are developed in different arrangements between research funding organisations, research institutions and also government authorities, in e.g. information technology, nanotechnologies and biotechnologies as well as life science in the past years and in energy, environment and climate change more recently. Most importantly, also joint institutional research structures are established between European and Chinese partner organisations; both

[31] Ministry of Education and Research, Bonn, 2008
[32] 'The government's China strategy', Norwegian Government, Oslo, 2007
[33] ''Knowledge-based Collaboration between Denmark and China', Ministry of Foreign Affairs, Copenhagen, 2008

national research organisations and also research funding institutions are involved in such activities.

Also the traditional forms of cooperation between institutions of higher education towards student exchange and joint study programmes have substantially intensified. Universities are developing their internationalisation strategies and China is an important target countries. From the discussions with university representatives in China the expert learned first that Chinese students are increasingly interested in possibilities for studying in Europe, and secondly that the top Chinese universities are challenged by the large numbers of visits from European universities. However, it is seen as problematic when some have no clear strategies or views on priorities for cooperation and are just following the general trend of 'working with China' without having a clear strategy.

Underneath the increased and intensified S&T co-operation between EU Member States and China, there is a more "proactive" view on the importance of internationalisation of S&T, and a more clear recognition of the role played by China in the process of the globalisation of knowledge production and the international human resources mobility. However, as it has been said before, governments have started only recently to develop strategies for international S&T cooperation forming a coherent framework for bi-lateral or coordinated multilateral cooperation activities. Most importantly, very often an international dimension is also been integrated in the design or update of national S&T programmes[34]. However, the lack of government strategies regarding international S&T cooperation still creates certain hindrances for coordinated approaches between Member States towards international S&T cooperation.

At the same time, to address the benefits from the perspective of EU Member States is not a straightforward task, in the face of intensified international competition, existing structural barriers as well as insufficient knowledge about the dynamic S&T landscape in China. In other words, the degree of "proactiveness" in the S&T cooperation with China among Member States is largely dependent on how clearly the vision of the importance of strategic co-operation with China is articulated, and even more importantly, how the "mutual benefits" from the cooperation are motivated. For those EU Member States that are taking a proactive approach, there are a few common strategic elements that can be observed in their S&T co-operation with China:

- Closer linkage between the national strategies in S&T and innovation policy at home in Europe and their international dimensions in forms of enhanced S&T co-operation with China;
- Moving beyond the "linear model "of knowledge production in China, towards a more systemic approach to promote innovation, which involves a larger number of actors through more complex interactions across different sectors;
- Stronger emphasis on enhanced S&T co-operation with China, through establishment of long-term bilateral cooperation at institutional level and through direct channels for funding;
- Diversification in co-operation with China through wider geographic scope and less concentration on just a few "big-shots", e.g. in Beijing and in Shanghai35; as recent studies show that there are S&T "hot spots" to be found also outside the well know centres;

[34] This development has certainly been influenced by and is one of the impacts of the FP6 ERA-NET scheme.
[35] see e.g. Rainer Frietsch, Li Tang, Sybille Hinze: Bibliometric data study: Assessing the current ranking of the People's Republic of China in a set of research fields. Final report the Delegation of the European Commission. Fraunhofer Institute Systems and Innovation Research. December 2007

- Increased emphasis on the mobility of human resources at the research level and the creation of more sophisticated mobility schemes encouraging and promoting also the integration of European researchers in the local innovation system of China;
- Over recent years increasing interest of Chinese students and researchers in studying and doing research in Europe.

In the highly dynamic and rapid process of intensifying and deepening the S&T co-operation with China, nevertheless, independent of country size and historical experiences, the EU Member States do face some common challenges:

- Capacity imbalance: Difficulties in involving and delivering large-scaled and systems solutions to the large infrastructure projects in the fields of environment and energy in China especially in the context of the urbanisation processes, despite the great market opportunities offered;
- Information deficit: Difficulties in gaining insight into the decision-making and evaluation processes, in obtaining in-depth information about and identifying the focus of national S&T investments and developments;
- Structural barriers in the funding system: both the size and the sources of funding for international cooperation from Chinese counterparts can be unclear to EU Member States.

5.3. Diversified national approaches of Member States

Depending on the S&T capacities and focus in individual Member States as well as on the historical linkages and experiences, EU Member States have developed various diversified approaches in their S&T cooperation with China. For large EU Member States, e.g. Germany, the U.K. and France, their S&T co-operation with China has been established with a broad spectrum along the complete knowledge production chain, "from basic research to market-oriented projects". For smaller EU Member States, such as Denmark, Finland, and The Netherlands a more "targeted approach" is applied to focus on a few selected sectors, which reflect national competitiveness and/or support industrial and practical application. At the operational level, a more flexible and also a more "combined" approach has been adopted by many Member States when dealing with the financing issues in the S&T co-operation at different levels:

- At the individual level: the bottom-up approach in which, researchers from Member States work with researchers in China. Very often, bi-lateral intergovernmental S&T agreements and related programmes focus on short-term visits;
- At the intermediate/regional level: some local funding can be added on, but still in an unstructured way and on a case-by-case basis;
- At the national level: Joint decision-making systems and formal co-funding schemes with national funding agencies and authorities in China, e.g. MOST, MOE and CSC, and NSFC.

An interesting observation on the recent development in the bilateral cooperation is the increasing presence and representations of funding agencies and research organisations from EU Member States in China.

In the following a few selected examples are given without any ambition to provide a comprehensive overview[36], [37]. The examples should show concrete cases from the broad

[36] See also: CREST Conclusions of 7 december 2007: Internationalisation of R&D – Facing the Challenge of Globalisation: Approaches to a Proactive International Policy in S&T. Based on the report of the OMC Working

spectrum of Member States' activities in China in China as well as some important creative thinking in the area of S&T cooperation:

Denmark:

- In line with the Danish government's globalisation strategy a joint initiative between the Danish Ministry of Science, Technology and Innovation, and the Danish Ministry of Foreign affairs, an **Innovation Centre** has been opened in Shanghai in 2007[38]. The Innovation Centre's Denmark play an important part of Denmark's strategy for getting access to the world's most interesting innovation hot-spots and their related research institutions, venture capital markets and business environments;
- In autumn 2008, the Danish Minister for Science, Technology and Innovation and the eight Danish universities, following thorough preparations that started precisely one year ago, agreed to establish a **Danish University Centre** in Beijing. Construction of the Centre will start already next year, and it is planed to be finished by 2013. This means that Denmark will be among the very first countries to establish research-based university educations in China. The Danish University Centre is to facilitate access to leading Chinese research environments and make it more flexible to exchange researchers and students between Denmark and China. At the same time the Centre will ensure that Danish enterprises in China get easier access to staff that also have an insight into Danish business environments and corporate culture;
- The Danish National Research Foundation (DNRF) and the Danish Research Council (DRC) both have **cooperation agreements with the Natural Science Foundation of China (NSFC).** Both sides will support cooperation and exchange between Chinese and Danish scientists in the areas of life science, natural science and engineering science through the co-funding of joint research projects and bilateral academic workshops.

Finland:

- The Finnish innovation funding agency **Tekes**[39] set up **representative offices** in Beijing and Shanghai a few years ago to support Finnish research institutes, universities and companies and to deepen the international linkage and co-operation with China in Tekes' funding programmes. The strong focus on industrial applications and practical dimensions has made the S&T co-operation between Finland and China a showcase for small EU Member States, in particular with an emphasis on promoting S&T-based SMEs.
- **NAMI, the China–Finland Nanotechnology Strategic Mutual Cooperation Initiative** was signed in Beijing in January 2007, and more than 30 project proposals and expressions of interest have been collected so far. The first cooperation projects under the NAMI programme have been launched in October 2007. Finland is the first country to sign a national level strategic cooperation agreement with China on nanotechnology. The new Finnish technology programme on functional materials, has a budget of 200 million EUR. It is expected that still more cooperation projects will be generated under this new programme, to be implemented under the NAMI framework.

Group "Policy Approaches towards S&T Cooperation with Third Countries". Especially Annex (d): Lessons learned from the S&T cooperation of Member States/Associated Countries with present and future competitors: Pilot case China. Brussels, December 2007

[37] For more examples see: Overview of bi-lateral S&T cooperations of EU Member States and China. Survey by the German Embassy Beijing (Dr. Matthias Hack, Dr. Zhang Baiyu) with kind contributions of the Eu Science Counsellors in Beijing. 21 May 2008

[38] Also in 2007, a Danish Innovation Centre has been opened in Silicon Valley. Recently another innovation centre was opened in Munich, Germany.

[39] See http://www.tekes.fi

- **FinChi, the Finland-China Innovation Centre:** As an integral part of the internationalization of the Finnish innovation environment, FinChi is dedicated to assisting Finnish companies to establish cooperation networks in Chinese market. FinChi has been established in 2005. With strong network with government agencies, research institutes and enterprises both in Finland and China, FinChi brings parties together to realize prospective projects. Until today, FinChi has served nearly 30 Finnish organizations ranging from government agency to research institute, from traditional paper industry to venture capitalist.

France:

- **CNRS – Centre National de la Recherche Scientific:**
  - CNRS has **a portfolio of different instruments for supporting international S&T cooperation**: International Projects for scientific Cooperation (PICS), International Associated Laboratory (LIA), International Research Networks (GDRI), and International Joint Units (UMI).
  - Example: In 2007,
  - The **French Programme for Cooperation with China (PFCC)**[40] was created recently to support scientific exchanges that will initiate research projects involving a French team working with a Chinese team. This programme has been jointly implemented by the French Ministry of Foreign Affairs and the Ministry of National Education, Higher Education and Research. Funding will be granted for researchers, postdoctoral fellows, and/or PhD students to undertake travel and medium (more than one month) and long-term research trips.
  - In spring 2007, CNRS, the French Atomic Energy Agency (CEA) and The Chinese academy of sciences (CAS) agreed to set up an International Associated Laboratory (IAL), the **France-China Particle Physics Laboratory (FCPPL)**. In this collaborative initiative 250 researchers, engineers and students are involved from both countries.
- **Institut Pasteur and China**: On 30 August 2004, the Chinese Academy of Sciences, the Municipality of Shanghai, and the Institut Pasteur in Paris signed a cooperation agreement to create the "Institut Pasteur of Shanghai, Chinese Academy of Sciences". Research areas are virology and hepatitis. The institute is funded jointly by the three institutions. The institute has nine research groups and employs 120 people; the General Director is Prof. Vincent Deubel, and Prof. Zang Jingwu is the Co-director. Seven principle investigators are Chinese, one is Japanese and one French.
- Chinese Academy of Sciences (CAS) and French National Institute for Research in Information and Automation (INRIA), **China-French Joint Laboratory of Information, Automation and Applied Mathematics** was founded in January 1997. It mainly serves the cooperative basic research and application development between Chinese and French scientists. It also plays a liaison role between S&T communities and industrial communities of China and France and to develop samples or sample models for general industries and service industries.

Germany:

- **German Research Foundation (DFG) – Natural Science Foundation of China (NSFC):**

[40] https://dri-dae.cnrs-dir.fr/spip.php?rubrique432

- The **Sino-German Center for Research Promotion**[41] is jointly established by NSFC and DFG. It was put into operation on October 19, 2000. NSFC and DFG invest 10 million yuan each annually to the Center to sponsor the cooperation and exchanges between scientists from the two countries. The Center's mission is to provide financial support for Sino-German cooperation concerning basic research in the natural, life and engineering sciences, and to promote exchange. To a limited extent, this also applies to the humanities and social sciences. In addition to the provision of funding for the organisation of symposia and workshops, it can also cover travel and accommodation costs and finance bilateral research projects organisation of symposia and workshops, it can also cover travel and accommodation costs and finance bilateral research projects. Projects are launched via joint calls for proposals.
- Another agreement from 2005 between DFG and NSFC lays the ground for the support of **International Sino-German Transregional Collaborative Research Centres** located both in Germany and China. Such centres are based in more than one location. One goal of the agreement is to provide support for long-term collaborative research projects involving scientists at multiple locations working together in a joint research programme.
- DFG has also signed agreements with the Ministry of Education of China (MOE) and with the Graduate University of the Chinese Academy of Sciences (GUCAS) for supporting the funding scheme **International Research Training Networks** also in the frame of Sino-German S&T cooperation.
- Shanghai Academy of Social Sciences (SASS);
- Chinesische Akademie für Gesellschaftswissenschaften (CASS).

- **May Planck Society (MPG) cooperation with Chinese Academy of Sciences (CAS):** MPG has long-standing formalised scientific cooperation with CAS and also with leading Chinese universities,
  - **MPG Independent Junior Groups in China**: Junior Scientist Group on Genomic Methylation (Shanghai), Junior Scientist Group on Early Embrionic Development and Regulation of Genome Expression (Shanghai), Junior Scientist Group on Genome Expression (Kunming);
  - **MPG Partnerlab**: CAS Institute for Biophysics (Beijing): The group will use the methods, which have been jointly developed during the last 10 years, to study various aspects of membrane trafficking, particularly stimulus-secretion coupling in neuroendocrine cells. A major goal of this initiative is to enable the MPG partner group to assemble the volume of equipment, research materials and manpower in order to make best use of its internationally leading expertise and to do so in collaboration with the Max Planck Institute for Biophysical Chemistry.
  - **MPG/CAS Partner Groups**: Chemical Physics (Dalian), Physical Sciences at Microscale (Hefei), Interfacial and Amorphous Structures in advanced Ceramics (Stuttgart), History of Science (Beijing);
  - **GTZ – Deutsche Gesellschaft fuer technische Zusammenarbeit:** Integrated experts are highly qualified German nationals or nationals of another EU Member State who are placed in positions important for development in Third Countries within the framework of the **GTZ Integrated Experts Programme.** They enter into a direct contract of employment with a public- or private-sector employer in a partner country. The employer

[41] http://www.sinogermanscience.org.cn/

pays them a normal local salary. Their salary is topped up by CIM and additional benefits accorded from German public funds. This scheme is intended to compensate for a lack of partner experts in existing and basically operational institutions in partner countries, for a limited period.

In the course of the present review, the experts were able to visit a very convincing case of this approach at the China Meteorological Administration (CMA), National Climate Centre (NCC), Centre for Climate Change (CCC) where the Head of Unit for energy and Economy is a German expert.

- **Fraunhofer-Gesellschaft:**
  - The Fraunhofer-Gesellschaft has set up a **Representative Office in Beijing**: The Representative Office represents the entire research spectrum of the Fraunhofer-Gesellschaft. It is available to all interested Chinese partners for establishing contacts and initiating activities in collaboration. Promoting rapid innovation is the key objective - by bringing together the R&D experience of both countries. The Representative Office further supports this objective through regular exchange programs for Chinese and German scientists
  - Fraunhofer German-Sino Lab for Mobile Communication MCI: The German-Sino Lab for Mobile Communications Institute is located at the Fraunhofer Institute for Telecommunications, Heinrich-Hertz-Institut, HHI in Berlin and cooperates with the Sino-German Joint Software Institute in Beijing. The institute is intended to cover various aspects of mobile communications and also to corroborate and initiate joint Chinese and German research activities. Primary responsibility is both theoretical and practical research work for evolving third generation mobile communication (3G+) systems. The work is supported by the Ministry of Science and Technology (MOST), P.R. China and the Federal Ministry of Education and Research (BMBF), Germany.
- **Helmholtz Association:**
  - The **Helmholtz Beijing Office** represents the Helmholtz Association in China. Its mission is to further promote cooperation between the scientists from the 15 Helmholtz Centers and their partners in the Chinese scientific community. The emphasis of this cooperation lies on strategic and long-term projects in the six research fields Energy, Earth and Environment, Health, Key Technologies, Structure of Matter and Transport and Space. The Beijing office aims to build a bridge between Germany and China by intensifying communication and increasing understanding.
  - **Helmholtz-China Scholarship Council Exchange:** Since 2007, up to 50 young Chinese scientists per year have the opportunity to do research at institutes of the Helmholtz Association of German Research Centers**.** In 2006, the Helmholtz Association signed an agreement with the **China Scholarship Council (CSC)** in consultation with the **Chinese Ministry of Education** (MoE). The agreement governs the selection and financing of scholarship holders. Accordingly, the number of Chinese scientists working at the Helmholtz Association is set to double over the next three years. This will give more young scientists from China access to the Association's excellent large-scale facilities and infrastructure and promote scientific exchange between the two countries. The young Chinese scientists will be able to do up to three years' research at Helmholtz Centers. Fifty Chinese doctoral and post-doctoral candidates will be supported by this scheme. Young German scientists from the Helmholtz Association can also apply to study at a Chinese research centre. University lectures and seminars are increasingly held in English, particularly in the mega-cities of Beijing and Shanghai.

The Chinese scholarship holders are selected in a multiple-stage process, which also involves representatives of the Helmholtz Association. In the first year of their stay in Germany, the young Chinese scientists are supported by the CSC. Following examination of their preliminary results, the second year can then be financed from the Helmholtz Association's Initiative and Networking Funds; the third year is then covered by the particular Helmholtz centre at which the Chinese doctoral or post-doctoral candidate is working.

Norway:

- **Research Council of Norway:** The Norwegian Government's China Strategy of 2007 identifies research as a priority area in the cooperation between Norway and China. A new bilateral agreement between Norway and China on research and technology is expected to be signed in autumn 2008. The Research Council already administers several agreements established with Chinese institutions, and Norwegian universities, independent research institutes and public administrative bodies have entered into various cooperation agreements with their Chinese counterparts.

Portugal:

- **SPI** – The Portuguese Society of Innovation has a **Strategic partnership with the TORCH Centre** of the Chinese Ministry for Science and Technology (MOST) and has an office in Beijing – SPI Beijing. Under the FP6 NEST scheme, spi coordinated the **ChinaFrontier project** that delivered interesting results regarding the situation and the opportunities for cooperation between the EU and China in the area of frontier research[42]. These results will certainly be interesting for the CO-REACH and the BILAT-SILK projects.

The Netherlands:

- In early 2007, a Memorandum of Understanding to set up a joint research centre, the **Sino-Dutch Centre for Preventive and Personalised Medicine** was signed in the Chinese city of Dalian between CAS, NGI, NWO and the Dutch research institute TNO. This joint effort aims to bridge the holistic and personalised approach of Traditional Chinese Medicine (TCM) and the upcoming systems biology approach in contemporary life sciences research. Starting point of the collaboration is the view that combining knowledge and methods of Chinese and Western medicine offers a unique opportunity to fuel the development of a whole new generation of diagnostics for both preventive and personalised health care. The presentation of a complete research and organisation plan is planned in the course of 2008.
- The **Royal Academy of Arts and Sciences (KNAW)** is responsible for three programmes for scientific cooperation with China funded by the Netherlands Ministry of Education, Culture and Science (OCW):
  - The China Exchange Programme,
  - CAS-KNAW Joint PhD Training Programme,
  - The Programme Strategic Scientific Alliances.

  The **China Exchange Programme (CEP)** aims at stimulating long-term scientific cooperation through exchange of Chinese and Dutch senior researchers and joint research projects I all fields of research. The activities of CEP have been extended by an additional scheme, the **CAS-KNAW Joint PhD Training Programme** addressing excellent PhD students in the context of joint research projects between institutes of the Chinese academy of Sciences (CAS)

[42] See: http://www2.spi.pt/chinafrontier/

and Dutch universities and research institutes. The **Programme Strategic Scientific Alliances (PSA)** aims at establishing a number of Strategic Scientific alliances in the fields of material sciences, biotechnology/drug research, and environmental science.

United Kingdom:

- More recently (November, 2007), the **Research Councils UK (RCUK)** opened an office in Beijing, which is its first office outside Europe. The mission of the **RCUK China Office** is to work directly with agencies in China to remove barriers to research collaboration between the U.K. and China, through improved mutual understanding of research systems in the U.K. and China, as well as by aligning research priorities and decision processes to establish joint UK-China research teams and projects.
- **UK-China Partners in Science (PiS):** The programme UK-China Partners in Science started three years ago. The first phase of this initiative ran though 2005 and concluded in March 2006.

  It led to more than 100 events and resulted in more than 500 UK participants visiting China. More than 50 UK and Chinese partner organisations were involved, including all leading scientific organisations of both countries. Outcomes included:

  - All of the UK's science Research Councils strengthening links with Chinese science organisations
  - Six science and technology MoUs, including milestone agreements between the UK's Research Councils and counterpart Chinese organisations
  - First ever China/UK workshops on astronomy and polar research
  - 18 live public debates with UK and Chinese speakers
  - Major symposium on the use of science and technology in rural development

  In the second phase of UK-China Partners in Science we have focussed on six priority areas. These were updated at the last UK/China Joint Commission on Science and Technology (London, April 2008). These are:

  - Climate change, energy and the environment
  - Infectious diseases
  - Innovation Policy
  - Materials and Nanotechnology
  - Space technology
  - Stem cells and the modernisation of traditional medicines

  Following through on the opportunities identified in the first phase has been a key driver of Phase II. Therefore Phase II activity include a mix of joint research projects involving Phase I partnerships; networking activities to seed new partnerships; and media work to disseminate key messages about the projects and UK science strengths.

  On the UK side there have been three main sources of funding: Office of Science and Innovation (now GO-Science); Foreign and Commonwealth Office (FCO) Global Opportunities Fund and FCO Public Diplomacy Fund. And many Phase II projects have benefited from co-funding administered by other partners (for example: Department for International Development (DFID), Research Councils, Chinese partner organisations).

These examples show the broad spectrum of approaches and instruments applied by Member States in cooperation with different Chinese partner organisations to foster the S&T cooperation, especially with

- The Ministry of Science and Technology (MOST),
- The Ministry of Education (MoE) and the China Scholarship Council (CSC),
- The Natural Science Foundation of China (NSFC),
- The Chinese Academy of Sciences(CAS),
- The Chinese Academy of Social Sciences (CASS), and also
- The National development and Reform Commission (NDRC).

Also science and technology policy and programme actors at provincial level in China are becoming relevant cooperation partners. In addition, there are countless cooperation agreements also between European and Chinese universities and it is very difficult to get a complete overview. Increasingly, there are also cooperation initiatives between companies and research organisations.

In the highly dynamic and rapid process of intensifying and deepening the S&T co-operation with China, nevertheless, independent of country size and historical experiences, the EU Member States do face some common challenges:

- Capacity imbalance: Difficulties in involving and delivering large-scaled and systems solutions to the large infrastructure projects in the fields of environment and energy in China especially in the context of the urbanisation processes, despite the great market opportunities offered;
- Information deficit: Difficulties in gaining insight into the decision-making and evaluation processes, in obtaining in-depth information about and identifying the focus of national S&T investments and developments;
- Structural barriers in the funding system: both the size and the sources of funding for international cooperation from Chinese counterparts can be unclear to EU Member States.

5.4. Conclusions and recommendations

1. In the highly dynamic S&T landscape in China, together with large EU Member States who have been traditionally more active in S&T cooperation, a group of smaller Member States have also intensified their S&T activities in China. While large Member States have established a broad spectrum of activities along the complete knowledge production chain, smaller Member States are taking a targeted approach to focus on selected sectors, which reflect their national competitiveness and support industrial applications.
2. EU Member States and funding organisations have bi-lateral agreements with MOST, NSFC, CAS and other organisations. The Commission is invited to discuss with Member States their experiences and lessons learned in the cooperation with China. The opportunities for cooperation in variable geometry arrangements around areas of common interest should be explored together with Chinese partner organisations. The experts are convinced that the S&T agreement can act as an umbrella for cooperation based on memoranda of understanding, implementing arrangements etc. for joint initiatives and programmes between consortia of European Member States' S&T authorities and funding institutions and complementary partners in China.

3. The experts welcome the close cooperation and exchange of information and experience between the Member States' S&T counsellors and the S&T Counsellor at the Delegation of the European Commission in China. It should be considered to deepen the cooperation for organising strategic intelligence on the developments of the Chinese S&T system and also for fostering the dissemination of information on the Chinese S&T activities in Europe as a major support activity for strengthening the EC-China S&T cooperation. On the other side, the experts realise also the important role of the S&T counsellors in Beijing for informing the Chinese scientific community on opportunities for EC-China Cooperation. The experts welcome the initiatives to prepare common position papers on relevant issues of the EC-China S&T cooperation. This cooperation has certainly a high potential for further development and bears the potential for substantial support of joint actions in the frame of future strategic cooperation activities between Europe and China.
4. European science and technology still lacks visibility in China. At the same time, most S&T counsellors have only scarce resources available for their work. Therefore, the experts invite the Member States to consider establishing a European S&T House in Beijing supported by the Member States' S&T counsellors and embassies in China.

6. EC-China S&T cooperation and Member States' bi-lateral initiatives – needs and opportunities for coordination and cooperation

Recently, the Commission called on governments of EU MEMBER STATES to jointly develop a strategy for international S&T cooperation with third countries[43]. Already in July this year, the Commission has launched a debate on how Member States' and the Community could work together to tackle common challenges more efficiently through joint programming[44]. In that context, Member States and the Community will together engage in defining together priority research and technology areas where a coherent European effort for strategic cooperation with key third countries would have more impact than isolated activities of individual Member States. The S&T cooperation with China is certainly an area in which these new considerations and approaches will be especially appropriate.

In this chapter, the coordination between EC-China S&T cooperation and the S&T activities of EU Member States in China is addressed from three different aspects as below:

- The need for coordination in the view of the state of play,
- The opportunity of coordination through new options and approaches,
- Learning-by-doing: experiences from CO-REACH.

6.1. EC-China and Member States' S&T cooperation with China – the state of play

At the current stage, the EU Member States have benefited from the EC-China S&T Agreement, since it provides a legal framework for regular policy dialogue supporting co-operation mainly at Community level but paving the way also for bi-lateral cooperation and initiatives in variable geometry arrangements. The S&T agreement facilitates also exchange of information and

[43] A strategic European framework for international science and technology cooperation. COM(2008) 588 final, 24.9.2008

[44] Towards joint programming in research: Working together to tackle common challenges more effectively. COM(2008) 468 final:

experience and the deepening of mutual understanding between the European Commission and the Ministry of Science and Technology (MOST) on S&T policies and programmes. This was an important prerequisite for the recent move towards strategic cooperation. However, the main outcome of the S&T Agreement is to a large extent, limited to the participation of Chinese teams in European research projects supported by the FP, while its practical and operational implications for Member States' S&T cooperation on a daily basis are rather indirect.

While the S&T counsellors agreed in the discussions with the experts that FP is certainly one of the important and suitable instruments to promote the EC-China S&T co-operation, their possibility of following and supporting FP activities varies considerably. For some of the Member States, the FP is considered a "both political and market-oriented programme" and therefore, the participation in FP and the cooperation with Chinese consortium partners were followed closely as one of the cooperation priorities. On the other hand, due to the larger complexity of the FP in comparison to bilateral cooperation, and not least because of the constraints in human resources and capacities, for some other S&T counsellors, the FP is simply too heavy to be supported locally from China.

Departing from the achievements in the bilateral S&T co-operation with China as well as in the face of the common challenges, there is a strong consensus among EU Member States' representatives in China on the need for a "*strategic cooperation framework*" between EU and China and on the importance of achieving complementarities, synergies, as well as avoiding duplication of efforts between the EC and Member States. The driving forces to bring Member States into the more co-ordinated and integrated cooperation framework with the EU are summarised as follows:

- From a strategic viewpoint, the priorities defined by Member States in their bi-lateral cooperation with China, to a great extent, coincide with the cooperation between the EU and China, in particular in fields such as TCM, biotechnology, environment, energy and climate change;
- In terms of human resources and available capacities, almost all EU Member States in China are facing similar constraints in their S&T offices in Beijing and co-ordinated efforts would be one way of overcoming such limitations;
- Currently, Member States and the EU interact individually with MOST and other Ministries and agencies; creating "one voice of the EU" on multilateral and cross-board issues, such as IPR, standard peer-review practices and co-funding would make the communication more effective;
- The Chinese S&T system is complex and in a dynamic development process. It is very difficulty to follow the developments and there are huge opportunities to strengthen the capacities for strategic S&T intelligence by structured cooperation between the Member states. This would certainly be both beneficial and effective for all partners involved;
- In practice, there are already clear synergies between bilateral and multilateral co-operation. For instance, European co-operation in the FP may lead to further bilateral co-operation, and vice versa. In the face of great co-operation opportunities in China, but at the same time constraints in financial resources, it is of increasing importance for EU Member States to utilise also the resources available in variable geometry arrangements. In that context, the bilateral co-operation schemes can also provide resources for experiments and exploratory actions for various innovative concepts and "light-touch projects", at multilateral level.

At the same time, it is also apparent that, in practice, the co-ordination among Member States and between Member States and the EC can be limited and difficult, due to the following reasons:

- There are considerable uncertainties and difficulties in finding a common and coordinated position between Member States to facilitate the dialogue and cooperation with China, in particular when the co-operation is getting close to market-oriented issues, where competition, rather than co-operation will dominate in such a situation among involved partners;
- The communication and interaction between the EC and the Member States on both the current state of play and future plans are not sufficient and the involvement of Member States in the process of developing EC-China strategic co-operation is still low. Unfortunately, from both sides, there is a lack of resources and a proper mechanism to improve the situation;
- Among the Member States, the variations in S&T capacity as well as differences in national priorities in the co-operation with China lead also to differences in the possibility and willingness for a co-ordinated and integrated approach.

6.2. Opportunities for joint programming and strategic international S&T cooperation

The recent communications from the Commission on Joint Programming and on A Strategic European Framework for International S&T Cooperation are setting the stage for utilising new options and approaches in the S&T cooperation between the EC and Member States with China.

More detailed analyses show that in many cases there are good reasons to build on bi-lateral S&T cooperation between individual Member States and China. However, it seems that there is also a huge potential of synergies between the different collaborative initiatives and cooperation at European level or increasingly also joint initiatives, programmes and organisational structures in different formations between Member States (variable geometry) would be promising.

6.2.1 Coordination and cooperation of programmes – Joint Programming

In the course of FP6, the ERA-NET scheme was an important innovation and the positive uptake by Member States' policy makers, programme owners, and funding organisations marked a success as the ERA-NET Review 2006 confirmed[45]. However, already at an early stage of the implementation of the scheme it became evident that structural measures will be necessary in order to make such a scheme effective and to ensure operational efficiency[46]:

"Three topics in particular would be of especial interest to future participants, namely:

- *Guidelines for the conduct of joint calls, including suggestions for harmonised selection criteria and evaluation protocols;*
- *The elaboration of guidelines concerning the operation of different funding modes (common pot, virtual pot, mixed-mode). Examples of some of the mixed-mode models used to date, with some indication of their advantages and disadvantages, would be especially welcome;*
- *Guidelines for the future elaboration of joint programmes.*

[45] M. Horvat, K. Guy, V. Demonte Bareto, J. Engelbrecht: ERA-NET Review 2006. The Report of the Expert Review Group. Brussels, December 2006.
[46] Op. cit., p. 26

The formulation of these guidelines should take place within the context of the development of a new structural and organisational framework for the ERA-NET scheme, specifically one geared towards the harmonisation of procedures and practices across all joint calls and programmes launched by ERA-NETs."

The Commission's initiative towards joint programme proposes a systematic approach and a pragmatic and well structured methodology for the coordination and cooperation of national research policies and programmes taking account of the life-cycle of programmes from programme definition to monitoring and evaluation[47]. Following the experience of European Technology Platforms, a three step approach is appropriate:

(i) Developing of a common vision for the agreed area;

(ii) Translating the vision into a Strategic Research Agenda (SRA);

(iii) Implementing of the SRA: *"All participating public authorities orient their programmes and funding in a coherent manner to the implementation for the SRA."* All public instruments such as e.g. national and regional research programmes, collaborative schemes, research infrastructures, mobility schemes etc. should be utilised to realize the joint programming initiative.

In accordance with the findings of the ERA Expert Review Group, initiatives for joint programming would benefit if certain framework conditions are agreed upon and are put in place, such as:

- Shared principles for the evaluation of programmes and projects (peer review);
- Common methodologies for foresight activities;
- Common principles for cross-border funding of research;
- Effective measures for protection of IPR.

In the meantime, there is a huge body of accumulated knowledge and experience in the coordination and cooperation of national policies and programmes. Currently, an exercise "Evaluation and Impact Assessment of the ERA-NET scheme and the related ERA-NET Actions under the 6th Framework Programme"[48] is under way. Despite the fact, that ERA-NET actions are of a much smaller scale than the proposed joint programming initiatives aiming towards addressing major challenges in substantial joint efforts this exercise will certainly produce important insights and conclusions relevant for the future of joint programming. For the focus of the present review these developments are extremely important and will provide also a favourable frame for future joint S&T cooperation between Member States and China. However, there is still a way to go till Member States will come to agreements about the different aspects of a common framework and commonly agreed "rules of the game". And in the case of the cooperation with China such agreements have to be reached together with China in close cooperation.

6.2.2 Developing a strategic framework for the S&T cooperation with China

As has been shown in previous chapters, a main characteristic of the reviewed period was the high level agreement that the EC-China cooperation should develop towards a strategic approach. This is fully in line with the principle of "Widening the European Research Area ad making it more open to the world" as defined in the follow up of the ERA Green paper and defined in more

[47] COM(2008) 468 final, p. 10
[48] Matrix Knowledge Group for DG RTD of the European Commission

detail in the Communication. *"Excellence in research stems from competition between researchers and from getting the best to compete and cooperate with each other"*[49]. Joining forces between China and Europe in commonly agreed priority areas – at Community level, in variable configurations of Member States, as well as in bi-lateral settings – will create win-win situations and thus benefits for all parties involved.

Building on past experiences in the Framework Programmes but also in Member States' activities there is ample room for strengthening the EC-China cooperation. The S&T agreement lists forms of collaborative activities. Not all of them have been utilized so far, and there is also the possibility for the Steering Committee to recommend any other modality that is in conformity with policies and procedures. Thus the scope of the policy dialogue and the collaborative initiatives can be broadened.

A basic requirement for fostering well coordinated approaches is ensuring the coherence of policies and complementarity of programmes. This is in line with the baseline of the Communication on joint programming.

The ways how to define priority areas for cooperation have to be further developed. However, the 7th Framework programme and the 11th Medium and Long-Term Plan give a very good basis to identify common priorities. This holds for the Community level but also for the different other possible arrangements. Community level strategic activities with China should probably concentrate on most challenging areas addressing global S&T and societal challenges[50]. Frontier and pre-competitive research and research leading to common standards are areas of particular important and relevance.

There are ambitious plans for strengthening the research infrastructure base in Europe[51] that have attracted interest around the world. Also China and particularly the Chinese Academy of Sciences (CAS) host very important and attractive large scale facilities. As the experts learned, these facilities are open for European researchers. Thus, this is another area to support cooperation and especially to stimulate also two-way mobility of researchers.

Both the European Barcelona goal and the ambitious Chinese plans for increasing the financial resources will require ensuring an adequate development of the human resources base for research. EC-China S&T cooperation and also the manifold S&T activities between Member States and China are providing a favourable framework for supporting the development of an internationally experience research work force. Two-way mobility of researchers between the European Union and China is a "conditio sine qua non" for such a development. The necessary legal and administrative framework for researcher mobility has certainly to be optimised.

The different experiences of the EU Member States cooperating with China show the great potential and the broad portfolio of ministries, agencies and research organisations that contribute to the manifold cooperative initiatives. It would be beneficial for all parties when the experiences are shared between Member States and with China in open exchanges. The S&T counsellors of the Member States and of the EC delegation have a central role to play there.

There are a number of different Chinese ministries and agencies and research organisations engaged in bi-lateral agreements with Member States. It would certainly be worthwhile to explore the cooperation potential also at Community level with these Chinese institutions. The experts welcomed the openness of the MOST representative to widen the consultations in the frame of the S&T agreement also to other Chinese parties in their discussion. When at the same

[49] COM(2008) 5888 final, p. 4
[50] See COM(2008) 588 final, p 8
[51] See the work of the European Strategy Forum for research Infrastructures (ESFRI): http://cordis.europa.eu/esfri/

time also the communication between the Commission and the Member States in the implementation of the S&T agreement is enhanced the foundations for developing and sustaining the strategic partnership with China will certainly be strengthened.

6.3. The FP6 ERA-NET CO-REACH Coordination Action

In May 2005, the ERA-NET Coordination Action CO-REACH[52] was launched as a network of European S&T policy and funding organisations involved in promoting research cooperation with China in the natural sciences, medical and life sciences, engineering sciences, social sciences and humanities. The consortium partners come from nine Member States and one Associated Country[53]. This network aims at creating coherence and synergy between the involved Member States' S&T relations with China. It will do so by promoting the co-ordination of China related policies and associated research policies and bi-lateral funding programmes of the participating countries, and aligning these efforts with those of other European initiatives, including the FP and other agreements and initiatives of the European Commission.

CO-REACH presents a test case and also a learning platform for a joint research initiative of a number of Member states towards China. The experiences and results from CO-REACH will be an important input in the debates on both on the perspectives for joint programming and for the European strategic framework for international S&T cooperation.

CO-REACH is a European-based network. Therefore, a strong partnership with the consortium's Chinese counterparts is crucial for the success of this initiative. For this reason, Chinese Work Package contact points have been appointed and the Chinese counterpart organisations are invited to participate in key CO-REACH activities. The Chinese Work Package contact points include:

- Ministry of Science and Technology (MOST),
- Ministry of Education (MOE),
- Chinese Academy of Sciences (CAS),
- Chinese Academy of Social Sciences (CASS),
- National Natural Science Foundation of China (NSFC).

Since its launch in May 2005, CO-REACH produced the following main outputs:

- Mapping Report comprising a comprehensive, structured overview of bilateral programmes with China, managed by CO-REACH partners,
- Benchmarking and Best Practices Report,
- Analytical report 'Bilateral collaboration with China: trends, systems and challenges'.

One of the first public deliverables is the ONLINE CO-REACH DIRECTORY accessible via the CO-REACH website. The CO-REACH Directory is a dynamic information source for European and Chinese scientists as well as policy makers that provides an overview of opportunities for funding co-operation. At present the directory includes information on bilateral funding schemes of all CO-REACH partners and observers. The aim is to expand the Directory with schemes of other national organisations across Europe and China. According to the CO-REACH homepage, the ultimate goal is to become a 'Gateway to Europe' for European and Chinese scientists and policy makers.

[52] http://www.co-reach.org/
[53] AT, FI, FR, DE, HU, IR, NL, PL, UK, and NO.

CO-REACH has launched a first joint call for proposals on *Social Science Collaborative Research between Europe and China (CO-REACH-SSR).* The Chinese partner organisation in that Call is the Chinese Academy of Social Sciences (CASS). This first joint call is a pilot designed to facilitate the co-operation between research teams of the CO-REACH partner countries and Chinese partners. Proposals in the following thematic areas will be invited:

- Demography, Family and Welfare,
- Cultural Heritage,
- Law, Governance and Policy Making,
- Participation, Co-determination, Employment and the Quality of Life,
- Labour Market Change, Migration and Social Cohesion.

Each applicant group must involve a minimum of two researchers/research groups from two different participating European CO-REACH-SSR Member States as well as a minimum of one researcher/research group from China. On the European side, organisations from Austria, Finland, France, Germany, The Netherlands, and Great Britain are involved. For the Call, the EU partner organisations provide some 1,5 million EUR for the call, while CASS will provide 150.000 EUR.

The experiences from CO-REACH so far

Positive experiences

One of the objectives of CO-REACH is to avoid duplication of efforts in national programmes of Member States and to promote increased convergence of European and Chinese priorities. To achieve this, it is essential to build trust among European funding organisations as well as to create an open discussion on the potential of coordination, co-operation and specialisation in the co-operation with China. The reactions to such initiatives of openness and joint efforts vary, at the current stage, across Member States. But there are indeed some positive coordination efforts, in particular even at national levels that have taken place. For instance, two Dutch funding organisations participating in CO-REACH have started a co-ordinated cooperation with China. However, this is also an example of some of some of the problems the European Research Area is facing. Furthermore, the mutual learning among involved European partners, in terms of S&T co-operation with China is highly appreciated, which is also one of the motives for their engagement in the projects.

The platform function of CO-REACH is appreciated by Chinese counterparts, such as the MOST and NSFC. Instead of interacting with individual funding organisations from different Member States, CO-REACH provides a platform in which a multilateral dialogue between the European and the Chinese sides can be established. For instance, NSFC shows a clear interest to develop some of their cooperation with Europe from a bilateral towards a multilateral co-operation. Another interesting observation is that, through such multilateral interaction and communication, the involved Chinese counterparts have gained increased understanding of the diversity among members states in the EU, as well as a more direct contact with the bottom-up approach of many funding activities in the EU.

Furthermore, the information platform, in the form of ONLINE CO-REACH DIRECTORY has also generated interest as well as provided support for new initiatives for cooperation with European partners from the Chinese side. For instance, discussions between the Ministry of Education (MoE) and CO-REACH have been initiated regarding the ongoing process of the establishment of the China-EU cooperation information platform and the possibility of

information exchange and linkage between MoE's information platform and the ONLINE CO-REACH DIRECTORY.

Challenges and lessons learned

Funding issues

Following the FP6 rules, Chinese organisations were not eligible to receive EC funding and consequently the Chinese organisations involved in CO-REACH could only be "counterparts" instead of "partners". In practice this means that all the Chinese organisations were involved on a "voluntary" basis and it has required significant efforts by the project coordinator to maintain the relationship with Chinese counterparts and sustain a reasonable engagement in the project. It is only reasonable that the Chinese organisations understood CO-REACH as a "European" project and there was understandably little motivation to develop some kind of co-ownership with the projects. This is also one of the reasons that the possibility of the mapping of national funding programmes from the Chinese sides has been limited. In such a context, both the current opportunities for international S&T cooperation in FP7 and the future progress towards a more strategic approach and an equal partnership in the form of co-ordinated calls and co-funding schemes are more attractive for the Chinese organisations.

Difficulties in policy dialogues from both sides

From the European side, China is one of the highest priorities for all the involved Member States and there is a certain reluctance to have an open communication and exchange on what are the key areas and how to perform the policy dialogue. The CO-REACH experience so far provides evidence that "Europe speaking with one voice" in S&T cooperation turns out to be both highly sensitive and an objective very difficult to achieve.

From the Chinese side, despite the advantages mentioned above the policy dialogue with European partners seems also to be a difficult task. For our international S&T partners the multilevel situation between Member State level, intra-European level (variable geometry, Member States in different groupings) and European level creates some difficulties. In the Steering Committee of the EC-China S&T agreement, the Commission is speaking with MOST for the Community and for European S&T policies. In CO-REACH, a number of EU Member States are entering into a policy dialogue with the Chinese counterparts. So far, there is no coordination or no division of labour.

So far, the policy dialogue has been carried out with a limited scope, focusing on identification of thematic priorities and more operational issues involved in funding activities. One lesson that has been learned from CO-REACH is that a coherent partnership of research policy and funding institutions from both sides will be important for future similar activities.

Joint call with CASS

The joint call with CASS has been a very complex process but a positive experience. The most important lesson learned from this exercise is the importance of equal partnership from the very beginning, through the whole process of topic identification, joint evaluation, selection and co-funding. In other words, involvement of European and Chinese partner organisations on equal terms is a pre-requisite for success.

However, concerning the co-funding, substantial obstacles exist from both sides. From the Chinese side, CASS provides the funding. However, being a research institute itself, the funding

resources that could be provided are limited. On the other hand, the MoE did not "reserve" funding for the cooperation of CAS with CO-REACH because of various administrative constraints and deviations in funding and planning praxis.

From the European side, the difficulties created by the differences in funding schemes and standards across different funding agencies in different Member States were even greater. Without a harmonised funding model and/or required flexibility, it is very complicated to involve Member States in such a joint call. Since the move towards joint calls and even programmes is the main objective of ERA-NET Member States and funding organisations have to find solutions for that problem.

In addition of securing financial resources for co-funding, the transparency in the use of funding from both sides is an import aspect in assuring the quality of deliverables from projects financed by the joint calls.

CO-REACH is the first ERA-NET action targeting S&T cooperation between EU Member States and China. It will be very important to carefully monitor the development of CO-REACH in order to learn from the experience.

In general, the ERA-NET scheme and the future Joint Programming involving Member States' and China's S&T funding programmes in different variable geometry arrangements have the potential of becoming attractive addition opportunities for supporting and promoting S&T cooperation between the EU and China. Before becoming involved in further pilot actions it would be useful to organise an EU-China workshop on the coordination and cooperation of S&T programmes to exchange the views on the lessons learned as well as the potential that should be further explored.

6.4. Conclusions and recommendations

1. The experts see a great potential in utilising the joint programming idea for supporting the strategic cooperation with China. The Commission and the Member States are invited to explore the opportunities offered by the joint programming initiative in the course of the development of a strategic European framework for international S&T cooperation.
2. The coordination and cooperation of Member States' initiatives and programmes is certainly an area for further consultation and exploration in the context of the European strategic framework for international S&T cooperation and the initiatives for joint programming. The ERA-NET Coordination Action CO-REACH is a useful pilot activity in that area and the lessons learned should be used when other activities will be developed for example in specific thematic areas in the future.
3. For the future development of joint programming initiatives between Member States the cooperation the Member States' S&T counsellors and the EC S&T counsellor of the European Commission in China will be important. This cooperation will help identify priority areas for S&T cooperation in thematic and problem areas in variable geometry arrangements.

7. General conclusions and recommendations

7.1. EC-China S&T Cooperation 2004-2008 – Political framework and the S&T dialogue

1. The Chinese S&T and innovation system is developing extremely fast and dynamically and China has become a major actor in the global system for the production of knowledge. This will strengthen the global S&T community and cooperation has to be high on the agenda.
2. During the reviewed period 2004-2008, the EC-China S&T Cooperation Agreement has proven to be an important legal basis and an efficient tool for the regular S&T policy dialogue between the EU and the People's Republic of China. The experts recommend renewing the agreement, with the major contents unchanged and, where necessary and appropriate, some technical updating of the text to the state of 2008.
3. In general, the EC S&T agreements have the potential to play an important role also in the frame of the implementation of the future strategic European framework for international S&T cooperation[54]. Especially in the context of developing strategic partnerships with key third countries the S&T agreements will be conducive for building mutual understanding and deepening the cooperation. The ways and means of setting targets and implementing activities have to be further developed, based on mutual benefits as well as taking into account region- and country-specific contexts. The development towards strategic cooperation under the EU-China S&T Cooperation Agreement is most welcome and can act as a very good example in that respect.
4. During the reviewed period the 7th EU RTD Framework Programme (2007-2013) and China's Medium- and Long-term Science and Technology Development Plan (2006-2020) and the 11th Five-Year Plan (2006 - 2010) were launched. This concurrence forms an excellent basis for in-depth dialogues on how to utilize possible synergies and complementarities between the policy frames from both sides.
5. Compared to 1998-2003, meetings of Steering Committee have greatly improved both regarding scientific content and participation of high level stakeholders. Regarding the systematic follow-up of S&T related aspects addressed during the EU-China Summits, there seems to be some room for improvement.
6. The move towards a strategic partnership in key priority areas is probably the most important development in the course of the 10 years since the S&T agreement was signed in 1998. Furthermore, the annual road maps of activities will provide an excellent framework for implementing cooperative activities efficiently and effectively. This is certainly a real advancement towards higher efficiency and effectiveness of the work of the Steering Committee. Annual road maps could also be used as input to annual reporting as required by Article 6 (d) 4 of the S&T agreement as well as for continuous monitoring and annually reviewing the progress of initiatives. The exercise to develop annual road maps would certainly gain even more value if the decisions on the road map would be taken jointly by the representatives of the European Commission and MOST in the meetings of the Steering Committee.

[54] See: COM(2008) 588 final, 24.9.2008

7. Increasing awareness and information on the S&T Agreement outside the Steering Committee is still an area where improvements are possible. Member states and S&T experts should be better informed of the agenda and outcomes of Steering Committee meetings, and where appropriate involved in the preparation and follow up. Information on the main outcomes of Steering Committee meetings should be widely spread in formats that are in accordance with the rules of the Steering Committee amongst S&T stakeholders of the Member States (e.g. via CREST or a possible future forum for international S&T cooperation) and National Contact Points (NCPs). The preparation and implementation of the road maps could be used to intensify the exchange of information and the cooperation between the Commission and the Member States. Also ERAWATCH could be used as one of the information channels.

8. Some directorates of the 'research family' have shown substantial involvement in the interaction with China on S&T-related issues. Thus, the internal awareness and utilization of the S&T agreement amongst the Commission services have been enforced. However, there seem to be rooms for improvement between S&T cooperation and the activities covered by other sectoral dialogues, e.g. environment and energy. The exchange of information, coordination and cooperation as appropriate between S&T cooperation and sectoral dialogues in other policy areas deserves continuous attention. Possible synergies should be utilized wherever possible.

9. Coordination of calls for proposals between the European Commission and the Ministry of Science and Technology (MOST) following the principles of co-evaluation, co-decision on selection and subsequent co-funding of projects will contribute to deepen EU-China S&T cooperation, and to achieve the equal partnership in real terms. The experts support the idea that the European Commission and MOST shall carry out cooperation based on FP7 of the EU and the 863 and 973 Programmes and other potentially feasible and appropriate research funding schemes of China. These developments can be seen as a major step towards achieving reciprocity as required by the S&T agreement. The prospect that a Memorandum of Understanding on China-European Commission S&T Partnership will be signed during the forthcoming EU-China Summit in Lyon is most welcome. The experts are fully aware of the difficulties to be overcome when designing joint efforts of different S&T funding systems and it is very well appreciated that a commonly agreed approach can be found. Therefore, the rigorous efforts combined with flexibility of the officers that prepared the agreement at the technical level are very much appreciated.

10. The experts fully support the structure and contents of the planned strategic partnership. The purpose, principles and ways of cooperation and management mechanisms are well defined and will provide a sound basis for the development of the future strategic S&T cooperation between Europe and China. Following a step by step approach will ensure that the programme will follow a development path of jointly learning from experience. Such an agreement will certainly become an example of best practice important also for other agreements on international S&T cooperation. However, such an effort may be only appropriate in cases where there are really substantial capacities for in-depth and long-term cooperation on both sides.

11. The involvement of experts from both parties in workshops to give input for calls for proposals provides also the opportunity to establish and deepen the contacts and communication between high level European and Chinese experts that may lead to future cooperation. Taking into account the great technical complexity and comprehensiveness in the institutional and regulatory framework involved in research areas, such as environment,

energy and climate change and heath, the engagement of a broad spectrum of well-respected high-level experts from both sides needs to be ensured.

12. The role of the EU S&T counsellor for promoting EU-China S&T cooperation should be clearly defined and has to be strengthened. The S&T counsellor has an important diplomatic role for continuously maintaining and cultivating the contacts with the main S&T stakeholders in China and ensuring an atmosphere of mutual trust and understanding while also monitoring the developments of S&T in the partner country.

7.2. EC-China S&T cooperation 2004-2008 in the EU Framework programme and beyond

13. One main aim of the EC-China S&T agreement remains the strengthening of S&T cooperation by using the available instruments such as the EU RTD Framework Programme. The participation of China in FP6 and FP7 shows a positive trend, in terms of both increased number of participation and a broader coverage of thematic areas. However, in the experts' view the potential for the cooperation is certainly much higher, taking into account of the rapid growth in China's R&D capacity building at both national and regional levels, as well as the larger scope of common and global issues faced by both the EU and China.

14. When reviewing the EU-China cooperation in the Framework Programmes it is difficult to judge if the level of cooperation is satisfying or not. Therefore, in the annual road maps, it should also be considered in the Steering Committee to agree jointly on targets or to define criteria for success which reflect both the level and the quality of FP participation, as well as the intensity of EU-China cooperation in an overall context. This would certainly also support monitoring and impact assessment of the activities.

15. From the meetings and interviews with Chinese and European project participants the experts were able to draw positive conclusions on the scientific quality and the mutual benefit of the cooperation in joint projects. These findings are to a large extent also supported by the outcomes of the detailed studies on the EU-China cooperation in FP6 performed independently by Chinese and European evaluation experts. The evidence of mutual benefits of the cooperation for the scientific communities of the EU and China is very encouraging and forms an excellent basis for further developing the partnership.

16. Mobility of researchers from China to Europe has developed very well. The Marie Curie scheme is seen as an appropriate instrument. However, the mobility of researchers from Europe to China is not at all satisfactory and no progress can be seen in the reviewed period. The new 'Science and Technology Fellowship (STF) Programme' in China launched by the Delegation of the European Commission in China is most welcome and should be carefully monitored. The same applies to the 'International Research Staff Exchange Scheme – IRSES' under the 'People' Specific Programme. However, to support a successful development of this initiative more awareness and information on the opportunities for S&T activities in China will be necessary.

17. For the future, the experts recommend to explore possible synergies between the 'Ideas' Specific programme and the initiatives of the China Scholarship Council. Also bi-lateral intergovernmental S&T agreement between Member States and China should be included in such considerations. Due to the different forms of fellowships a spectrum of possibilities could be presented in a systematic way. Fellowship programmes should also be used in more strategic ways for developing and deepening the long-term S&T cooperation between the institutions sending and receiving scholars.

18. The experts recommend that a short review and analysis of the state and the future potentials of contacts of European Technology Platforms and Joint Technology Initiatives with China is performed, and that bottlenecks and possibilities for ETPs and JTIs for the interaction and S&T cooperation with China are identified. European Technology Platforms and Joint Technology Initiatives should be encouraged to include the international dimension in their strategies and to explore and promote opportunities of EC-China S&T cooperation as appropriate.
19. The activities initiated by the EC-China Summits going beyond the EC-China S&T cooperation in the Framework Programme and Chinese research programmes are supported by the experts. The perspectives that the next EC-China Summit will bring a major step forward in the implementation of these collaborative initiatives are most welcome.
20. The China-Europe Science and Technology Year (CESTY) 2006 and 2007 was a most welcome joint initiative of the Ministry of Science and Technology (MOST) and the Directorate-General of the European Commission. CESTY contributed to raising the awareness on the huge potential of strengthening EU-China S&T cooperation. It is recommended to consider similar initiatives also for the future.
21. The new actions ERA-LINK and NERE-LINK that are being developed by the European Commission will support the strengthening of contacts and collaboration between the EU and China. Therefore, the experts support their further development and implementation.
22. The visibility of European S&T activities not only of the Framework Programme in China is still limited. In the experts' opinion more joint activities of Member States and the European Commission would be useful. It is suggested to consider the possibility organising EU-China S&T Summits around the general EU-China summits.

7.3. Success factors and obstacles for the ongoing EC-China S&T cooperation

23. The overall experiences in participating in Framework Programmes projects, are positive, from the viewpoints of both the project coordinators in the EU, and the project participants in China. There are strong interests and incentives to continue and deepen the cooperation from both sides. At the project level, the long-term institutional partnership and scientific excellence in research fields with common interests as well as the capacity and willingness in mobilising large networks, are considered most important success factors in the project implementation. At the institutional level, to narrow the gap between top-down strategic partnership and bottom-up and individual driven research activities is underway to become a key element of internationalisation strategy at top research institutes and universities in China.
24. There is clearly room for improvement of information and assistance of researchers on the possibilities of EU-China S&T cooperation. During the visits to universities and research organisations in the course of their mission to China the experts received positive opinions on the activities of CECO. However, the experts realised that due to the size of China developing a multi-layered and professionalized network of contact points for information and assistance as well as for capacity building in EC-China S&T cooperation would be very useful. Support activities should not be limited only to support for the preparation of proposals. Also general information on the S&T system(s) and structures in Europe would be most appropriate. In many cases, the experts found strong interest in working with Europe but also a lack of information on the European research area. In leading positions at universities and research institutes there are in many cases more scientists that have been trained or worked in the US compared to scientists with professional experience and contacts in Europe.

25. On the other side, there is a substantive need also on the European side to improve the information and assistance on the opportunities for S&T cooperation with China. National Contact Points should receive specific information and training on the Chinese science, research and innovation system and on the opportunities for supporting cooperation.

26. Projects with Chinese partners should be monitored and success stories and flagship projects should be identified and widely published in the EU Member States and Associated Countries and in China.

27. To move from a science-driven towards a science-and-policy driven EC-China cooperation in S&T, the governance and institutional settings are of great importance, to shorten the distance between research agenda setting and policy agenda setting, as well as to narrow the gap between the scope of cooperation and the coverage of institutional interfaces. This can be achieved through increased openness in communication between the European Commission and MOST as well as possibly also other Chinese S&T actors, improved coordination in horizontal actions and, when appropriate, flexible implementation arrangements.

28. Adequate resources should be made available to the EC S&T counsellor in China for providing the first access point and gateway for user-friendly information for CN partners on possibilities for S&T cooperation with the EU. The website of the EC delegation should be the major tool for that purpose. For other operational promotion activities in China the BILAT-SILK scheme should be utilized in clear division of labour and cooperation with the EC S&T counsellor.

7.4. EU Member States bi-lateral S&T cooperation activities with China

29. In the highly dynamic S&T landscape in China, together with large EU Member States who have been traditionally more active in S&T cooperation, a group of smaller Member States have also intensified their S&T activities in China. While large Member States have established a broad spectrum of activities along the complete knowledge production chain, smaller Member States are taking a targeted approach to focus on selected sectors, which reflect their national competitiveness and support industrial applications.

30. EU Member States and funding organisations have bi-lateral agreements with MOST, NSFC, CAS and other organisations. The Commission is invited to discuss with Member States their experiences and lessons learned in the cooperation with China. The opportunities for cooperation in variable geometry arrangements around areas of common interest should be explored together with Chinese partner organisations. The experts are convinced that the S&T agreement can act as an umbrella for cooperation based on memoranda of understanding, implementing arrangements etc. for joint initiatives and programmes between consortia of European Member States' S&T authorities and funding institutions and complementary partners in China.

31. The experts welcome the close cooperation and exchange of information and experience between the Member States' S&T counsellors and the S&T Counsellor at the Delegation of the European Commission in China. It should be considered to deepen the cooperation for organising strategic intelligence on the developments of the Chinese S&T system and also for fostering the dissemination of information on the Chinese S&T activities in Europe as a major support activity for strengthening the EC-China S&T cooperation. On the other side, the experts realise also the important role of the S&T counsellors in Beijing for informing the Chinese scientific community on opportunities for EC-China Cooperation. The experts welcome the initiatives to prepare common position papers on relevant issues of the EC-China S&T cooperation. This cooperation has certainly a high potential for further

development and bears the potential for substantial support of joint actions in the frame of future strategic cooperation activities between Europe and China.

32. European science and technology still lacks visibility in China. At the same time, most S&T counsellors have only scarce resources available for their work. Therefore, the experts invite the Member States to consider establishing a European S&T House in Beijing supported by the Member States' S&T counsellors and embassies in China.

7.5. EU Member States and EC-China S&T cooperation – complementarities and synergies

33. The experts see a great potential in utilising the joint programming idea for supporting the strategic cooperation with China. The Commission and the Member States are invited to explore the opportunities offered by the joint programming initiative in the course of the development of a strategic European framework for international S&T cooperation.

34. The coordination and cooperation of Member States' initiatives and programmes is certainly an area for further consultation and exploration in the context of the European strategic framework for international S&T cooperation and the initiatives for joint programming. The ERA-NET Coordination Action CO-REACH is a useful pilot activity in that area and the lessons learned should be used when other activities will be developed for example in specific thematic areas in the future.

35. For the future development of joint programming initiatives between Member States the cooperation the Member States' S&T counsellors and the EC S&T counsellor of the European Commission in China will be important. This cooperation will help identify priority areas for S&T cooperation in thematic and problem areas in variable geometry arrangements.

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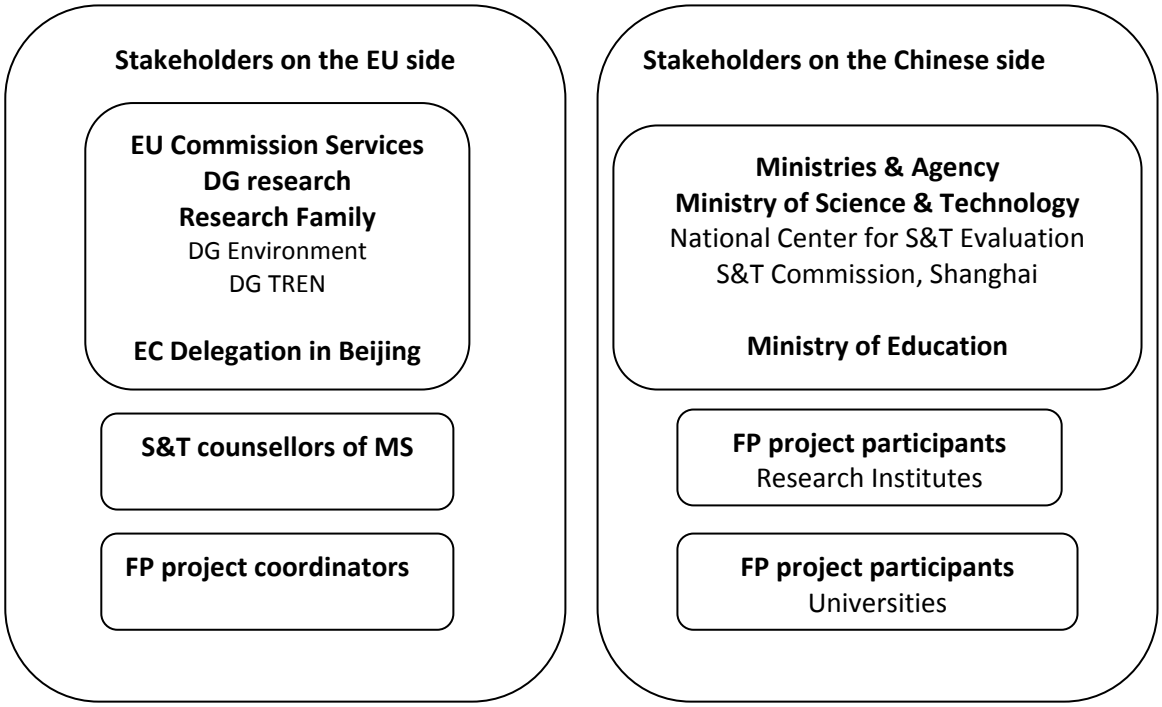
ANNEXES

Annex 1 The list of interviews

During the course of the Review, a large number of interviews and meetings with stakeholders from both the EU and the Chinese sides have been carried out in the period September- October, 2008, in the form of:

- Face-to-face meetings and interviews during the Mission in China.
- Face-to-face meetings and interviews during the Mission to the EU Commission Brussels.
- Telephone interviews and meetings with FP project coordinators.
- Telephone interviews and meetings with S&T counsellors of Member States

The overview of interviewed stakeholder organisations is given in the figure below:



The detailed list of interviewed stakeholders is given in the table below:

Organisation	Interviewee
EU Commission Services: DG Research and "Research Family"	
DG Research International Cooperation	Philippe Vialatte (Programme officer) Svend Otto Remoe (Programme officer)
DG Research PEOPLE Programme Marie Curie Actions	Georeges Bingen (Head of unit) Alessandra Luchetti (Deputy head of unit) Louise Byrne (programme officer)
DG Research IDEAS programme	Monica Dietl (Policy officer)
DG Research Industrial Technologies	Marine Wauters (Coordination officer)
DG Research ERA	Wolfgang Wittke (Scientific officer)
DG Research Environment	Birgit de Boissezon (Head of unit) Niholas Christoforides (Policy officer)
DG Research Research in the Economic and Social Sciences and Humanity and Foresight	Philippe Keraudren (Deputy head of unit)
DG Research Energy	Gilles Lequeux (International cooperation officer)
DG Research **Health**	Indirdi Benediktsson (Principal policy officer, International Aspects Health Research)
DG Research Transport	Karsten Krause (Policy officer) Dietrich Knoerzer (Aeronautics) Claus Seibt (National expert)
DG Environment	George Strongylis (Principal administrator) Lynn Sheppard (Policy officer)
DG Energy and Transport	Florence Leroy (Policy officer)

EU Delegation in Beijing	
Delegation of the EC, Science, Technology and Environment Section, Beijing	Georges Papageorgious (Minister Counsellor) Ignacio Asenjo (S&T officer)
S&T Counsellors of EU Member States	
TEKES, Beijing office	Juho Rissanen (Technology Counsellor)
Embassy of the Federal Republic of Germany	Mattias Hack (First Counsellor, S&T)
Austrian Embassy, Beijing	Andrea Nasi (Second Secretary)
British Embassy, Beijing	David Concar (Science Counsellor)
Italy Embassy, Beijing	Giuseppe Rao (Attache, Technological and Industrial Innovation)
French Embassy, Beijing	Yves Miaux (Science Counsellor)
Embassy of the Kingdom of the Netherlands	Eric van Kooij (Counsellor for Science and Technology)
FP project coordinators	
European road transport telematics implementation coordination organisation S.C.R.L, Belgium	Mariana Andrade (Project coordinator for SIMBA)
Istituto di tecnologie industriali ed automazine, Italy	Marco Sacco (Project coordinator for (KOBAS)
Leiden Univesity, Institute of biology Netherlands	Bernardus Franciscus Ouwerkerk (Project coordinator for CEDROME)
International insittute for applied system analysis-IIASA Austria	Markus Amann (Project coordinator for GAINS-ASIA)
Department of Informatics, University of Hamburg, Germany	Jianwei Zhang (Project coordinator for Ming-T)
Organisation for international dialogue and conflict management, Austria	Markus Schmidt (Project coordinator for DIVERSEEDS, AGRO-FOLIO)
University of Copenhagen Denmark	Anders H. Karlsson (Project coordinator for Q-PORKCHAINS)
LBERT-Universitat Freiburg Germany	Otto Haller (Project coordinator for FLUINNATE)
UFZ-Umweltforschungszentrum Leipzig-Halle	Josef Settele (Project coordinator for ALARM)

GMBH **Germany**	
Royal Netherlands Academy of Arts and Sciences **Netherlands**	Anouk Tso (Project coordinator for CO-REACH)
Swedish Agency for Innovation Systems (VINNOVA) **Sweden**	Gunnar Sandberg (Project coordinator for BILAT-SILK)
Chinese Ministries and Government Agencies	
Ministry of Science and Technology (MOST)	ZHOU Longchao (Deputy Director, Dept. of International Cooperation)
National Center for Science and Technology Evaluation (NCSTE)	CHEN Zhaoying (Executive Director) HAN Jun (Director of International Cooperation Division)
Science & Technology Commission of Shanghai Municipality, Department of International Co-operation	FU Guoqing (Director) LI Chenhao (Program Officer)
Ministry of Education (MoE)	SHENG Jianxue (Deputy Director-General, Dept. of international co-operation &Exchange) ZOU Ying (Programme officer, Dept. of international co-operation &Exchange)
FP project participants – Research Institutes	
CAS Pasteur Institute of Shanghai Chinese Academy of Science (CAS)	Vincent Deubel (Director General) Irenee Robin (Administration and Finance Director)
Chinese Academy of Sciences (CAS), Beijing	LV Yonglong (Director General, Bureau of International Cooperation) WANG Dongyao (Program officer, Bureau of International Cooperation) SUN Jianghua (Professor, Deputy Director, Institute of zoology) DAI Xingang (Professor, Institute of Atmospheric Physics) WEI Wei (Professor, Institute of Atmospheric Physics)
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Tsinghua University, Beijing Overseas R&D Management Office	MA Jun (Director) JIAO Hanwei (Program officer)

Annex 2 Interview structures

On the EU side

A2.1 Interviews with the EU commission services in thematic areas

- How is S&T co-operation perceived in specific thematic fields in general?
- What is the role played by S&T co-operation in specific thematic fields, in terms of:
    1. FP participation
    2. Policy dialogue
    3. Specific initiatives
    4. Identification of strategic priorities/Strategic co-operation
- Is the co-operation with China considered important in the specific thematic fields and why?
- What are the mutual benefits through the EU-China co-operation in the specific thematic fields and how they are defined?
- What are the expected benefits, in comparison with achieved benefits?
- What are the barriers/difficulties for generating the mutual benefits?
- What is the role played by EC-China S&T Cooperation Agreement?
- Some success stories and flagships as examples for S&T co-operation between EU and China in specific thematic fields?

A 2.2 Interview with the EU delegation in Beijing

- What are the key activities of the S&T and Environment section in China?
    1. Observing the S&T development in China – policy papers/briefings?
    2. Presenting EU S&T development in EU to China?
    3. Supporting EU-China S&T co-operation /strategy?
- How does the Delegation see EU-China co-operation, in terms of:
    1. FP participation
    2. Intra-EU level: ERA-Net
    3. Bilateral cooperation between EU Member States and China
- What is the Delegation's view on the EC-China S&T Cooperation Agreement?
    1. The role of S&T agreement (such as a platform for policy dialogue)?
    2. Future perspective and how it can be more efficiently implemented?
- How to involve Member states in the policy cycle, i.e. preparation, implementation and evaluation of the S&T agreement?
    1. Are there joint priorities and strategy settings for mutual benefits?
    2. The involvement of S&T counsellors?
    3. Programme committee, CREST?
    4. Experts?

A 2.3 Interviews with S&T counsellors from Member States

- What are the key driving forces to bring Member States into a more co-ordinated and integrated co-operation framework with the EU and among Member States, i.e. the bilateral co-operation between Member State and China, multilateral co-operation among Member States and China, and multilateral co-operation between EU, together with Member States and China?
- What are the key barriers to bring Member States into a more co-ordinated and integrated co-operation framework with the EU?
- What is the current situation in terms of information exchange, coordination and co-operation, between the Member State and the EU as well as among Member States?
- What are the expectations and suggestions from the viewpoints of Member States in terms of information exchange, coordination and co-operation between Member States and the EU, as well as among Member States?
- What is the role of the EC-China S&T Cooperation agreement?
- The role played by FP6? The expected role played by FP 7 and by the new structure and concepts in the FP7 in terms of bilateral and multilateral S&T co-operation?
- Opinion on implementation of CO-REACH and what can be learned from it for EU-China S&T co-operation.
- Concrete ideas and strategic actions to enhance S&T co-operation with China at different levels.
- Some bilateral showcases/flagships of co-operation with China?

A 2.4 Mirror Interviews with the FP project co-ordinators in the EU

- What is your overall level of satisfaction regarding to the participation of your Chinese partner and the co-operation between your Chinese partners with others in the consortium?
- Why did you choose to involve the Chinese partner in your project and how was the partnership initiated?
- What was the most important contribution made by your Chinese partner, and how did that compare to your expectations?
- Which are the most important improvements needed during the working process or in the future?
- Are you going to initiate new collaborations with your Chinese partners after your FP project is concluded and how? If not, why?
- Do you have any comments and suggestions regarding how the EU-China S&T co-operation can be strengthened through participation in FP as well as beyond FP through other channels and /or in other forms?

On China side

A.2.5.1 Interview with government agencies: Ministry of Science and Technology

- What is the Chinese S&T internationalisation strategy, in terms of regional priorities, thematic priorities, instruments?
- What is the role of FP and the role of collaboration with EU as well as the role of bilateral cooperation during the period 2004-2008?
- What is the general satisfaction regarding S&T co-operation in the FP?
- Are there any flagship and showcase FP projects?
- What are experiences, difficulties and barriers in the co-operation?
- The view on the direction towards a more strategic approach and on the tools that can be applied, such as "co-ordinated call", roadmap and SICA?
- Are there any support structures and measures for enhancing participation in FP?
- What is the experience in Co-REACH and what is the expectation on BILAT-SILK?
- What is the progress of participation of European partners in the Chinese programmes?
- What is the role of EC-China S&T Cooperation agreement?
- Is there any need for specific modification with regard to activities and co-ordination?
- The view on efficiency and achievement from the implementation of S&T agreement?
- Is there any synergy between MOST and other Chinese organisations for enhancing S&T cooperation with the EU?

A.2.5.2 Interview with government agencies: Ministry of Education

- How does MOE see its role in the EU-China S&T co-operation in terms of
    1. Involvement
    2. Contribution (e.g. support for enhanced participation of universities in FP in forms of capacity building, training, etc.)
- How can mobility be utilised for strengthening joint research activities in the EU-China S&T co-operation.
- How can mobility be utilised as a strategic tool for strengthening the link between the sending and receiving organisation and for enlarging the research network?
- The view on potential of and interests in co-operation in social sciences within the FP and in the Co-REACH?
- What is the progress in the establishment of ICARE?

A. 2.6 Interviews with Universities and Research Institutes

- Is there a general institutional internationalisation strategy?
- How is this strategy developed and how is the implementation organised?
- Are there defined institutional priorities for international cooperation (e.g. other countries in Asia, USA, Europe, others) and themes, what are the related selection criteria?
- What is the role of FP in your internationalisation strategy?
- How was the participation in FP initiated? What was the source of information? Were the Chinese participants sufficiently involved in the project design stage?
- Was the co-operation related to previous and/or ongoing bilateral co-operation? Is there any plan for future multilateral/bilateral co-operation?

- What is the general motivation of participating in FP 6 and FP 7?
- What is the relative importance of the participation, in terms of research capacity building, mobility, strategic cooperation with selected foreign partners?
- Co-ordination for the participation, e.g. a bottom-up approach or centrally organised?
- Are there institutional/provincial/national support services for information on and assistance for international S&T cooperation, in particular for FP?
- Is there an institutional monitoring and assessment of participation in FP projects?
- How important is international co-operation in the performance assessment of individual researchers and research units?
- How important is international S&T co-operation in the assessment and the ranking of the university?
- What were your expectations before the participation and what are your experiences in participation?
- What are the benefits and impact of the co-operation and what are the most important results from the co-operation, e.g. co-publication, patents, personnel training, capacity building (methodology, research/project management, linkage b/w research and policy making)
- Were there any specific difficulties during the participation (e.g. financial rules, personnel and organisational rules) and what could be difficulties for the future participation?
- The relative importance of the participation in FP 6 and FP 7, to other domestic and other bilateral funding schemes?
- View of EU as a research partner, in comparison to other international partners – strengths versus weaknesses?
- View on the approach of "co-ordinated calls"- advantage and disadvantage from a participants' view point?
- Expectation on future S&T co-operation with partners in the EU in FP activities and other co-operative activities.

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Information on external relation with China from the European Commission:

- EU-China relation overview:http://ec.europa.eu/external_relations/china/index_en.htm
- EU-China relation architecture: http://ec.europa.eu/external_relations/china/docs/architecture.pdf
- EU-China summits:http://ec.europa.eu/external_relations/china/summits_en.htm
- EU-China sectoral dialogue http://ec.europa.eu/external_relations/china/sectoraldialogue_en.htm

Information on S&T and research from the European Commission:

- International cooperation in research:http://ec.europa.eu/research/iscp/index.cfm?pg=countries
- European Strategy Forum for Research Infrastructures (ESFRI): http://cordis.europa.eu/esfri/
- European Technology Platforms (ETPS): http://cordis.europa.eu/technology-platforms/home_en.html

Information on S&T and research cooperation of selected EU Member States with China

- Germany: http://www.sinogermanscience.org.cn/
- France: https://dri-dae.cnrs-dir.fr/spip.php?rubrique432
- U.K.: http://ukinchina.fco.gov.uk/en/working-with-china/
- Portugal:http://www2.spi.pt/chinafrontier/
- Finland: http://www.tekes.fi/eng/china/

Information on EC-China S&T cooperation, coordination, support and promotion initiatives:

- China-EU S&T Cooperation Promotion Office (CECO): http://www.ceco.org.cn
- Co-ordination of Research between European and China (CO-REACH): http://www.co-reach.org
- China-EU Science &Technology Year (CESTY): http://ec.europa.eu/research/iscp/eu-china/index_en.html
- EU-China Climate Change Partnership: http://ec.europa.eu/environment/climat/china.htm

Information on S&T and research related Chinese government agencies and institutes

- Ministry of Science and Technology (MOST): http://www.most.gov.cn/eng/index.htm
- Ministry of Education (MoE): http://www.moe.gov.cn/
- National National Science Fondation of China (NSFC) http://www.nsfc.gov.cn/Portal0/default106.htm

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In 1998, the European Community and the People's Republic of China signed an agreement to deepen their cooperation in the field of Science and Technology. Before extending it for another period of 5 years, the EC commissioned independent experts to review the S&T cooperation, as foreseen in the agreement.

This review shows that the EC - China S&T cooperation between 2004 and 2008 increased considerably both in terms of participation and of thematic areas covered. The move towards a strategic EC-China S&T partnership scheme with key priority areas is probably the most important development during the reviewed period.

To attain this result, the S&T cooperation agreement has played a pivotal role, and has proved to be an efficient tool in establishing an effective policy dialogue on S&T between the EC and China.

The authors of the report recommend extending the EC-China S&T agreement for another 5 years (starting December 2009) and provide recommendations on how best to enhance future S&T cooperation.

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