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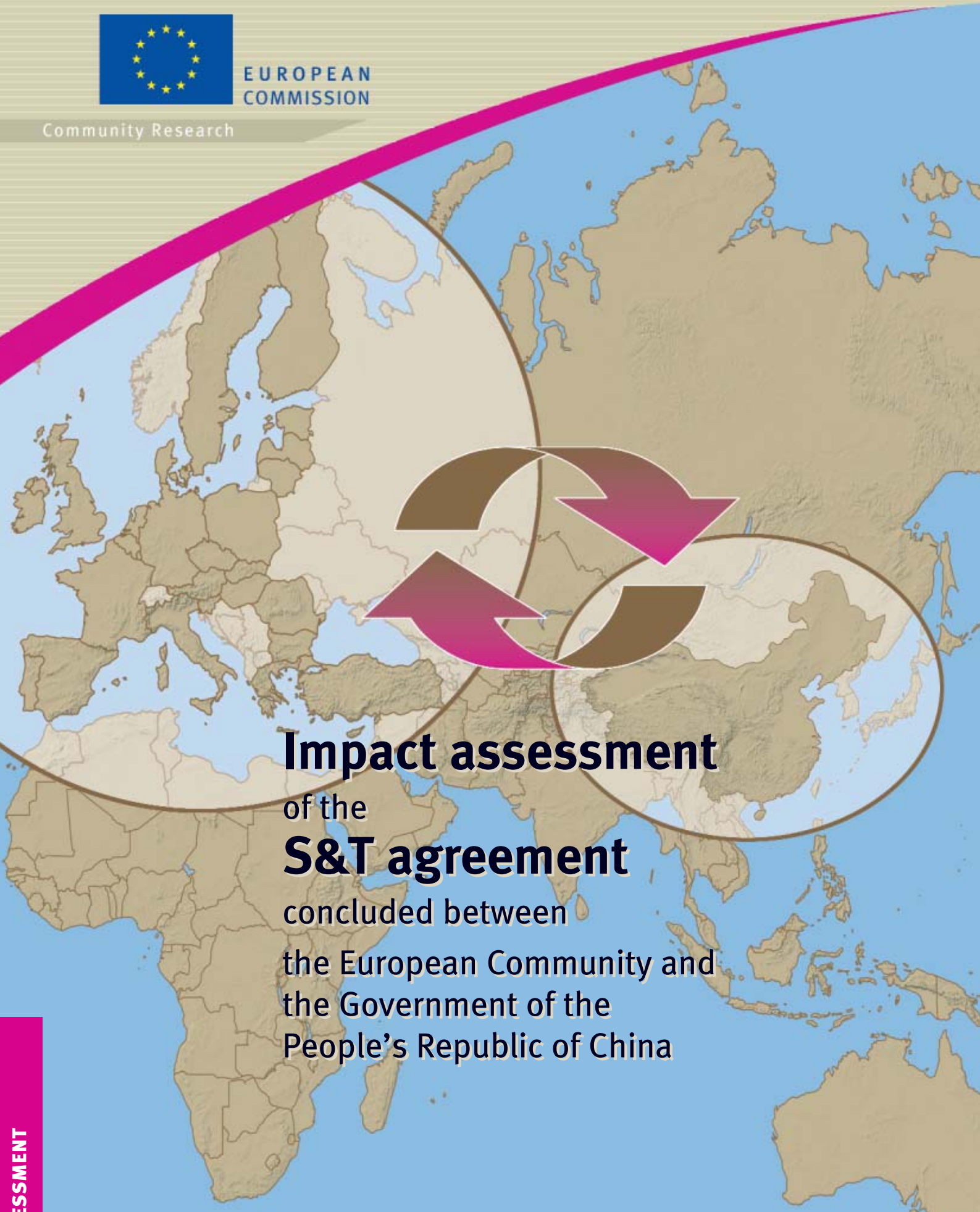

Impact assessment

of the

S&T agreement

concluded between

the European Community and
the Government of the
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An impact assessment of the Science and Technology agreement

concluded between

the European Community and the Government of the People's Republic of China

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1. EXECUTIVE SUMMARY

1.1 INTRODUCTION

The Science & Technology (S&T) Agreement between the European Union and China was signed on 22 December 1998 thereby providing a legal basis for future cooperation on science and technology between the two signatories. As a result of the signature of this Agreement the European Union opened its research and technology development (RTD) Framework Programme (FP) to China, which allowed the participation of Chinese institutions. In turn China opened to EU researchers and institutions the National High Technology Research and Development Programme (863 programme) and the National Key Basic Research Programme (973 programme).

1.2 ASSESSMENT OF THE IMPACT OF THE S&T AGREEMENT

The Science and Technology Agreement is due for renewal in 2004. With this in mind, DG RTD of the European Commission contracted an expert Panel coordinated by **The Evaluation Partnership**[1] to conduct an assessment of the impact of the Agreement on EU-China S&T cooperation. The Panel, which was made up of representatives from the EU and from the People's Republic of China, was engaged between November 2003 and July 2004. This task involved analysis of existing databases and documentation provided by the European Commission and the Chinese Ministry of Science and Technology (MOST), the development and launch of an on-line survey, which was accessible to participants in China and the EU, face to face interviews with the major stakeholders at the European Commission and in China, and telephone interviews with researchers located in the EU.

The results of the field work and desk-based analysis allow many interesting insights into the nature of EU-China research collaboration; the joint interest areas, the benefits, the barriers and the recipe for success in such activities. These results have been fully considered by the expert Panel, who have prepared the impact assessment reported in this document and, based on the data considered, the conclusions and recommendations relating to this study.

A summary of the conclusions and recommendations are provided below. A more comprehensive description is provided in **Chapter 7**.

[1] The Evaluation Partnership is an authorised representative of The European Evaluation Consortium.

1.3 SUMMARY OF CONCLUSIONS

- The EU-China STA should be seen as a success. Stakeholders at all levels appear to be satisfied with this instrument. Therefore, the Agreement should be **renewed without any particular textual changes**

- The fostering, emphasis and communication of simple **mobility schemes** is a crucial prerequisite for fruitful scientific cooperation between the EU and China.

- There needs to be **wider communication** of the opportunity presented by the Agreement not just in public sector domains but more widely. This includes the need to address the lack of awareness of EU researchers regarding opportunities in Chinese research programmes, as well as awareness about opportunities in the FPs.

- There is **confusion** about whether funding of Chinese partners is possible from FP sources or whether this always is the responsibility of MOST. Such confusion can destroy research commitment.

- EU policy objectives in relation to S&T cooperation need to take into account the **operational issues** from the point of view of the Chinese involved, as failure to deliver will be counter-productive.

- It is not sufficient just to "open" the FP to Chinese involvement. There is a need to design an **instrument** to foster Chinese involvement, if success is to be maximised.

- For **FP7** thought needs to be given to ways in which scientific cooperation with China can be given further substance and specificity.

1.4 SUMMARY OF RECOMMENDATIONS

It is recommended that:

- The EU-China Science and Technology Agreement is **renewed** without any particular textual changes.

- Simple straightforward schemes are put in place to create **mobility** both amongst young and experienced people.

- Some FP funds dedicated to **fostering cooperative research** with China must be ring-fenced for this purpose, either through specific Calls or in other ways.

- More emphasis is placed on **promotion and targeting** of the opportunities made available by the Agreement for example to encourage:

    - the targeted involvement of SMEs especially in high technology;
    - involvement of large EU companies that already have a substantial research or manufacturing presence in China;
    - researchers in the EU to take advantage of the opportunities which exist under the PRC research programmes 973 and 863.

- There is **greater communication** of the types of projects and activities already undertaken; for example, the promotion of success stories, targeted promotion via the CORDIS and EUROPA web sites, the possible setting up of a targeted web-based partner search tool.

- The potential **sources of funding** for Chinese partners in thematic FP projects, whether directly through MOST or from FP sources needs to be clarified.

- **A guidance note** (drawing on experience of the INCO programme) is prepared for distribution as part of the FP proposal documentation relating to Calls, especially in thematic areas with little prior overseas experience.

- Ways are found to take better **account of the Chinese situation**, to facilitate participation within the FPs. The experience gained from INCO involvements needs to be used to better effect.

- The role of the STA **Steering Committee is strengthened**, more specific targeted initiatives and ideas are formulated via the Steering Committee, and these are provided with the means for their implementation.

- A **contingency fund** is created so that a pragmatic research response to particular crises or urgent issues is always possible.

2. INTRODUCTION

2.1 THE CHINA-EU S&T AGREEMENT

2.1.1

The European Union (EU) has negotiated a range of international RTD cooperation agreements with various countries. Associated non-candidate countries such as Israel and Switzerland make a financial contribution to all or part of FP6 whereas countries signing science and technology (S&T) cooperation agreements (currently 16 in force) provide funding for cooperative projects from there own sources. The Science & Technology Agreement (STA) between the European Union and China is in the latter category. It was signed on 22 December 1998 after relatively straightforward negotiation rounds thereby providing a legal basis for future cooperation on science and technology between the two signatories. As such it was able to build on prior cooperative involvements with China through the INCO-DEV programme and in particular specialist areas such as biotechnology (European Biotechnology Node in China - EBNIC) Representation of the Agreement is a responsibility of the Directorate-General Research on behalf of the European Commission and the Ministry of Science and Technology (MOST) on behalf of the Government of the People's Republic of China (PRC).

2.1.2

China set a priority on S&T over twenty years ago. It is growing very quickly as evidenced by its universities (growing at 30% annually) and its high technology sector (growing at 25% annually) where for certain types of product China is already the world's premier market. In fact the present rate of growth of the Chinese economy is phenomenal with some commentators predicting that China will be the world's largest economy by 2007. Since gaining admission to the World Trade Organisation in 2001 China now has a trade surplus with the USA. It is already the EU's second largest trading partner, is one of the world's top exporters and is attracting record amounts of foreign investment – in excess of the USA. S&T is one of the important foundations supporting this growth.

2.1.3

The Government of the PRC views the STA with the EU as an important legal instrument. This was evidenced in the China-EU policy paper seminar held in Beijing in February this year where policy papers issued by both parties the previous October provided the basis for dialogue and one of the three working parties of the seminar was devoted to cooperation in science and technology, information society, education, culture and health. The report and conclusions from this seminar specifically relating to science and technology signalled how both parties valued the results stemming from the STA and looked forward to its renewal; China was invited to provide suggestions as an input to FP7

preparation and a strengthened participation would be welcome; new areas for relationships should be explored (to include hydrogen energy, health, aeronautics and air traffic management); cooperation in existing fields should continue and be strengthened including possible exchanges of personnel to accelerate and simplify procedures to intensify cooperation (further involving all 25 Member States); ITER negotiations should hopefully reach a successful conclusion; the visit of Commissioner Busquin was eagerly anticipated; and preparations should start soon for a high level forum on S&T policy and strategy suggested by China for 2005. The outcomes of the seminar in the S&T sector exemplify the vigour of the collaboration and confirmed the high regard in which it is held by the government of the PRC.

2.1.4

As a result of the signature of this Agreement the European Union opened its research and technology development (RTD) Framework Programme (FP) to China thereby allowing the participation of Chinese institutions. In turn China opened to EU researchers and institutions the National High Technology Research and Development Programme (863 programme) and the National Key Basic Research Programme (973 programme). The Agreement therefore laid the basis for a unique opportunity for cooperation in science and technology between China and the European Union. The Agreement itself covers all activities of research, technological development and demonstration (referred to as RTD) through means such as reciprocal participation in project activities in programmes established by the two signatories, pooling of RTD projects already implemented, visits and exchanges of scientists and technical experts, joint organisation of seminars and similar events and participation of experts in such activities, concerted actions, exchanges and sharing of equipment and materials, exchanges of information on relevant practices, laws and regulations, and any other modalities recommended by the Steering Committee that was established.

2.2 THE PRESENT ASSESSMENT

2.2.1

Because the Agreement is due for renewal in 2004 its impact and performance has been independently assessed (as required by the STA in Article 11) by a panel of four experts – two from the PRC and two from the EU. The thrust of the work was to assess the on-going S&T cooperative activities taking into account the overall policy context, an understanding of China RTD and the institutions involved, the scientific context, the scientific priority areas mutually agreed on, the nature and appropriateness of the contacts and various operational matters.

3. METHODOLOGY

The Panel met initially in Brussels in November 2003 and will meet again in Brussels in the Autumn of 2004 when its findings will be presented to the European Commission. At one other meeting in Brussels when the Chinese Panel members could not attend they were represented by an official (Second Secretary) of the Permanent Mission of the PRC to the EU. The Panel worked together in China for nearly two weeks in March 2004 visiting research institutions and government officials in Beijing, Nanjing and Wuhan. The programme of visits was arranged by the Chinese members of the Panel in conjunction with officials of the EU Delegation (S&T Section) in Beijing.

3.1 THE TOOLS USED

3.1.1

The Panel pursued its work in several ways. It undertook ***desk study of a wide range of papers and documentation*** provided both through DG Research in Brussels, the EU Delegation in Beijing, and a variety of Chinese institutions. It also made significant use of the Cordis database and outputs from other Commission databases particularly in relation to analysis of cooperative research projects and activities so that various aspects and characteristics of the cooperative projects could be analysed and collated. Two particular Accompanying Measures in the INCO FP5 programme, the China-European Union S&T Cooperation Promotion Office (CECO) and European Focus on Biotechnology in China (EFBIC), themselves had also a range of documentation and information available for the panel to assess. A list of documentation sources is provided in **Annex 2**.

3.1.2

A ***questionnaire*** was designed for internet-based circulation and response both in Europe and China. It was promoted widely among the research communities involved and other relevant stakeholders. The questionnaire is provided in **Annex 3**.

3.1.3

Interviews were used extensively as a means of obtaining both information and views from those involved directly in research cooperation, policy development and other supporting activities. There were three key categories of interviewees: (i) Commission programme/project officers with direct involvements in cooperation with China and Officials from the Chinese Ministry of Science and Technology (MOST); (ii) Chinese scientists and other policy and support personnel involved at a working level in the cooperative activities; and (iii) European scientists with similar involvements through various Framework

Programmes (FP). Interviews in categories (i) and (ii) were done face-to-face whereas interviews in category (iii) had to be conducted by telephone because of time and resource constraints. Information relating to those persons interviewed is provided in **Annex 4** and the structure of the discussion topics for each category in **Annex 5**.

3.1.4

A ***mission*** to China was implemented in March 2004 when all four Panel members visited relevant research institutions where cooperative projects were in place and/or planned in Beijing, Nanjing and Wuhan. Discussions were also held with key persons with policy or operational involvements. The itinerary for the mission was planned largely by the EU Delegation in Beijing in conjunction with the Panel (in particular its Chinese members), MOST and local S&T committees. A significant amount of documentation was acquired during the course of the mission.

3.1.5

Information and experience gained as a result of the various informational inputs and the views of those involved was organised and assessed in various ways so that key messages about past and present cooperative experiences could be distilled and indications for potential future developments taken into account.

3.2 THE CONTENT SELECTED

3.2.1

The full extent of past, present and future project involvements involving Chinese partners in FP projects, as derived from the various information sources made available, was taken into account at the outset of the assessment study. The selection of programme areas for discussion with programme/project officers in Brussels (**Annex 4**) reflected this. For the mission to China projects were selected for visits subject to travel and other resource constraints and their appropriateness for exemplifying Chinese partner activity in the various FPs. Interviews held with scientists involved in cooperative projects with China that were based at institutions in Europe endeavoured in the main to reflect those that had been visited in China with some additions or replacements where relevance appeared to be particularly important or a project appeared to be a good representative example. On a few occasions an individual requested a telephone discussion during his input to the questionnaire. Other exchanges involved e-mail.

4. THE WORK INVOLVED

4.1 CHARACTERISTICS OF THE PROJECTS SELECTED

4.1.1

It was beyond the resources of the assessment study to examine all the cooperative FP projects with Chinese partners in detail. Also it has to be remembered that the purpose of this study was not to evaluate individual research projects but to assess the functioning of the STA. The projects examined in detail therefore were no more than a sample of the type of activity in place under the umbrella of the Agreement. It was more important therefore to try to ensure that the projects selected as examples reflected the type of cooperative research activity well, represented typical scientific sectors, represented typical research institutions, and demonstrated problematic areas as well as successes. From an EU standpoint it was also valuable if the projects selected for detailed study exemplified a range of FP areas.

4.1.2

The full extent of project involvements with Chinese partners in the FPs is set out in **Annex 2**. Its characteristics can be summarised as follows:

The extent of the involvement of Chinese institutions in FP projects demonstrates the success achieved so far. There has been a clear increase in participation from FP4 to FP5. It is too early to draw conclusions as to levels of participation in FP6. However, data related to the first two years of operation (one third of the total life span of the FP) suggests that this trend is set to continue.

Within FP5, 76 projects currently exist with Chinese participation of which 39 derive from INCO and 37 from thematic priorities. In FP6 it is estimated that around 188 Chinese organisations were involved in the 382 proposals involving Chinese organisation that were submitted to the first Calls for proposal in FP 6 during 2002 and 2003. When this analysis was conducted[2] nearly 30 proposals were preliminarily selected covering areas such as information technology, nanotechnology, materials, food quality and safety and global change.

A number of current projects have significant policy influence – for example projects on SARS, HIV clinical trials, digital mapping (ROADMAP), and several projects relevant to the rural economy such as on genetic improvements to Chinese wheat and wetlands research to achieve clean waste water. Other initiatives such as China's involvement in GALILEO and ITER have significant policy impacts as do cooperative initiatives in fields such as materials and energy.

[2] It is possible that more proposals involving Chinese organisations have now been selected and will be selected by the end of FP6 in 2006.

FP4,5,6 China(CN) : Projects by Scientific Area			
Project Area	**FP4 (%)**	**FP5 (%)**	**FP6 (%)**
Transport & Energy	2%	17%	4%
Environment/Development/Sustainability	36%	39%	27%
Agriculture	43%	13%	10%
IT& Telecommunications	0%	15%	18%
Industry / Nanotechnology / Engineering	0%	7%	10%
Health	19%	5%	15%
SARs	0%	0%	6%
Food & Food Safety	1%	3%	7%
Physics/Chemistry	0%	1%	3%
Total	**100%**	**100%**	**100%**

Table showing the FP 4, 5, 6 projects by scientific area

FP4 China (CN) : Participation by Organisation Type			
Organisation Type	**FP4 (%)**	**FP5 (%)**	**FP6 (%)**
Higher Education Establishments	46%	31%	35%
Industry & Commercial Organisations	3%	7%	7%
Research Organisations	46%	47%	46%
Other	5%	15%	12%
Total	**100%**	**100%**	**100%**

Table showing the FP 4, 5, 6 projects by Organisation Type

Many on-going projects involve partners in China primarily in the public sector - typically over 30% in the university sector and over 40% in government research institutions. In FP5 and FP6 around 30-40% of the projects/proposals were in the environment/development/sustainability area. However, FP6 food/health issues are currently more prominent than agriculture (around 22% compared to 10%) whereas in FP5 the position was the reverse of this (13% in agriculture and 8% in food/health).

4.1.3

A number of projects were presented in the telecommunications sector. For example OPIUM, DAIDALOS, WINNER, DRAGON, CENNET and ALVIS. A project relating to emissions control (EUCHINAPOWER) was also described. Projects relevant to the rural economy that were visited included one on *B. thuringiensis* transgenic cotton for IPM systems, RURBIFARM (a project on sustainable farming at the rural-urban interface), a wetlands project and a number of international cooperation projects in the development sector – for

example one on genetic variation in pig breeds (PIGBIODIV). Projects were also presented on landslide alert systems (OASYS), on flood analysis (ANFAS), on remote sensing applications relating to illegal fishing (DECLIMS) and on services for manufacturing sectors provide by SMEs (KOBAS). In addition two SARS projects were presented. The complete list of projects visited in China for detailed discussions with the Chinese partner organisations is provided in **Annex 6**. Those projects for which telephone discussions were held with one partner or the coordinator in Europe are provided in **Annex 6**. From this portrayal it should be clear that a useful breadth of examples of project involvements was presented for discussion with the members of the Panel during its mission in China. Institutions visited included both universities and government research institutes in particular those that were components of the Chinese Academy of Sciences.

4.1.4

In the majority of the projects presented it was striking that **prior relationships existed** between the partners in China and those in the EU. In some case these were the result of involvements in INCO DC and DEV projects in FP4 and FP5 and even earlier. In other cases they were the result of contacts made and professional relations established bilaterally between China and a Member State – often as a **result of a mobility initiative** such as postgraduate study. The benefits of mobility were highlighted by respondents of the on-line survey. Such pre-existing relationships are true catalysts of cooperation and give confidence to the partners involved in making a proposal to the FP. In some instances the Panel met European partners in the Chinese institution spending time there working professionally as a result of a long history of involvement between the Chinese and European institutions involved.

4.2 Other Activities

4.2.1

Two support projects were visited in Beijing; the China-European Union S&T Cooperation Promotion Office (CECO) and European Focus on Biotechnology in China (EFBIC). Both are Accompanying Measure in INCO FP5. The Panel also attended an FP6 Information Day in Nanjing and participated in the discussions there. Meetings were also held in relevant Ministries and with diplomatic representatives in Beijing and at a local level at lunch and evening meetings.

5. IMPACT ANALYSIS

5.1 THE OPERATION OF THE AGREEMENT

5.1.1
From the standpoint of the two signatory parties, DG Research of the European Commission on behalf of the EU and MOST on behalf of the PRC acting as 'executive agents' the operation of the Agreement appears to present few problems, is highly valued, and there is an expectation of its renewal in much the same form as presently. This view has been endorsed by an official of the Ministry of Foreign Affairs in Beijing. For the purpose of the Agreement particular terms are defined in it. For example it is accepted that 'intellectual property' shall have the meaning defined in Article 2 of the Convention establishing the World Intellectual Property Organisation in Stockholm in 1967 and an annex on intellectual property rights is attached to the Agreement and is seen as an integral part of it.

5.1.2
Oversight of the Agreement is maintained through a Steering Committee established by the 'executive agents' as specified in the Agreement document. In summary its functions include promoting and overseeing different cooperative activities; indicating priority areas within the potential sectors within which cooperation is sought; proposing to scientists the pooling of projects that would be of mutual benefit and complementary; making recommendations on exchanges of information; advising on ways to improve and enhance cooperation activities; reviewing the efficient functioning and implementation of the Agreement; and reporting annually to the two Parties on the status and effectiveness of the cooperation undertaken. The Steering Committee has met three times so far, in 2000 and 2003 in Brussels and 2001 in Beijing. The generally have quite large delegations from the two sides (up to 20 on occasion) and have agendas of some substance involving discussion and presentation of scientific areas, options and involvements, briefings on new instruments and proposed initiatives for the future. The minutes of meetings have reflected a positive ambience – "held in an atmosphere of mutual understanding and friendship".

5.2 NATIONAL AND INTERNATIONAL IMPACTS

5.2.1
For policy-making officials in government generally the presence of a legal instrument such as the STA is a welcome facilitating mechanism for underwriting and stimulating cooperation in professional communities such as scientists. From a subjective standpoint there is evidence that Chinese

involvements in the FP are more easily justified within the international dimension of the ERA concept with a particular STA in place. In MOST significant energy has been expended to make the cooperation work that would seem less likely without a specifically agreed legal instrument to justify the effort. The efforts of MOST, the EU Delegation in Beijing, and local S&T committees for example in mounting information days and exhibiting at high-tech fairs to promote the opportunities afforded by cooperative involvements for Chinese institutions in the FP are tangible manifestations of the impact of the STA. It is difficult to imagine that such implementation efforts would have occurred without the STA in place.

5.2.2

The importance of visits and exchanges at senior levels can also be seen as a likely impact of the STA - for example visits to China by the Director-General of DG Research and the Commissioner himself. The organisation of particular forums to discuss key scientific issues of mutual interest attracting senior scientific figures is another indicator of impact as is the response to particular crises requiring common scientific efforts such as SARS research and funding availability for this. Other tangible impacts at this level include the establishment of the China-European Union S&T Cooperation Promotion Office (CECO) supported in part by a FP5 contract and funded in China by MOST to foster and support cooperative research and related activities and European Focus on Biotechnology in China (EFBIC) again supported through a FP5 contract and by MOST creating a platform of cooperative involvement in a specialised scientific area where there has been a history of cooperative effort.

5.2.3

Of course certain individual Member States are also actively involved in bilateral relationships with China and these would no doubt exist and continue in the absence of any EU-China STA. However those Member States that have made significant infrastructural commitments, involvements of professional personnel or frequent visits to China at senior ministerial levels tend to be the larger ones with a history of collaboration with China. Conversely some smaller Member States have been able to take advantage of the STA arrangements at the EU level to pursue bilateral initiatives. At a local level in China the EU Delegation in Beijing is active in bringing about personal contacts among diplomatic representations of Member States in a social context so that the cooperative efforts of European countries with China are complementary. Such complementarity is important for Europe so that China can see European cooperative efforts in S&T as ‘all of a piece’ rather than in competition. Certainly there seems to be a view in Chinese government circles that the EU S&T Agreement is of particular value in that it brings together a number of European countries into a single cooperative S&T relationship thereby achieving a size and substance perhaps more appropriate to a country the size of China than individual Member States might achieve alone. This should be recognised as added value for the EU-China STA.

5.2.4

The STA is felt to have been a major factor in generating a higher profile for

S&T in EU-China relations and encourage key initiatives such as the significant participation of China in Galileo, involvements in ITER and the development of international standards for certain technology platforms. The existence of the STA might well have encouraged Japan to initiate negotiations on a EU-Japan STA and its success might also have brought a positive influence to the signature of the EU-China Agreement on Tourism.

5.3 THE CONTRACTORS INVOLVED

5.3.1

It is not easy to assess the impact of the STA on the contracting organisations involved as partners and/or coordinators in research projects or other forms of activity. Awareness of the STA was not particularly high though sources of information were known. Certainly there are many positive messages regarding cooperative work but whether the same would also have been true in the absence of the STA is more difficult to determine. This is particularly the case because those institutions that seem to be particularly effective in implementing research projects in China in general have a history of involvement there – often as a result of bilateral contacts over many years, personal academic links or networks already in place and former collaborations in similar research.

5.3.2

The added value of China's involvement for European institutions was widely recognised to the extent that some projects just could not have been undertaken without it. Epidemiological projects were singled out as particularly enriching for both sides but more generally contributions were highlighted in terms of field-work and Chinese local knowledge and expertise, access to biological material, expertise in soil science, provision of major test sites and strengths in basic science. Some institutional facilities in China are of the highest calibre especially in certain high tech subject areas and this was recognised by the European partners involved. In other instances, perhaps more commonly relating to scientific areas relevant to the rural economy, the institutional capabilities were not felt to be of equivalent quality by some European contractors.

5.3.3

In the main cooperative projects were seen as benefiting all the parties involved though sometimes with a particular emphasis or interest for one side especially in agricultural, environmental and SARS-related research projects. Those involved in projects generally seem satisfied with the outputs in terms of published scientific papers and workshop/conference contributions though there were some cases in which cultural differences had led to misunderstanding and slow progress. It was often felt that the research involved would have taken place anyway in China but the cooperation with EU research institutions brought added value in terms of depth and speed. Some Chinese institutions involved in

research projects felt that the cooperative approach provided as a result of the STA with its emphasis on partnering was more flexible and helpful than an emphasis on large-scale research projects resulting from scientific cooperation with some other nations.

5.4 SECTORAL AND SCIENTIFIC IMPACTS

5.4.1

The involvement of Chinese institutions as partners was considered important in sectors such as biotechnology, life sciences generally, environment, natural disasters and ICT (Information and communication technologies). At present areas such as transport and aeronautics for example appear to have a lower profile. Biotechnology was seen by several as a success story as cooperation here has a long history with prior bilateral arrangements and established nodes or platforms for dialogue and working involvement such as EFNIC and currently EFBIC with its partnership with the China National Centre for Biotechnology Development (CNCBD). There are also multiple uses for the research in question – though it should be noted that there has been less impact on opportunities in FP6 on biotechnology for health. Apart from biotechnology, nanotechnology was seen as another developing success area possibly with analogous characteristics.

5.4.2

Within the various other sectors notable for cooperative involvement there are some variations. In the environment area climate change, desertification and clean coal technologies presently seem to have more representation than biodiversity and marine systems for example. In the field of natural disasters earthquake and landslide prediction research should be noted. In ICT the regular meetings of the working group on “Digital Olympics” should be mentioned as should new generation mobile communication technology (3G and beyond) more generally.

5.4.3

The identification of areas for activity under the STA and the vigour with which these are pursued is influenced by personal and institutional contacts in addition to encouragement from MOST and the Commission or the EU Delegation in Beijing. The importance of such institutional contact is particularly noticeable in the field of agricultural research where there are many valuable research projects relevant to the rural economy and continuing relationships between the scientists involved. In particular there is a history of FP projects in INCO DC in FP4 and even earlier (STD and ISC) and in INCO DEV in FP5 where project compendia have been published and there is evidence of application directly to problems in the field. Member States have also developed many bilateral relationships in this sector involving both key scientist and institutions.

5.4.4
Evidence of impacts on industry in the form of technology transfer has not been specifically identified in this study due to resource constraints but key involvements are clear in different sectors in projects with Chinese partners and large European industrial partners and/or governmental organisations trading commercially. Some examples here are ANFAS, DRAGON, ECOSTAMP LOCOPROL, VALUE, OPIUM and DECLIMS There are also projects involving smaller companies both in China and Europe – for example KOBAS, BTN and IMSORB.

5.5 DIFFERENT TYPES OF ACTIVITY

5.5.1
As already mentioned the STA embraces a wider range of activities than just collaborative research projects – though these are often regarded as the cornerstone for achieving the macro-level policy objectives envisaged. Two particular platforms of cooperative involvement have already been mentioned – the China-European Union S&T Cooperation Promotion Office (CECO) supported in part by a FP5 contract and funded in China by MOST to foster and support cooperative research and related activities and the European Focus on Biotechnology in China (EFBIC) again supported through a FP5 contract and partnered with the China National Centre for Biotechnology Development (CNCBD) again funded by the MOST. These two initiatives can be viewed as cooperative “success stories” and a fuller description of each can be found in **Annex 9**. In addition workshops and similar events were regarded positively particularly as flexible platforms for reviewing past work and planning future activities or indeed for providing management inputs to projects when these were necessary. More forums of this type can be envisaged in future focussed on sectors of particular interest – for example in materials science.

5.5.2
Reciprocity in activities as envisaged in the STA preamble is presently rather out of balance and for government and institutional actors the impression is certainly that the STA is far more visible in China than in Europe. The STA envisaged not only proposals involving Chinese partners to FP6 and later but also EU proposals from scientists to the Chinese 863 and 973 national programmes. This is the first time that China has opened these programmes up in this way. The two programmes are of the utmost importance to China’s economic development and China would welcome more EU partners in them. So far the take-up of this opportunity by EU groups of scientists in partnership with Chinese colleagues has been disappointing though there are examples of involvements through bilateral relationships with European countries. At an EU level however this is one anticipated impact that still requires effort and CECO is likely to be further involved in this.

6. THE PRESENT POSITION AND FUTURE ASPIRATIONS

6.1 NATIONAL AND INTERNATIONAL ASPECTS

6.1.1

The scientific collaboration between the EU and China under the auspices of the S&T Agreement is a success for both Parties and appears to be growing in vigour and stature. It is also seen as complementary to S&T collaboration between China and individual Member States so that taken together the reputation and appreciation of European science in China is further enhanced. The Agreement is valued by the PRC Ministry of Foreign Affairs to the extent that renewal of it is a clear expectation and the view is that there is little need to change it as it works well in its present form.

6.1.2

In terms of political and policy impact the Agreement has the potential to further commercial opportunities as a result of scientific and technical experience gained and indeed the involvement of industrial partners in FP projects directly. There is evidence that the scientific collaboration builds confidence and trust both individually, institutionally and at a government level. This can be reflected elsewhere so providing a favourable atmosphere to underpin a breadth of common policy interests and mutual benefit. In terms of scientific impact there is value to China in the Agreement increasing international contacts and improving the recognition and positioning of China in the world of science. For the EU the Agreement can provide opportunities for scientific work and experience not available in Europe.

6.1.3

The STA is felt to have been a major factor in generating a higher profile for S&T in EU-China relations. Operationally it also adds value to the ERA concept at a EU level by maintaining awareness and recognition of Member State involvements with China and building on these in various ways. A further added value of the STA is the fact that it brings an enhanced scale and diversity to scientific endeavours as a result of the possibility of collaboration with several countries under one umbrella – in contrast to bilateral agreements. This might be seen as particularly important for a very large country such as China with a huge diversity of natural and man-made environments. For European institutions further added value from China's involvement under the auspices of the STA is widely recognised in that some projects just could not have been undertaken without it. It is difficult to quantify such features but their existence is recognised by those involved in EU-China S&T relations at both policy and scientific levels.

6.2 MANAGEMENT ISSUES

6.2.1

A key management issue if the underlying policy objectives of the STA are to be achieved is to bring about the involvement of scientists from both sides in the initiation of projects and their subsequent implementation. Such actions represent the building blocks for achieving the macro-level policy aims. The pragmatic objective of achieving genuinely collaborative research between Europe and China is appreciated in a rapidly developing country such as China with an increasingly mature science and technology professional and physical infrastructure. The MOST and the European Commission can stimulate scientists to get involved collaboratively - and do so.

6.2.2

The FP procedures can be daunting for Chinese scientists so to achieve a viable project the role of the coordinator in the European institution is generally a vital element in fulfilling the submission requirements for a Call. There is presently a lack of clarity in relation to the funding options for FP6 projects involving Chinese partners. There is a notional financial envelope with very limited funds to support international collaboration in FP6 thematic programme areas but some coordinators in Europe (and possibly even some Commission officials) are either unaware that Chinese institutions can qualify for funding or prefer to disregard this. A particular advantage is that MOST accepts the FP proposal evaluation process and consequently it is generally able to provide financial support for the Chinese partner in a successfully evaluated FP6 project. Some European institutions probably know this is the case and indeed some Chinese ones may prefer it. In practice this potential for dual funding alternatives can lead to confusion because necessary requirements fall between the two funding options and so do not get taken into account. So some difficulties can result, for example in inadequate budgetary planning for attending project management meetings or workshops in Europe or facilitating visits and exchanges by providing support in organising travel and welcome arrangements, visa requirements and so forth.

Both good and bad examples can be found in European institutions in such matters. The problems found here are very important and need to be addressed.

6.2.3

Project coordinators with experience of, and in, China were generally better placed to overcome such operational problems. In fact an experienced coordinator's role in the successful implementation of a project (dealing with matters such as unforeseen budget reductions or the application of European management standards or procedures unfamiliar to Chinese researchers) is so vital that changes in coordinator in the life of a project could provoke real difficulties. In practice both the initiation of a proposal and implementation of a project usually worked best where there had been prior contact between the scientists involved - for example through bilateral projects with a Member State – or where a European partner, or ideally a coordinator, had particular

experience in international collaborative research (for example a previous INCO project) or had a track record of research in China funded by national programmes

6.2.4

Some operational and scientific features of projects should be noted. For example, because a Chinese partner generally gets no funding from the FP (always the case in FP5 thematic areas and not yet fully corrected in certain early FP6 Calls) the strategic fit of the proposed FP project must be a good one at an institutional level in China if it is to be fully appreciated. This complementarity is seen as very important particularly as the scientific work usually can be implemented in China without international collaborative input – though more slowly and perhaps in less depth. INCO projects are something of an exception here as they are fully FP funded but even so there are some worrying examples of delays or difficulties in providing funding on time from Brussels to both European and Chinese partners which causes unease in China and has the potential to threaten the achievement of the EU's policy-related goals – especially in comparison to other countries or global groupings where such problems for the Chinese might not occur. It is a pity that such practicalities can threaten what should be over-riding policy aims for Europe.

6.2.5

Mobility is a predominant factor in fostering cooperation in S&T as it is the true catalyst for achieving the policy objectives at a macro level. There are some good examples of mobility between Europe and China both of researchers and graduate students to be found in FP-funded projects. Some of these have led to robust relationships between the individuals and institutions involved and the vital importance of these has already been referred to. However some instances can be identified where such movements had not been fully exploited usually because of inadequate initial financial planning. Awareness of other opportunities within the FP, such as Marie Curie awards, is not highly developed though mobility opportunities bilaterally with individual Member States are generally well-known where there has been a history of bilateral contact. Regrettably some Chinese post-graduates have had problems moving freely in the EU as a result of single entry visas and in other cases the time taken for obtaining an entry visa from a Member State has been much too protracted for scientific or educational purposes. These are facile administrative matters that yet again threaten the vital policy objectives that Europe must deliver if it is to be a major player in relationships with China. Europe cannot afford to fail here as a result of administrative processes that reflect no awareness of the macro-objectives of policy.

6.3 COMMUNICATION

6.3.1

The existence of an opportunity such as that provided under the Agreement does not itself guarantee that real collaboration at a working level will occur. In the EU in particular scientists have to be encouraged to become involved as they have available to them a variety of opportunities for research funding whether at national, European, or wider international levels and their participation in a particular initiative cannot be dictated. The availability of funding in the FP may well encourage their participation but because such funding is not specifically designated to underpin particular S&T agreements with other countries the implementation of the Agreement with China has to depend on a sufficiency of candidate proposals of appropriate quality involving Chinese partners that will survive a rigorous peer review process. So communication and promotion of an opportunity such as that created by the signature of the S&T Agreement between China and the EU is essential in order to create the right perceptions both in China and in the EU. China in particular is a huge country (9.6 million sq km) in which to achieve this. Also it has to be recognised that there are significant cultural differences which need to be overcome through dialogue and the provision of appropriate assistance between European and Chinese scientists

6.3.2

Considerable efforts have been made to achieve the communication that is so vital to the success of the cooperation that was envisaged. For example many information days have been held throughout China to provide information about the FP as a result of cooperative efforts by the EU Delegation in Beijing, MOST (international cooperation department) and local government S&T committees. The EU Delegation is often seen as an important source of advice - at present perhaps more so than other organisational platforms that have been established jointly to service this need. The MOST is also seen as a very important source of information and advice by the scientific community in China and is fully involved in information days

6.3.3

The role of CECO (China-European Union S&T Cooperation Promotion Office) established by MOST and part-funded by an INCO Accompanying Measure contract is a vital contribution to the communication requirement. So far it has not fully exploited its potential but in the foreseeable future this should be achieved and CECO ought then to become more innovative in promoting both the FP in China and Chinese national programmes (863 and 973) to EU scientists. There may well be a case for targeting certain audiences more specifically through tailor-made events – for example EU companies with research and/or manufacturing capability in China might be seen as project partners with more potential than currently realised. The objective is that CECO matures into a capability analogous to a NCP (National Contact Point). As this occurs its positioning in relation to the roles presently played by MOST and the EU Delegation will need to be clarified. At present scientists and their

institutions in China are more likely to seek advice and information from these latter sources than from CECO.

6.3.4

EFBIC (European Focus on Biotechnology in China) and its partnering with CNCBD (China National Centre for Biotechnology Development) might also be seen as a model arrangement for furthering cooperative initiatives in specialised areas. Such initiatives and other forms of working groups, discussion forums and task forces might potentially support a better bottom-up dimension involving younger scientists with new ideas than reliance on administrative procedures such as Implementing Arrangements (currently one in place for materials). However if this were to be developed as an approach proper channels would need to be in place (ideally via the Steering Committee) so that any new initiatives could be officially endorsed and supported. This is perhaps even more important in a country such as China with a very centralised structure as compared to the association of the various nation states found within the EU and the preference among many European scientists for delegation away from a central authority.

6.3.5

There is of course still a real need for top-down communication especially at a policy level and in 'science for policy' development. There are benefits to be gained from examining controversial issues such as cloning, GMOs and energy needs from a scientific standpoint and in determining common industrial priorities with a major research requirement. The Steering Committee is the ideal vehicle for pursuing this sort of approach in the first instance and its meetings so far indicate that it has not shirked this role. Beyond this, regular visits and meetings at a senior governmental level are important not only in agenda-setting but in signalling the regard in which the STA is held to the two scientific communities. From a European standpoint some Member States individually can already be seen to achieve more here than the EU itself with ministers holding science portfolios visiting China almost on an annual basis.

6.4 THE SCIENCE

6.4.1

Genuine enthusiasm for scientific involvement can be found among Chinese scientists. Many such scientists are of international calibre, are publishing in internationally refereed journals and have state of the art research facilities in their institutions. Indeed in a number of instances the appropriate infrastructure for world-class research is available. It is important to Chinese scientists therefore that their involvements are not limited to the provision of samples or opportunities for field-testing but result in a real integration into the scientific research work in a truly cooperative partnership. In terms of professional contact and experience of international collaborative research involvements in INCO-DC and DEV (and even earlier), projects and bilateral contacts with

particular Member States are very relevant and as mentioned above coordinators of FP projects with such a background are often the most effective. Familiarity with China is a particular advantage for a European institution wanting to achieve a collaborative project. Personal relationships with European scientists are real and tangible in many instances where there is history of involvement and peer recognition of scientific contributions to human knowledge are self-evident. However as mentioned already in terms of reciprocity little enthusiasm can be detected so far for scientists at an EU level to apply to Chinese government research programmes though there are bilateral activities here with individual Member States

6.4.2

One of the outcomes of the growing collaboration between the EU and China is that further proposals to FP6 are being generated. This is a real bonus. There are also good examples of the transfer of technology and scientific know-how to commercial sectors that can bring the essential wider benefits of the research findings to China socio-economically. In other instances it is sometimes not clear how this transfer of technology can be achieved and some help might be desirable to bring it about. There are significant differences between various sectors here. In the main in technology-driven areas such as information technology and communications there are fewer problems but in scientific areas that have more of a rural economy locus the take-up of the scientific work can be a problem. Some European partners feel this disparity quite strongly though there is the impression that things are improving and the more critical positions are sectoral or involve older projects.

7. CONCLUSIONS AND RECOMMENDATIONS

This section gives detailed consideration of the conclusions and recommendations of the impact assessment of the STA. A shorter, summary version is provided in the Executive Summary at the beginning of this document (**Chapter 1**).

7.1 CONCLUSIONS

7.1.1

It would be difficult to examine the EU-China STA and not come to the conclusion that it should be seen as a success. This judgement can also be justified at different levels: there is satisfaction with the Agreement at governmental policy levels and the great majority of scientists and research managers involved are satisfied with the scientific work performed under the umbrella of the Agreement and value the complementary strengths and reciprocal learning processes. Few, if any, areas of contention can be identified. Of course considerable effort has been made to make it work not least by the EU Delegation in Beijing and by MOST. The principle therefore of "if it works don't fix it" should apply so there is little argument for making changes prior to renewal and none against renewal itself. Furthermore the Agreement, along with others, is important to the overall concept of ERA and its international dimension – an underpinning policy objective of the EU. **The Agreement should therefore be renewed without any particular textual changes**.

7.1.2

The message to European scientists who until now have had no involvement with China should be twofold. Firstly there are many first class scientists in China and the scientific infrastructure is in place, and is often of a high order, so it is a straightforward matter to engage in high quality research with Chinese colleagues - though some European colleagues with experience of China should also be involved. Secondly China is open and in a state of accelerating socio-economic change which makes involvement with it exciting. At present it is truly a land of opportunity – an opportunity that must be grasped now, while there is still time, so that enduring relationships are formed. It is in this respect that the easy mobility of students, younger professionals, who will be the decision-takers of the future, and experienced professional people is so relevant as a foundation for future cooperation. It is often the true catalyst for this**. The fostering, emphasis and communication of simple mobility schemes is**

therefore a crucial prerequisite for fruitful scientific cooperation between the EU and China.

7.1.3

Although ERA is an important overall policy objective for the EU it is an internally articulated one. In itself it cannot be the sole justification for a cooperative position that involves two parties. There has to be more to it than that. The additional features in the relationship must embrace not only presumed advantages for China but also bipartisan aims, a mutuality of interest based on policy compatibilities, genuine regard for each other's capabilities and contributions to human knowledge and a desire to work in partnership, even perhaps on a favoured partner basis, rather than in competition to pursue such aims. To fulfil such aspirations the use of the opportunity presented by the Agreement needs to be encouraged further not just in public sector domains but more widely. The first five years of activity need to be built on so that even more pragmatic strategic and policy goals are identified for collaborative effort and, most importantly, operational systems are created that facilitate their achievement.

7.1.4

It is here that there is a dilemma for the Commission. To achieve its policy goals it needs to have in place at a working level practical cooperative research between Chinese and European institutions as a foundation. But it has no specific instruments targeted at the achievement of such goals. Rather it relies on an internal system of funding research projects (the Framework programmes) that by adaptation might be able to achieve its higher level policy objectives. But to succeed here particular cooperative research projects have to be subject to exactly the same processes that would apply to any proposed ideas for research funding within the FP – whether deriving only from European institutions or more widely. Fulfilment of the policy objectives is therefore somewhat open to chance. **It is perhaps not sufficient just to "open" the FP to Chinese involvement – rather it might require some instrument designed to foster Chinese involvement if success is to be maximised**. So there are dangers here that have their origin in the processes that the EU has available and chooses to use to foster its collaborative scientific objectives with China.

7.1.5

There is little doubt that operational frustrations and problems can inhibit the achievement of policy objectives. Some hints of this can be detected already. As mentioned there is confusion about whether funding of Chinese partners is truly possible from FP sources or whether this always is the responsibility of MOST. This confusion exists even in Europe so that some European institutions even now do not seem to understand FP6 in this context. Even if they do there can be advantage to European partners to plan on the basis of funding for Chinese involvement being a responsibility for China – and indeed have done so. Even when funding is sourced from Europe there are examples of very slow, erratic, or even no, payment occurring and no funding having been budgeted for management meetings, exchange visits and so forth – or at least a degree of

naivety about the necessity for costing these in a proposal. Some formal guidance for coordinators is required in this area during the conception of a proposal for FP submission as such frustrations at an operational level can destroy research commitment. The EU must remember that it is in a competitive environment. There is no shortage of other interested parties globally seeking working scientific relationships with the Chinese so goodwill alone from the EU is not going to be enough. Even certain Member State have shown far greater willingness to make tangible commitments with a minimum of bureaucracy than can often be found at an EU level. This situation is not good enough. So the message for the EU is that **when designing policy objectives in relation to S&T cooperation with the Chinese operational issues must be uppermost in the minds of the officials involved** as failure to deliver will be counter-productive.

7.1.6
For FP7 it is suggested that **thought be given to ways in which scientific cooperation with China can be given further substance and specificity**. **Quality and relevance should be the benchmarks here**. This might perhaps be achieved through targeted and/or collaborative Calls, collaborative initiatives involving particular Member States with a good track record in China, and the use of "seedcorn" funding to foster novel ideas from younger scientists or at the very least their mobility to, and within, the EU and China so that the seeds of cooperative goodwill are sown for the future. Such approaches are not simply altruistic but good common sense.

7.2 RECOMMENDATIONS

Some specific *ideas and recommendations* for the future are set out below:

7.2.1
Simple straightforward schemes must be put in place that create mobility both amongst young and experienced people. For example EU-China STA long and short term Visiting Fellowships and EU-China STA Postgraduate Studentships;

7.2.2
Some FP funds dedicated to fostering cooperative research with China must be ring-fenced for this purpose either through specific Calls or in other ways. A serendipitous approach to achieving policy aims through use of the FP system being "open" is not enough;

7.2.3
The Steering Committee must become more *dirigiste* operationally so that new ideas are not just taken note of but are provided with the means for their achievement;

7.2.4
A contingency fund should be created in budgetary terms so that a pragmatic research response to particular crises or urgent issues is always possible. The model is the SARS situation but here there was an element of luck that FP funding was possible – this is too amateurish a position for meeting urgent needs or fulfilling genuine policy objectives;

7.2.5
There needs to be more emphasis on the targeted involvement of SMEs especially in high technology areas as they can represent a real forerunner of progress. Better liaison with the Chinese TORCH programme should be an objective here;

7.2.6
In order to increase the involvement of big industrial enterprises the STA should be targeting those European companies that already have a substantial research or manufacturing presence in China;

7.2.7
To assist in the management of involving Chinese partners in FP projects a guidance note should be provided as part of the FP proposal documentation relating to Calls, especially in thematic areas with little prior overseas experience, that sets out those key operational attributes that must be planned for in order to support the effective involvement of partners from countries such as China. Such a guidance document should draw on the experience available from previous INCO Calls and projects over a number of years;

7.2.8
INCO projects have ploughed a furrow for the EU in research project involvements with China over several years. This institutional experience should be used to better effect. Many past INCO involvements can now be addressed through thematic programme areas so the pioneering role of INCO could be capitalised on in other ways – for example by supporting collaborative research efforts that inform the achievement of policy goals;

7.2.9
The potential sources of funding for Chinese partners in thematic FP projects, whether directly through MOST or from FP sources needs to be clarified and planned for more effectively in project proposals to avoid misunderstandings;

7.2.10
More specific targeted initiatives should be formulated via the Steering Committee that can be seen to result directly from the existence of the STA. These might originate from working parties or task groups, particular forums or symposium events or simply as a result of direct contact through e-mail or telephone. Such initiatives should be labelled in a way that demonstrates their origination through the existence of the STA;

7.2.11

It should not be assumed that procedures intrinsic to delivering the FP in its various forms are necessarily appropriate to cooperative work with Chinese partners. Ways must be found of examining the processes involved, and maximising their effectiveness in achieving the policy objectives sought, by sanctioning changes – in other words processes must be subordinate to policy aims and support them, not the reverse. This is an underlying cultural problem that needs to be convincingly addressed in the EU if its international aims in S&T are to be effective in a global context.

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European Commission

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The EU-CN S&T Cooperation Agreement entered into force on 14 December 1999 for a 5-year period. It covers a list of areas of non-nuclear research falling under the thematic programmes of the Framework Programmes.

The assessment of the impact of the S&T Agreement indicates what it is adding to S&T Cooperation in relation to what it was intending to add. A relevant question was therefore: Has there been an increase in cooperation with the countries involved or has there been no change - in which case what was the impact of the agreement?

This study contributes to the preparing a position for the Commission at the renewal date for the S&T agreement and indicates whether changes and/or improvements are required or whether the agreement is in its present form.

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