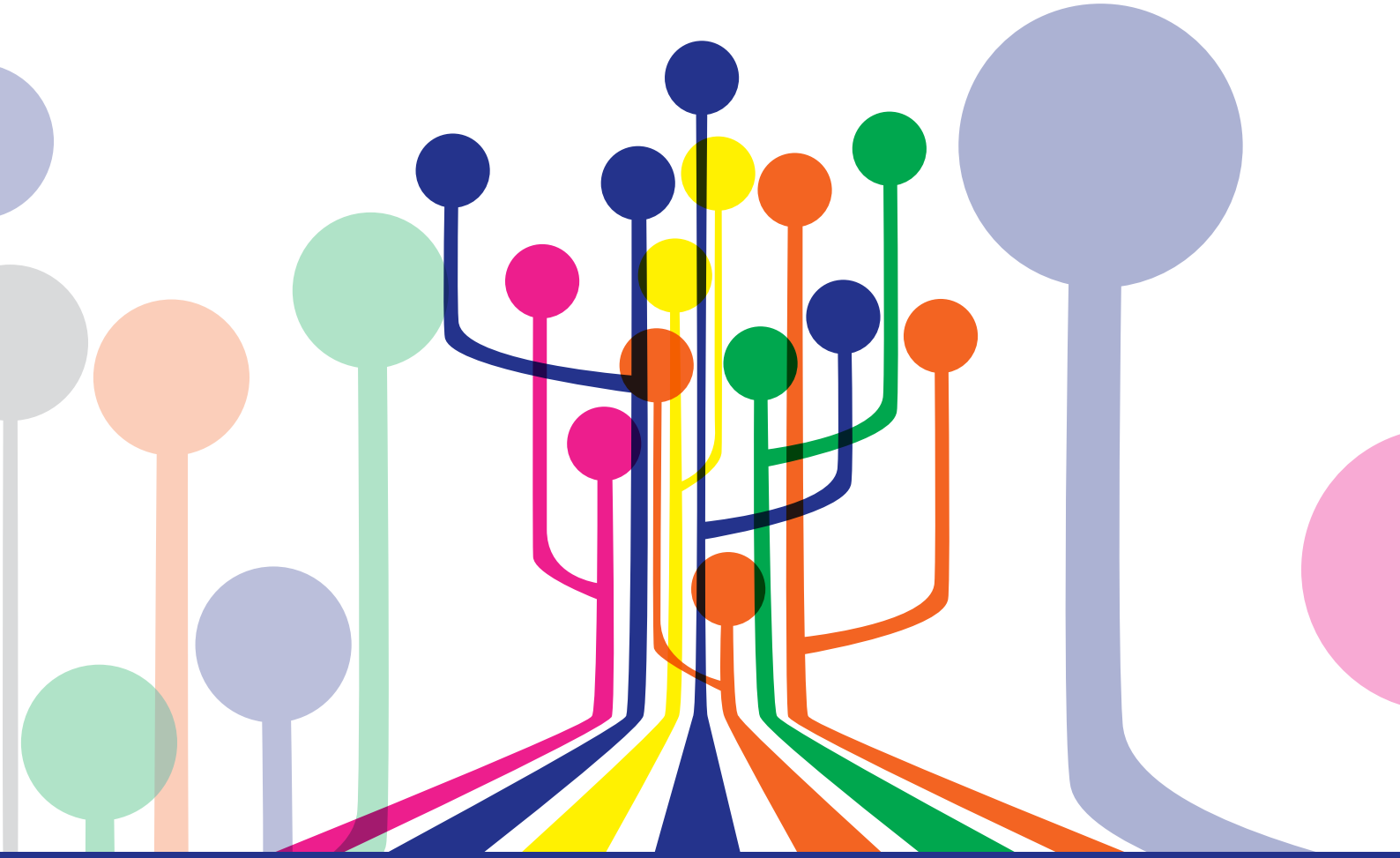


Policy brief: Horizon 2020 opportunities for India

Highlighting a number of instruments and options that can increase India's Horizon 2020 participation

Main editor: **Sean Angiolillo**, IndoGenius, India
Contributors: **Teresa de Oliveira**, Centre for Social Innovation, Austria; **Hans Westphal**, DLR, Germany

INDIGO POLICY

INDIGO POLICY

Supporting the Science-Technology-Innovation dialogue India-EU

Project	INDIGO POLICY
FP7 GA No.	609535
Deliverable Number:	D 2.4
Submission Date	31.03.2016
Responsible author(s):	Main redactor: Sean Angiolillo, IndoGenius, India Contributor: Teresa de Oliveira, Centre for Social Innovation, Austria; Hans Westphal, DLR, Germany

Deliverable: Policy Paper on Horizon 2020 opportunities for India

Author's Note

The authors are solely responsible for the content of this technical presentation. The technical presentation does not necessarily reflect the official position of the European Commission.

Work package	WP 2 – Support to EU-India Policy Dialogue
Deliverable	Policy Paper on Horizon 2020 opportunities for India
Main author	Sean Angiolillo, IndoGenius, India
Contributors	Teresa de Oliveira, Centre for Social Innovation, Vienna; Hans Westphal, DLR, Germany
Dissemination level	PU
Due submission date	
Actual submission date	31.03.2016
Project	INDIGO POLICY
FP7 contract number	609535
Start date of project	01/11/2013
Duration	42 months

Table of Contents

Table of Figures

Abstract

The removal of emerging economies from the list of countries eligible to receive automatic funding in the collaborative projects of Horizon 2020 has led to a strong decrease in their EU Framework Programme participation thus far, creating a challenge for policymakers in China, Brazil, Russia, Mexico and India.

This report aims to sketch a variety of possible paths forward for the Indian ministries and their respective counterparts from the European Commission to consider in hopes of restoring Indian Framework Programme participation.

To do so, the report first reviews India's significant participation in FP7 and its minimal participation in Horizon 2020 (as of November 2015). It then analyses a number of case studies of EU Framework Programme participation practiced in industrialized countries, which never benefitted from automatic funding, as well as emerging economies, India's peer countries that have also only been removed from the list of automatic funding with the onset of Horizon 2020.

All of this is done with a view to highlighting a number of instruments and options that can increase India's Horizon 2020 participation and more broadly, ensure the long-term sustainability of Indo-European STI collaboration over the coming years.

With the March 2016 conclusion of a co-funding mechanism between the EU and India's Department of Biotechnology (DBT) (and discussions with India's Department of Science and Technology still in process), this report is a timely look in to how the European Commission and countries like India can more sustainably advance cooperation.

Introduction

Statement of Problem

A testament of India's growing strength as a research and innovation partner to the European Union has been its participation in the EU Framework Programmes for Research and Technological Development. Under the most recent FP7, India was the fourth most active Third Country in terms of participation (305 participants in 181 projects) and in terms of financial contribution (€35.8m) from the European Commission—behind only Russia, the United States, and China.[1]

Under the current policy framework however, Indian participation in the collaborative projects of Horizon 2020, the successor to FP7, has been strongly reduced thus far and its future remains questionable. While individual Indian participants remain eligible for funding in components under Horizon 2020 such as the European Research Council (ERC) and the Marie Skłodowska-Curie Actions (MSCA), Indian participants are no longer eligible for automatic funding in the classic collaborative projects.

That being said, Indian partners remain eligible to participate as full members of consortia for research cooperation but will thus have to look for third party funding sources under the rules of the European Union and more specifically Horizon 2020 programme. Moreover, as this report will demonstrate, many non-EU industrialised countries have a strong track record of EU Framework Programme participation without automatic funding.

While Horizon 2020 has seen a dip in participation among many Third Countries, the extent of the decline in participation among Indian participants would point chiefly to this policy change as the primary cause. In fact, only seven participants have joined six collaborative projects as of November 2015.

Comparing the first two years of FP7 and nearly the first two years of Horizon 2020, this amounts to an approximately more than 85% decrease in the number of Indian participants, the number of projects with Indian participants, and the total value or cost of those projects. While Brazil, Russia, China and Mexico were also included in the policy change, India has seen its participation suffer the greatest consequences.

While other countries have established various co-funding opportunities to provide matching funds to participants of their respective countries, such mechanisms have been slow to develop in India and have loomed as a key issue facing Indo-European STI collaboration.

While other forms of multilateral and bilateral collaboration between Europe and India certainly continue, an important and previously successful avenue for

[1] All Framework Programme participation data is from the European Union Open Data Source Portal.

collaboration had been throttled. The EU Framework Programme is a unique opportunity for Indian participants to leverage all of the European Research Area's research infrastructure and expertise, while it provides European counterparts access to many of the top institutions in an exciting emerging knowledge area.

This policy issue received a major breakthrough at the EU-India Summit held 30 March in Brussels. This summit brought together the President of the European Council Donald Tusk, the President of the European Commission Jean-Claude Juncker, High Representative Federica Mogherini, and Prime Minister of India Narendra Modi. Paved by a long series of discussions, including the EU-India Joint Steering Committee Meeting in November 2015 in Delhi, India's Department of Biotechnology (DBT) agreed to a Horizon 2020 co-funding mechanism.[2]

Under this co-funding mechanism (CFM), a maximum of three crore rupees (₹ 30,000,000) per project will be made available by DBT to successful Indian participants in joint collaborative projects with European partners under Horizon 2020. As of publication, 21 Horizon 2020 calls have been selected in the priority areas of agriculture (including food), biotechnologies, bio-energy, health, water resources, new materials and nanotechnology.[3] Discussions with India's Department of Science & Technology (DST) still continue.

While this report will provide greater detail on this agreement, in a broader sense, the specific issues faced in this context are also representative of the larger questions of international STI collaboration today. What combination of funding models will best satisfy potentially competing principles of encouraging scientific excellence (via open calls) and building research and innovation partnerships with strategic regions (via coordinated calls)—both of which can be seen to generate long-term benefits under the right conditions? How can co-funding mechanisms be devised such that concerns of equal representation in key issues such as work programme drafting, evaluation, monitoring, funding, and even intellectual property sharing, are sufficiently satisfied?

The consequences, or the response, to the removal of automatic funding for emerging economies in Horizon 2020 collaborative projects will lend important insight into these questions.

[2] http://eeas.europa.eu/factsheets/docs/eu-india_factsheet_en.pdf
[3] http://www.dbtindia.nic.in/wp-content/uploads/DBT-EUcallsunderH2020-.pdf

Objectives

This analytical report reviews details of this policy change, its impact thus far on India's participation and examines case studies of countries that participate in the EU Framework Programme without automatic funding as a means of examining whether similar models could be learned from, or adopted in India.

This paper proceeds along the following structure:

- A review of India's significant participation in FP7 as a way of contextualizing its minimal participation in Horizon 2020;
- A review of Horizon 2020 and, in particular, details of the policy change removing automatic funding from not just Indian participants, but also those from China, Russia, Brazil and Mexico;
- Analysis of industrialized non-EU countries that have experience participating in the EU Framework Programme without automatic funding to map out potential policy options for India;
- Analysis of the policy response thus far of Brazil, Russia, China and Mexico to being similarly disqualified from automatic funding in Horizon 2020 collaborative projects;
- Distilling from this analysis, a presentation of a variety of possible paths forward that India and the EU could consider in their efforts to improve the current policy situation; as well as details of the recently concluded co-funding mechanism with DBT;
- It concludes by summarising the above findings to its key points.

Methodology Considerations

This report draws its analysis from a variety of sources. The research team first conducted a review of secondary (official sources), in particular the European Union Open Data portal, the CORDIS database, and several key reports published by the European Commission from 2013 to 2015. These are cited in the report where appropriate. Unless otherwise noted, all data regarding Framework Programme participation comes from the European Union Open Data Portal. This dataset does not include data from coordinated calls.

Informed by this review, the research team developed a structured questionnaire aimed at determining models of EU Framework Programme collaboration without automatic funding. The questionnaire (found in Appendix 1) was developed in consultation with Indigo Policy consortium members and attempted to highlight key criteria such as scientific priorities, evaluation procedures, and funding mechanisms that together would form a model of collaboration.

This survey was distributed through various BILAT projects to experts of EU collaboration with a variety of Third Countries.[4] These countries included both

[4] BILATs are a series of projects dedicated to international cooperation providing funding to support activities designed to underpin the S&T dialogue and promote cooperation opportunities to international partners. The survey was distributed in July 2015.

industrialized countries (which have collaborated without automatic funding prior to Horizon 2020) and emerging economies that, like India, qualified for automatic funding under the previous Framework Programme (FP7). Having reached out to 10 countries, we received completed questionnaires from 5 countries. A head of unit in two cases and a project officer in three other cases completed the questionnaire.

While these experts replied to the questionnaire, nowhere are they quoted directly. Their responses, supplemented with a review of secondary sources and other publically available government documents, were used to draw a picture of collaboration models for those particular countries. This choice was implemented because only official representatives of national ministries would have the requisite authority to be quoted on issues of international collaboration, whereas a general model of collaboration can be obtained through a summary of publically available documents cross-checked against expert testimony.

The next step in the methodology was a series of semi-structured interviews with EU and Indian stakeholders. As a method, a semi-structured interview is applied in order to gather qualitative information from the projects' coordinators (based in the European Member states). Qualitative data is collected by setting up a conversation situation (the interview) that allows a respondent the time and scope to express their opinions and perceptions on scientific collaborations between EU and India and, more specifically, their impact.

Lasting an average of one hour, these followed the format of the above questionnaire and were held with senior officials below Director-level in India's Department of Science & Technology (DST) and Department of Biotechnology (DBT), responsible for multilateral EU engagement, including Horizon 2020. These officials ranged in seniority from "Scientist C" to "Scientist E". An interview with a senior policy officer at the EU Delegation in India's Research & Innovation section also helped shed light on the EU's perspective.

As with the questionnaire responses, these interviews at the operational level were off the record conversations and not official testimony, but instead used to generally inform the report's understanding. While making clear that their testimony needed to be kept off the record as no official decision had yet been taken, respondents answered openly and were keen to understand paths that other countries had taken.

Finally, the research team reached out to the current seven Indian participants participating in Horizon 2020 without automatic funding as a way of examining what can be learned from these cases. Informal phone or in-person interviews were conducted with the Forum for Ethics Review Committees in India (TRUST project), and The Energy and Resources Institute (CD-LINKS project). Emails were exchanged with the Aryavarta Space Organisation. The others could not be reached for comment.

Together the review of public data, questionnaire responses, and face-to-face interviews served to give a well-rounded understanding of the issue at hand. Relying

on these sources alone have created a position well-suited to present in an analytical report a variety of paths forward that could improve India's participation in Horizon 2020 collaborative projects.

Chapter 1 – Reviewing India's Participation in FP7

This chapter first reviews the context of EU-India STI collaboration before examining India's participation in the EU Framework Programme, and in particular FP7. This is done in with a view to establishing a comparative benchmark for understanding India's minimal participation thus far in FP7's successor—Horizon 2020.

The Context of EU-India STI Collaboration

The case of EU-India STI collaboration surely is one of the most interesting for the field. Scale and potential are two key reasons. First, Europe is undoubtedly a world leader in research and innovation, boasting 24% of the world's expenditure on research, 32% of high-impact publications, and 32% of patent applications despite having only 7% of the world's population.[5]

India's research and innovation system warrants respect in its own right, ranking ninth in the world according to the SCImago Journal & Country Rank behind only the United Kingdom, Germany, France, and Italy (in terms of Europe).[6] Still, the expectation is that now as officially the world's fastest growing economy,[7] India's contributions to the global research and innovation ecosystem will grow at a similarly fast pace.

A strong case for why EU collaboration with India is a high priority is well summarized in a 2014 European Commission document titled "Report on the implementation of the strategy for international cooperation in research and innovation." It states:

> "India's developments, such as those in space technology with capabilities to launch commercial satellites and un-manned missions to the moon and to Mars, nuclear technology, pharma research capabilities in drug discovery and commercialization, ICT software, biotechnology in health and agriculture and the emerging capabilities in automotive research and telecommunications, have contributed to the country's recognition as an important knowledge power in the global economy. India is also attracting attention as a vibrant and versatile source of frugal innovation, a cost-effective and inclusive innovation, leading to affordable products and services without compromising on quality and environment protection standards."[8]

This has led to joint identification of topics such as health, water, bio-economy, energy and fusion energy as priority areas for collaborative research.[9] In this context,

[5] http://europa.eu/rapid/press-release_IP-12-967_en.htm?locale=en
[6] http://www.scimagojr.com/countryrank.php
[7] http://www.schwab.com/public/schwab/nn/articles/India-Becomes-World-s-Fastest-Growing-Economy-What-Investors-Need-to-Know
[8] http://ec.europa.eu/research/iscp/pdf/policy/annex_roadmaps_sep-2014.pdf (p 28)
[9] http://ec.europa.eu/research/iscp/pdf/policy/annex_roadmaps_sep-2014.pdf (p 28)

the EU has become India's first cooperation partner in terms of joint academic publications.[10]

This context has fuelled a huge range of collaboration activity with India happening not only at the EU level, but also bilaterally at the Member State level. While a summation of data on the level of funding committed by Member States to collaboration with India is outside the scope of this report, an overview EU Member States' research and innovation cooperation with India can be found here. A compendium of mobility schemes between EU Member States and India can be found here.

Many EU Member States and Associated Countries have a full-time Science & Technology Counsellor based in India looking after bilateral collaborations. Other countries have physical bilateral centres. In 1987, the Indo-French Centre for the Promotion of Advanced Research (CEFIPRA) was established with financial support from India's Department of Science &Technology and the French Ministry of Foreign Affairs.[11] More recently, the Indo-German Science & Technology Centre (IGSTC) has been established to facilitate partnerships and joint R&D projects.[12] Research Councils UK and CNRS are just two EU Member State funding agencies and research organisations with full-time dedicated staff in India.

For analysis of patterns of scientific co-publications or co-patents between India and EU Member States and Associated Countries, please see Indigo Policy's policy briefs on co-publishing[13] and co-patenting.[14] Indigo Policy also maintains a directory of unilateral, bilateral, and multilateral calls between India and EU Member States/Horizon 2020 associates.[15] A forthcoming Indigo Policy report is further exploring India's bilateral cooperation with EU Member States.

Open and Coordinated Calls in EU-India STI Cooperation

While the reasons to collaborate have been quite obvious, the question of how to collaborate is intrinsically more complicated. In recent decades, Europe and India have experimented with a variety of models seeking to produce the best scientific outcomes and a vibrant research and innovation partnership.

These have included the EU Framework Programme (which includes tools such as open collaborative projects, and geographic ERA-NETs), coordinated calls, and of course the bilateral programmes of the Member States.

[10] https://indigoprojects.eu/page/31/attach/INDIGO_Policy_Broschuere_Co-publishing_View.pdf
[11] http://www.cefipra.org/
[12] http://www.igstc.org/
[13] https://indigoprojects.eu/page/31/attach/INDIGO_Policy_Broschuere_Co-publishing_View.pdf
[14] For further information: https://indigoprojects.eu/page/31/attach/1_INDIGO_Policy_Brochure_Co-patenting_View.pdf
[15] https://indigoprojects.eu/object/program/list

As previously stated, the primary focus of this report is India's participation in the open collaborative projects of the EU Framework Programme.[16] However, a brief understanding of these other tools helps to contextualise the role of the EU Framework Programme in the EU-India research and innovation partnership.

For funders, it is important to understand the respective outcomes and benefits of these types of calls. For the sake of simplicity, it is possible to contrast the open calls of the EU Framework Programme with coordinated calls. By being open to participants in any country, the intention of the EU Framework Programme is to raise the level of scientific excellence to the highest possible standard.

On the other hand, noting the value of collaboration with key strategic regions (India being one of them), the European Union and India have also pursued coordinated calls to specifically foster collaboration between the two regions, while at the same time maintaining high scientific standards.

An independent 2012 review of the S&T Cooperation Agreement between the European Union and India helps bring some of these competing interests to light.[17] The differing structure of an EU-India coordinated call versus the EU Framework Programme necessarily results in differing levels of Indian participation. As Basile and Régnier explain:

> "The major – and predictable – discrepancy between open calls and coordinated calls is found in relation to Indian participation. While (broadly) in the coordinated calls EU and India have the same number of involved institutions (as a consequence of the way in which the calls are designed), the situation is very different in the case of open calls."[18]

The differing level of participation accordingly impacts the way the EU Framework Programme has been perceived in India. As Basile and Régnier further conclude:

> "…the FP is widely perceived [in India] as a mechanism which tends to deviate Indian researchers – already in limited numbers – from national research and public funded priorities related to urgent domestic development issues and problems. Indian authorities are not consulted on the scientific themes and calls announced by the EU: the widespread perception is that the selected Indian institutions do provide work primarily to feed a EU research agenda. A major implication is that the symmetry and reciprocity principles established in the Agreement are not applied and the limited participation delivers marginal impact on India. In this sense, the FP is perceived as an initiative de

[16] In this context, the word "open" is used to highlight how EU FP participation is open to applicants from many if not all countries in contrast to a "coordinated" call between two (or a small number) of countries or entities.
[17] https://ec.europa.eu/research/iscp/pdf/policy/india-review-brochure.pdf
[18] Ibid, 12.

facto outside the field of EU-India cooperation, and in particular outside the Agreement signed in 2001 and renewed in 2007."[19]

Noting this dissatisfaction among Indian policymakers, Basile and Régnier's in their conclusions identified coordinated calls as a "major shift of paradigm in the EU-India S&T Cooperation", arguing: "Coordinated joint calls appear to be the right instrument for S&T cooperation being identified, funded, and managed on a parity basis."[20]

Amidst this discussion, from 2007 to 2011, the EU and India held five coordinated calls, which in contrast to the EU Framework Programme, feature a common call text, joint evaluation, simultaneous launch, and co-funding where the Indian ministries (in particular DST and DBT) participated. Collectively these calls totalled €50m pooled equally from the EU and India over five years.

Figure 1 FP7 EU-India Coordinated Calls[21]

FP7 EU-India Coordinated Calls			
Year	***Topic***	***Funding***	***Number of Projects***
2007	Computational Materials Science[22]	Co-funding of €5m from each side (DST on Indian side)	6
2008	Food and Nutrition Research	Co-funding of €3m from each side (DBT on Indian side)	2
2009	Solar Energy Systems	Co-funding of €5m from each side (DST on Indian side)	3
2010	Partnering Initiative on Biomass and Biowastes	Co-funding of €1m from each side (DBT on Indian side)	1
2011	Water Research	Co-funding of €16m from each side (10 from DST and 6 from DBT on Indian side)	6

Source: European Commission

Despite the conclusions of Basile and Régnier, strategies with respect to both coordinated calls and India's participation in the EU Framework Programme have changed from FP7 to Horizon 2020. Unlike the five EU-India coordinated calls under FP7 (discussed below), none have been scheduled under Horizon 2020.

Secondly, while India was the fourth most active Third Country participant in FP7 open calls (discussed below), the removal of automatic funding for participants from emerging economies has led to a major reduction in Indian participation in Horizon

[19] Ibid, 19
[20] https://ec.europa.eu/research/iscp/pdf/policy/india-review-brochure.pdf (pg 20)
[21] http://www.oir.iitm.ac.in/wp-content/uploads/2013/05/EuropeanUnionFunding.pdf
[22] For the midterm assessment of this coordinated call, please see: https://ec.europa.eu/research/industrial_technologies/pdf/eu-india-workshop-report_en.pdf

2020 collaborative projects thus far. These policy changes have renewed the importance of discussions regarding the most sustainable models of collaboration, and in particular the conditions for co-funding mechanisms.

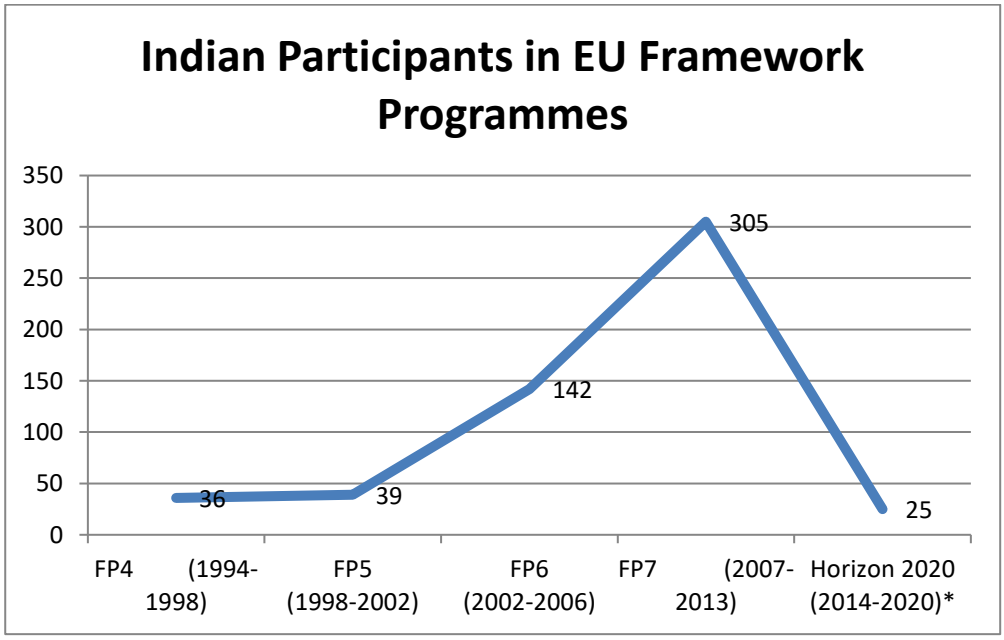
India's Participation in the EU Framework Programme Collaborative Projects

Having introduced the variety of tools that have been key to advancing EU-India STI cooperation in the last several years, it is possible now to direct focus on India's participation in the FP7 collaborative projects.

Since the conclusion of the Science and Technology Cooperation Agreement (STCA) between India and the European Community in 2001, India's participation in the EU Framework Programme has grown tremendously. From 36 participating organisations in FP4 (1998-2002) and 39 in FP5 (1998-2002), India's participation rose to 142 participants in FP6 (2002-2006) and more than doubled in FP7 (2007-2013) to 305 participants.[23] India's leadership in projects also reached a peak in FP7, with Indian participants taking the coordinator role in 19 projects in FP7, up from 9 in FP6.

In just the first two years of Horizon 2020 however, India has had only 7 participants.[24] A simple extrapolation of this figure creates an estimate of 25 for the sake of comparison.

Figure 2 Indian Participants in EU Framework Programmes (Collaborative Projects)



Source: European Union Open Data Portal

[23] All Framework Programme participation data from European Union Open Data Portal
[24] This falloff is discussed in Chapter 3.

Comparing India's FP7 Participation to Third Countries

International collaboration is key to the vision and mandate behind the EU Framework Programmes. This collaboration extends beyond Member States and Associated Countries to those all over the world. 8% of applicants in retained proposals are from Candidate and Associate Countries and 6% from Third Countries. Organisations from 170 countries participated.[25]

As previously mentioned, among Third Countries, India ranked fourth both in terms of participation and EC financial contribution received—behind only Russia, the United States and China. As a Third Country qualifying for automatic EC funding, in total, **305 Indian participants received a total of over €35.8m in 181 projects with a total value of nearly €780m[26].** In these projects were a total of **2,471 consortia members from 102 different countries.**

Although qualifying for automatic funding, not all Indian participants received EC funding in FP7. 99 of all Indian participants (or 32%) in fact did not receive any EC funding.[27] An EC funding rate for Indian participants of 68% in FP7 is nearly comparable to other emerging economies that formerly qualified for automatic funding: Brazil (69%), Mexico (60%), China (72%), Russia (65%).

It is also important to realize that countries that did not qualify for automatic funding under FP7 did still receive EC funding for a variety of reasons to be discussed in Chapter 4. Specifically:

- 38% of US participants received a total of nearly €68m in EC funding.
- 47% of Canadian participants received a total of over €57m in EC funding.
- 34% of Japanese participants received a total of over €7m in EC funding.
- 19% of Australian participants received a total of nearly €8m in EC funding.[28]

Through a variety of agreements and exemptions, non-EU industrialized countries such as these above were still able to access EC funding. As the data above (and in Figure 4) makes clear, there was a substantial body of precedence under FP7 of non-automatically eligible participants receiving exemptions for EC funding.

Now that emerging economies like India have been added to this group of countries not automatically eligible to receive EC funding, this body of precedence should be kept in mind. If the path of emerging economies under Horizon 2020 follows similarly to that of industrialised countries under FP7, then it is reasonable to expect that participants from emerging economies can, in certain cases, qualify for exemptions for EC funding.

---

[25] http://ec.europa.eu/research/evaluations/pdf/archive/fp7_monitoring_reports/7th_fp7_monitoring_report.pdf

[26] The figure of €780m refers to the total cost of projects with at least 1 Indian participant. This is a separate figure than the EC Max Contribution of projects with Indian participants.

[27] Source: European Union Open Data Portal

[28] All of the above data results from European Union Open Data Source Portal.

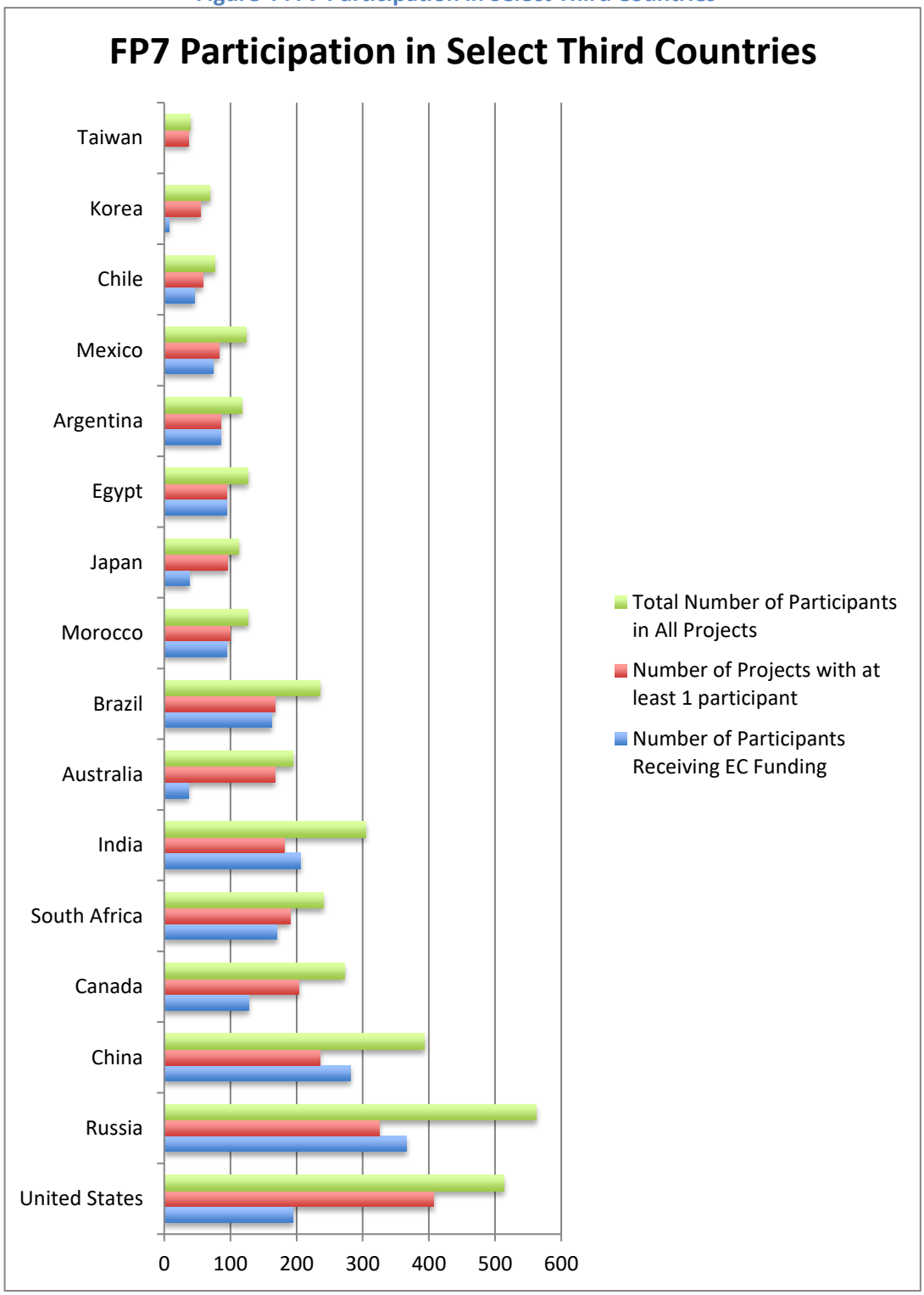
Figure 3 Comparison of India's Participation in FP7 Open Calls[29]

Indicators	India	Rank among Third Countries
Total Number of Indian Participants in All FP7 Projects	305	4th
Total EC Contribution Received by Indian participants in FP7	€35,844,468.58	4th
Number of Indian FP7 Participants Receiving EC Funding	206	3rd
Percentage of Indian FP7 Participants Receiving EC Funding	68%	N/A
Number of FP7 Projects with at least 1 Indian participant	181	6th
Total Cost of FP7 Projects with at least 1 Indian Participant[30]	€779,771,351.42	8th

Source: European Union Open Data Portal

[29] This data does not include projects resulting from coordinated calls.
[30] This is a separate figure than EC Max Contribution.

Figure 4 FP7 Participation in Select Third Countries[31]



Source: European Union Open Data Portal

[31] Data refers to open collaborative calls and not coordinated calls.

Figure 5 FP7 Participation in Select Third Countries (Table)

Country	Total Number of Participants in All FP7 Projects	Total EC Contribution Received in FP7 Projects (€)	Number of Participants Receiving EC Funding in FP7	Percentage of Participants Receiving EC Funding	Number of FP7 Projects with at least 1 participant	Total Cost of FP7 Projects with at least 1 Participant (€)
Russia	562	53,157,123.04	366	65%	325	2,401,740,887.91
United States	513	67,912,593.84	195	38%	407	2,715,872,530.20
China	393	26,601,473.81	281	72%	235	1,266,087,877.12
India	**305**	**35,844,468.58**	**206**	**68%**	**181**	**779,771,351.42**
Canada	273	57,451,233.56	128	47%	204	1,362,267,203.09
South Africa	241	28,771,178.75	170	71%	190	861,945,356.57
Brazil	235	26,185,646.02	163	69%	167	704,498,393.89
Australia	195	7,746,841.98	37	19%	168	1,412,842,335.63
Morocco	126	10,702,581.45	95	75%	99	460,774,537.41
Egypt	126	11,721,722.99	94	75%	94	346,693,750.86
Mexico	124	10,582,291.47	74	60%	83	296,228,393.50
Argentina	117	12,193,577.08	86	74%	86	297,586,418.51
Japan	112	7,047,916.39	38	34%	96	798,740,873.72
Chile	77	7,776,925.25	46	60%	58	283,314,590.81
Korea	69	1,137,414.50	7	10%	55	533,872,447.70
Taiwan	40	-	0	0%	37	344,094,319.85

Source: European Union Data Portal

Quantitative Analysis of FP7 Projects with Indian Partners

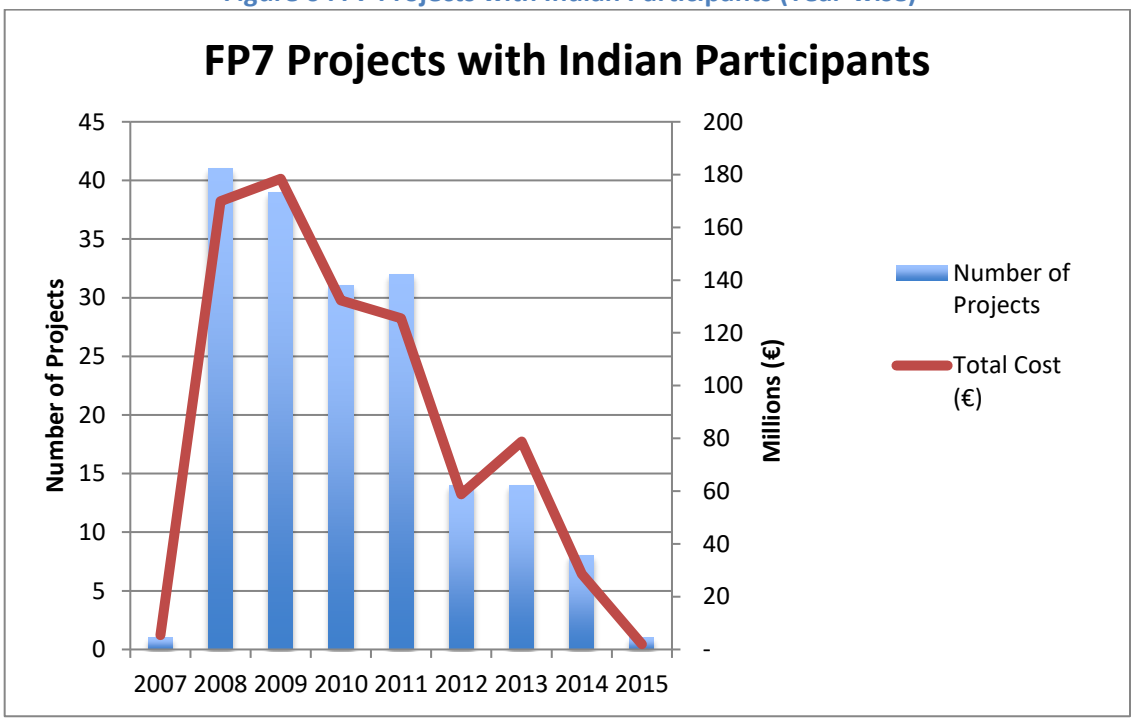
Now with a greater understanding of India's participation in FP7 with respect to other Third Countries, this report now conducts an analysis of the Indian participation in order to set a benchmark when discussing the decreased participation in Horizon 2020.

By Time

It is worth first examining a year-wise breakdown of India's FP7 participation. The chart below maps the start dates of FP7 projects with at least one Indian participant. With very few project start dates in 2007, it is clear that India was active right from the beginning of FP7. Also, the tailing off of participation in the end is a reflection of the fewer number of calls rather than a decrease in Indian interest.

It is plausible that the transition from FP7 to Horizon 2020 has played a role in negatively impacting India's participation in Horizon 2020 (discussed in Chapter 3). Horizon 2020 is in some ways a new concept to its predecessor, perhaps more so than FP6 to FP7.[32] If this has been an issue, the data below suggests that the transition from FP6 to FP7 did not have an impact on India's participation in FP7.

Figure 6 FP7 Projects with Indian Participants (Year-wise)



Source: European Union Open Data Portal[33]

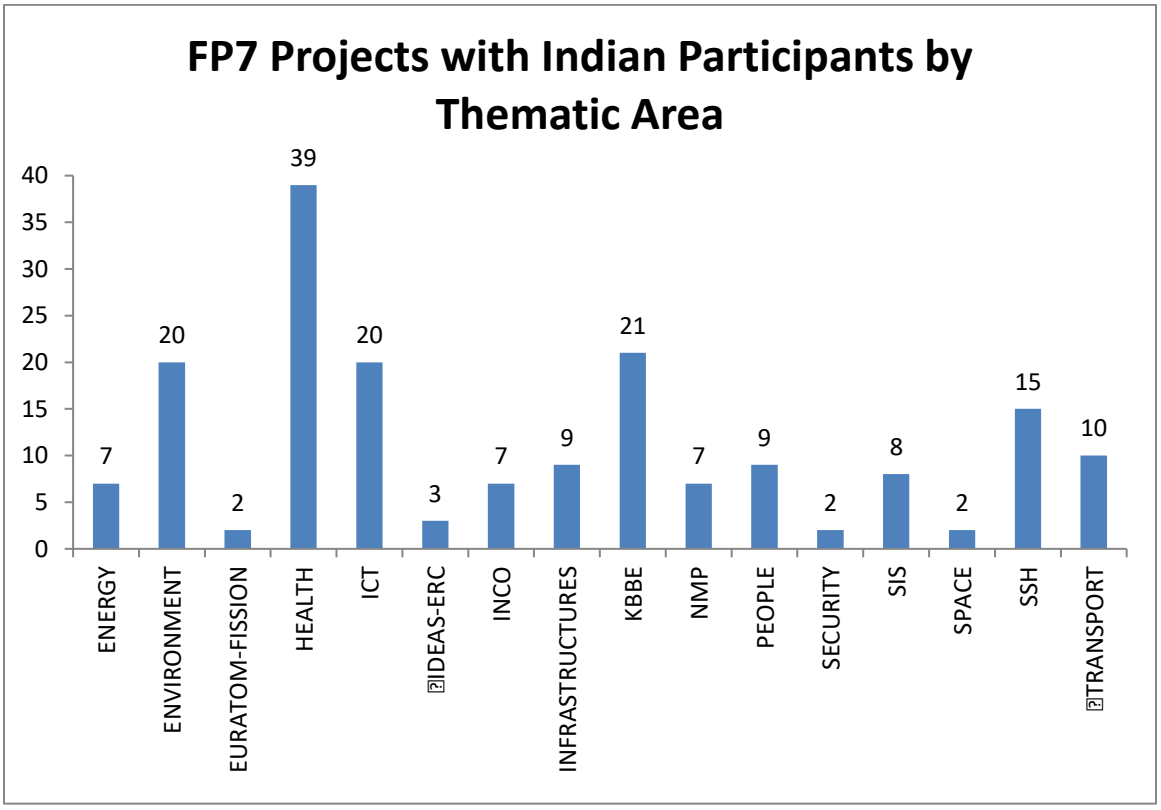
[32] For a discussion of differences between FP7 and Horizon 2020, see: http://cerneu.web.cern.ch/horizon2020/fp7-comparison; and http://horizon2020projects.com/pr-interviews/is-horizon-2020-really-simpler-than-fp7/

[33] The year of a project start date was used as the organising metric.

By Sector

The 181 FP7 projects involving Indian participants fall into the thematic sectors below. Just over 20% came in the category of Health; followed by just over 10% in KBBE, ICT and Environment—all priority areas for India's scientific and research agenda.

Figure 7 FP7 Projects with Indian Participants by Thematic Area



Source: European Union Open Data Portal[34]

[34] ICT (Information and Communication Technologies); INCO (International Cooperation); KBBE (Food, Agriculture and Fisheries, Biotechnology); NMP (Nanosciences, Nanotechnologies, Materials & New Production Technologies); SIS (Science in Society); SSH (Social Sciences & Humanities)

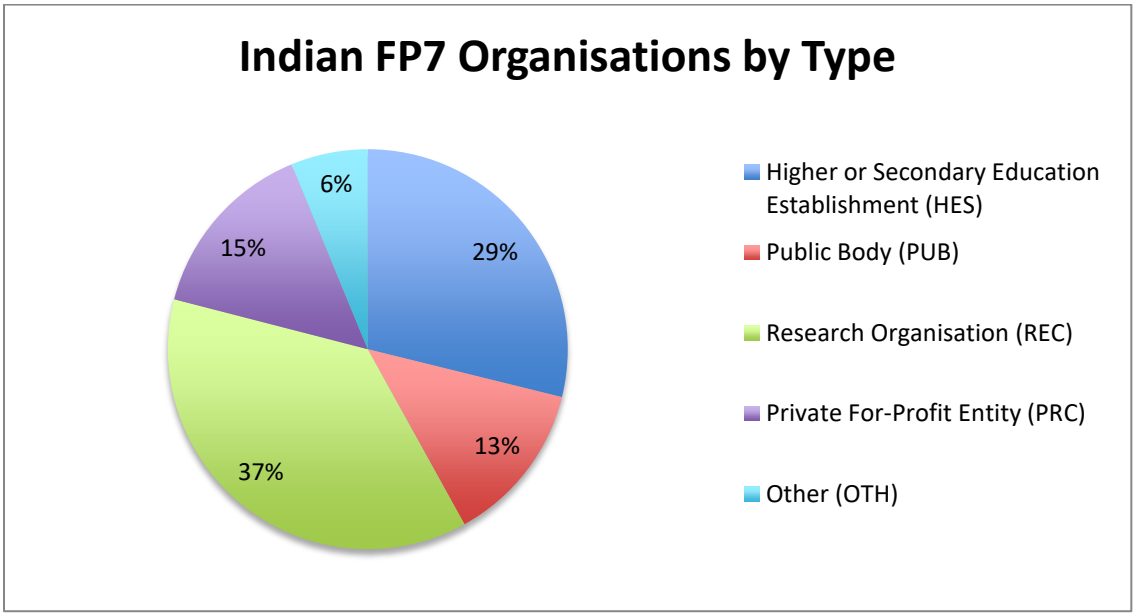
By Organisation Type

The European Union Open Data Portal also provides organisation type for Framework Programme participants. Options included: Research Organisation (REC), Public Body (PUB), Private For-Profit Entity (PRC), Higher or Secondary Education Establishment (HES), or Other (OTH).

These categories are self-reported. 51 of India's 305 participants did not report a selection. To allow analysis, we have made a selection as most appropriate. For example, IBM India Pvt Ltd was marked as PRC; Indian Institute of Technology (IIT) Delhi as HES; Variable Energy Cyclotron Center as PUB; The Energy and Resources Institute (TERI) as REC; and Federation of Indian Chambers of Commerce of India (FICCI) as OTH.

As this data is self-reported, there are cases that do not appear to have made the most appropriate selection. In particular, the more generic category of Research Organisation (REC) is probably oversubscribed, including both public and private entities. We have limited reclassifying data to only the most obvious cases, such as relabeling Dr. Reddy's Laboratories Ltd, a multinational corporation headquartered in Hyderabad, as a Private-For-Profit Entity (PRC).

With these modifications from the European Union Open Data Portal dataset, the following observations can be made. 37% of Indian participants in FP7 are Research Organisations, followed by Higher Education Establishments at 29% and Private For-Profit Entities at 15%.



Source: European Union Data Portal[35]

[35] Modifications to data explained above.

It is particularly interesting to examine the funding rate of Indian participants by organisation type. Of any organisation type, public bodies were the least likely to receive EC funding at only 35%. This is not entirely surprising given that public bodies participating in coordination and support action projects often participate with in-kind contributions. Research Organisations received EC funding in 76% of cases, however this is a fairly generic category that both public and privately funded institutions selected. 62% of Indian Private-For-Profit Entities received EC funding—just below the overall average.

Figure 8 Indian FP7 Participants by Type & Funding

Organisation Type	Participants	Number Receiving Funding	Percentage Receiving EC Funding
Higher or Secondary Education Establishment (HES)	88	66	75%
Public Body (PUB)	40	14	35%
Research Organisation (REC)	113	86	76%
Private-For-Profit Entity (PRC)	45	28	62%
Other (OTH)	19	12	63%
TOTAL	**305**	**206**	**68%**

Source: European Union Open Data Portal

By MNCs

We can also examine the participation of Multinational Corporation R&D centres. In examining the list of Private-For-Profit Entities, at least five certainly fall into the MNC territory (this includes one participant in Horizon 2020, which is discussed in Chapter 3).

Interestingly, IBM, Honeywell, and Hewlett-Packard are three MNCs that are representative of a broader trend of R&D outsourcing to India.[36] While IBM has received European Commission funding in its Horizon 2020 project, under FP7, these three MNCs brought their own funding to the table. As the trend of R&D outsourcing continues, it is possible that MNC R&D centres could grow into an important partner in Horizon 2020.

Figure 9 FP7 & Horizon 2020 Participation of MNCs in India

FP	MNC	Project	EC Contribution (€)
FP7	AstraZeneca India Pvt Ltd.	More Medicines for Tuberculosis (MM4TB)	742,191.5
FP7	IBM India Private Limited	Citizens Collaboration and Co-Creation in Public Sector Service Provision (COCKPIT)	0
FP7	IBM India Private Limited	Artifact-Centric Service Interoperation (ACSI)	0
FP7	IBM India Private Limited	Modelling and Analysing Demand Response Systems (WATTALYST)	0
FP7	Volkswagen India Private Limited	Innovative guidelines and tools for vulnerable road users safety in India and Brazil (SAFER BRAIN)	84,720
FP7	HONEYWELL TECHNOLOGY SOLUTIONS LAB PRIVATE LIMITED*HTS	Wireless, Self-Powered Vibration Monitoring and Control for Complex Industrial Systems (WiBRATE)	0
FP7	HONEYWELL TECHNOLOGY SOLUTIONS LAB PRIVATE LIMITED*HTS	Strengthening EU-India collaboration in networked monitoring and control systems technologies (EUCLID)	0
FP7	HEWLETT-PACKARD (INDIA) SOFTWARE OPERATION PRIVATE LIMITED	India-Europe cooperation to promote IPv6 adoption (6CHOICE)	0
H2020	IBM India Private Limited	OPTi Optimisation of District Heating Cooling systems (OPTi)	321,005

Source: European Union Open Data Portal

[36] http://www.iimahd.ernet.in/assets/snippets/workingpaperpdf/8040799502012-01-06.pdf

By Institution

In addition to attracting a variety of organisation types, FP7 also included participation from many of India's top research institutions. Indicating the quality of science, these projects have included many of India's most well respected government research labs, public universities, and non-profit research organisations. The table below includes Indian institutions participating in five or more FP7 projects.

Figure 10 Most Active Indian Institutions in FP7 Projects

Institution Name	Number of Projects
Council of Scientific and Industrial Research	18
International Centre for Genetic Engineering and Biotechnology	16
The Energy and Resources Institute	10
Indian Institute of Science	9
Jawaharlal Nehru University	8
Tata Institute of Fundamental Research	7
Indian Institute of Technology Bombay	6
Indian Institute of Technology Delhi	6
Ministry of Science and Technology	6
Public Health Foundation of India	6
Centre for Development for Advanced Computing	5
Foundation for Innovation and Technology Transfer	5
Research and Information System for Developing Countries	5

Source: European Union Open Data Portal

By Region

The map below shows that institutions across the country engaged with FP7. Not only the tier-1 cities of Delhi, Mumbai and Bangalore were able to take part in the programme, but also participants from a total of 34 cities in all parts of the country.

Figure 11 Locations of Institutions in FP7 Projects

Source: European Union Open Data Portal

By Consortia Size & Geographic Spread

One of the most unique features of the EU Framework Programme is the size and diversity of consortia. Compared to a bilateral programme for example, the collaborative projects often have much larger consortia.

We can examine the size of consortia for the 181 projects involving at least 1 Indian participant. **Including 305 Indian participants, the 181 projects with at least 1 Indian participant had a total of 2,471 consortium members from 102 different countries. This means the average consortia size for those 181 projects was 13.7 partners.** This analysis suggests that FP7 was successful in creating a high number of linkages with institutions across the world.

Figure 12 FP7 Collaborative Projects Consortia including an Indian Participant[37]

FP7 Collaborative Projects Consortia including an Indian Participant	
Total Number of Consortia Members in FP7 Projects involving at least 1 Indian Participant	2,471
Average Consortia Size of FP7 Projects involving at least 1 Indian Participant	13.7
Total Number of Consortia Members in FP7 Projects involving at least 1 Indian Participant (Excluding Indian Participants)	2,166

We can also gain insight into the geographical makeup of these consortia. Europe is of course most prominent among consortia partners, but Indian institutions have also connected with institutions from industrialised countries, emerging economies, and the developing world through FP7—a total of 102 different countries.

The table below summarises instances of country participation within the 181 FP7 projects including an Indian partner. The United Kingdom was the most common consortium partner for India. A participant from the United Kingdom was present in 154 of the 181 projects including an Indian participant. This is not surprising given the strong bilateral scientific ties between the two countries. Other European countries with high scientific output, such as Germany, Italy and France, follow.

What is perhaps most interesting is to see India's collaboration with countries outside of Europe through FP7. Outside of European partners, China was most often to be found in consortia with at least 1 Indian participant. In 28.7% of India's FP7 projects, at least one Chinese participant was also present. The same can be said for Brazil 18.2%, South

[37] Institutions are counted for each project in which they have participated. Institutions joining more than one project are counted more than once.

Africa 17.7%, and the United States 9.4% of the time. This data suggests that FP7 participation was not just a gateway to all of Europe, but in many cases, all of the world.

Figure 13 Instances of Participation in FP7 Consortia with an Indian Participant[38]

Instances of Participation in FP7 Consortia with an Indian Participant		
United Kingdom	154	85.1%
Germany	126	69.6%
Italy	112	61.9%
France	106	58.6%
Netherlands	83	45.9%
Spain	76	42.0%
Belgium	71	39.2%
China	52	28.7%
Sweden	49	27.1%
Greece	40	22.1%
Austria	37	20.4%
Switzerland	36	19.9%
Brazil	33	18.2%
South Africa	32	17.7%
Portugal	31	17.1%
Finland	30	16.6%
Denmark	26	14.4%
Hungary	24	13.3%
Poland, Russia	20	11.0%
Turkey	19	10.5%
Norway	18	9.9%
United States	17	9.4%
Czech Republic, Romania	15	8.3%
Argentina	14	7.7%
Bulgaria, Canada	13	7.2%
Australia, Israel	12	6.6%
Kenya	11	6.1%
Mexico, Slovenia, Slovakia, Vietnam	10	5.5%
Estonia, Ireland, Japan	9	5.0%
Egypt	8	4.4%
Bangladesh, Chile	7	3.9%
Croatia, South Korea, Lithuania, Latvia, Malta, Thailand, Tunisia, Uganda	6	3.3%

[38] A country having multiple participants in a single project is counted only once. Therefore, please note that the table is reporting that a participant from the UK was present in 154 of 181 projects (85.1%) involving an Indian partner. It is not reporting that there were 154 participants from the UK in projects with an Indian partner.

Ghana, Luxembourg, Morocco, Malaysia, Nigeria, Peru, Philippines	5	2.8%
Cameroon, Colombia, Iceland, Serbia, Tanzania, Ukraine	4	2.2%
Ecuador, Ethiopia, Nepal, New Zealand, Singapore, Senegal, Uruguay	3	1.7%
Belarus, Cyprus, Guatemala, Hong Kong, Indonesia, Cambodia, Kazakhstan, Lebanon, Lebanon, Sri Lanka, Madagascar, Namibia, Pakistan, Sudan, Taiwan, Zambia	2	1.1%
Armenia, Burkina Faso, Benin, Democratic Republic of the Congo, Costa Rica, Cape Verde, Georgia, Jordan, Jordan, Moldova, Montenegro, Mali, Mauritius, Malawi, Mozambique, Nicaragua, Oman, Papua New Guinea, Suriname	1	0.6%

By Funding Scheme

Another important metric we can use to examine India's FP7 participation is funding scheme. Funding scheme allows us to examine the nature of India's FP7 participation in terms of different types of collaborative projects, coordination and support activities, as well as mobility initiatives (research fellowships).[39]

Indian organisations were active in funding schemes across the board (see Figure 14). Grouping the various sub-schemes into a parent funding scheme allows us to see a clearer picture of activity (see Figure 15 Legend Note).

54% of all Indian organisations participating in FP7 did so in the realm of collaborative projects; 35% came under coordination and support actions; 8% fall under Marie Curie actions; 2% under European Research Council; and 1% as Networks of Excellence.

It is particularly useful to crosscheck this data with data of European Commission funding. Compared to the general average, a much higher percentage of Indian organisations receiving EC funding came in the realm of collaborative projects than coordination and support actions.

Compared to the numbers above, when looking at only Indian organisations not receiving EC funding, 43% were collaborative projects and 56% were coordination and support actions. In the specific category of CSA (not the parent category), none of the 38 Indian participants received EC funding.

The picture is even starker when examining the destination of European Commission funding to Indian participants. **71% of all EC funding to Indian organisations in FP7 came in the realm of collaborative projects.** Only 13% went to coordination and support actions, 11% to those winning European Research Council grants, and 5% to Marie Curie Action grant winners.

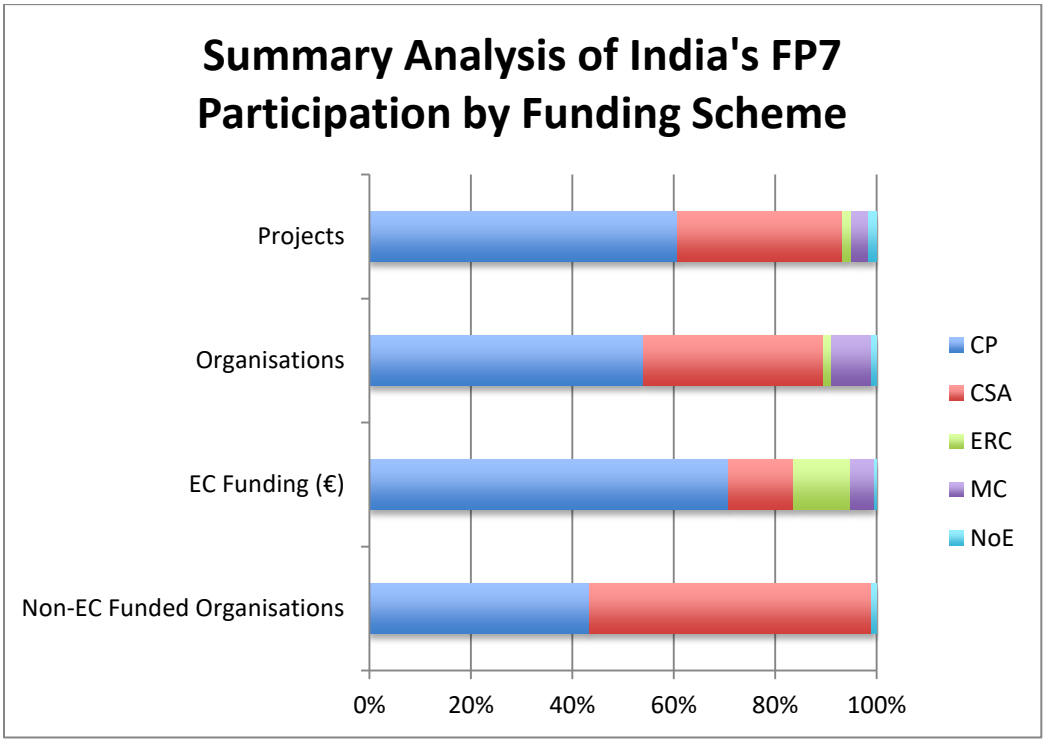
This data would suggest that, without EC funding, Indian organisations were more eager to engage in Framework Programme projects aimed at coordination and support of European research collaboration activities. Now that automatic funding for Indian participants has been removed under Horizon 2020, there is reason to expect, based on the experience of FP7 that Indian participation in coordination and support actions would likely continue.

[39] For a definition of funding schemes, see: [https://ec.europa.eu/research/fp7/understanding/fp7inbrief/funding-schemes_en.html] The term collaborative project here as a funding scheme is a more specific usage than applied elsewhere in this report. Elsewhere in the report, collaborative project is a more general term that encompasses collaborative projects, but also coordination and support actions.

Figure 14 India's FP7 Participation by Funding Scheme

Funding Scheme	Abbrev.	Projects	Orgs.	EC Funding (€)	Non-EC Funded Orgs.
Collaborative Projects	CP	18	20	1,312,596.85	12
Combination of Collaborative Projects and Coordination and Support Actions	CP-CSA	2	2	-	2
Combination of Collaborative Projects and Coordination and Support Actions for Integrating Activities	CP-CSA-Infra	2	3	-	3
Small or medium-scale focused research projects	CP-FP	28	34	3,544,669.22	14
Small or medium-scale focused research projects for specific international cooperation actions	CP-FP-SICA	18	38	7,254,993.30	1
Large-scale integrating project	CP-IP	13	17	2,275,724.25	3
Large scale integrating project for Specific International Cooperation Actions	CP-IP-SICA	4	4	788,406.50	-
Collaborative Projects for Specific International Cooperation Actions	CP-SICA	22	43	9,885,415.00	8
Collaborative Project targeted to SME	CP-TP	3	4	313,632.00	-
Coordination and Support Actions	CSA	17	38	-	38
Coordination (or networking) actions	CSA-CA	21	40	2,274,192.55	11
Support actions	CSA-SA	21	30	2,300,045.71	6
European Research Council Advanced Grant	ERC-AG	1	3	3,784,927.20	-
European Research Council Consolidator Grant	ERC-CG	1	1	241,215.60	-
European Research Council Starting Grant	ERC-SG	1	1	39,942.00	-
Marie Curie Industry-Academia Partnerships and Pathways	MC-IAPP	1	1	42,455.00	-
Marie Curie Intra-European Fellowships	MC-IEF	0	1	93,707.40	-
Marie Curie International incoming fellowships (Return phase)	MC-IIFR	0	17	243,750.00	-
Marie Curie Innovative Training Networks	MC-ITN	5	5	1,331,150.00	-
Network of Excellence	NoE	3	3	117,646.00	1
	TOTAL	**181**	**305**	**35,844,468.58**	**99**

Figure 15 Summary Analysis of India's FP7 Participation by Funding Scheme



Source: European Union Open Data Portal

Y-Axis Note	
Projects	181 FP7 projects with at least 1 Indian participant
Organisations	305 Indian organisations participating in FP7 projects
EC Funding (€)	Amount of funding Indian organisations received in FP7
Non-EC Funded Organisations	Indian organisations listed as not having received any EC funding for their FP7 participation

Legend Note	
For simplicity, categories have been combined to their most general.	
Collaborative Projects (CP)	CP-CSA, CP-CSA-Infra, CP-FP, CP-FP-SICA, CP-IP, CP-IP-SICA, CP-SICA, CP-TP
Coordination and Support Actions (CSA);	CSA-CA, CSA-SA
European Research Council (ERC)	ERC-AG, ERC-CG, ERC-SG
Marie Curie (MC)	MC-IAPP, MC-IEF, MC-IIFR, MC-ITN
Networks of Excellence (NoE)	NoE

By Participation without EC Funding

As individual Indian organisations are no longer eligible for automatic funding in Horizon 2020, it may be useful to attempt to explain the number of Indian organisations participating in FP7 without EC funding.

Despite qualifying for automatic funding, 99 of all Indian participants (or 32%) in fact did not receive any EC funding.[40] An EC funding rate for Indian participants of 68% in FP7 is nearly comparable to other emerging economies that formerly qualified for automatic funding: Brazil (69%), Mexico (60%), China (72%), Russia (65%).[41] As seen above, these organisations differed significantly by funding scheme, with those in coordination and support actions receiving EC funding in far fewer cases.

We reached out to each of the Indian organisations participating but not receiving EC funding. Our response rate was fairly low, but certainly one explanation that has arisen is participation with in-kind contributions. For example, particularly government-affiliated organisations had a higher propensity to participate without EC funding. A very small minority of these cases could also be organisations selected but a granted project was not carried out or that organisation dropped out of the project.

By Research Output

It is also important to know, particularly from the funder's perspective, the research output of India's participation in FP7 projects in terms of scientific publications, patents, or technology transfer. While the literature suggests that international collaboration improves scientific output,[42] does that also hold true in this particular case? And how does it compare to other forms of international collaboration, such as bilateral collaboration with EU Member States?

This important question is outside the scope of this study, but instead is being addressed in Indigo Policy's second monitoring report of WP3.

[40] Source: European Union Open Data Portal

[41] See Figure 5.

[42] Aparna Basu and Ritu Aggarwal (2001) International collaboration in science in India and its impact on institutional performance, *Scientometrics*, Vol. 52, No. 3, 379-394.

Qualitative Impact of India's FP7 Participation

While the previous section has taken a quantitative look at India's participation in FP7, it is important not to lose sight of the many qualitative success stories. These have been well documented elsewhere,[43] but it is worth remembering that these projects are closely aligned with India's priorities. As key challenges today are global in nature, there is no debate in this.

Indigo Policy is also producing a qualitative impact assessment study of FP7 projects connecting Europe and India[44]. Preliminary findings include:

- From the Indian side, there was in general a positive response from the project coordinators / members of the consortium being associated with EU related projects as this gave them a good exposure to EU based science institutions and researchers;
- A cross scientific and cultural experience seems to be one of the most significant features of EU – India cooperation projects under the framework of FP7 projects;
- From the European side, there was in general a positive experience for the European research teams and possibility to interact with significant research challenges in the field of Water, Energy and Health.

Regarding advancement of knowledge, the study has preliminarily found the following:

- Almost all projects involved in the sample (25 Europeans and Indians researchers) may be characterised as applied research projects rather than basic research;
- Indian participants state that projects were not so much about advancing a piece of frontier knowledge, but stressed how the project enabled them to address a problem in the Indian context;
- From the European side, it was mentioned that the fact of partnering with India brought complementarity and a better understanding in some specific challenges;
- In the FP7 project context, advancement of knowledge often allows acquiring new perspectives on joint problems.

It is also striking how many projects involving at least one Indian partner include "India" in the actual project title. Keep an average consortium size of 13.7 partners from all over the world, 26 of those 181 projects include "India" in the project title.

[43] http://ec.europa.eu/research/infocentre/success_stories_en.cfm?item=Countries&subitem=India

[44] "Impacts analysis of the FP7 projects connecting Europe and India – Qualitative impact assessment study" (Indigo Policy) produced by Teresa de Oliveira, ZSI – Center for Social Innovation, Vienna, Austria

Figure 16 FP7 Collaborative Projects including "India" in Project Title

S.N.	FP7 Collaborative Projects including "India" in Project Title
1	Developing efficient and responsive community based micro health insurance in India
2	Role of human papillomavirus infection and other co-factors in the aetiology of head and neck cancer in India and Europe
3	EU-India Fostering COOPeration in Computing Systems
4	Euro-India ICT Co-operation
5	Modelling and Analysing Demand Response Systems
6	Increasing the Dialogue between India and Europe by Improving EU Awareness and Access to Indian Research and Innovation Technology Programmes
7	Innovative Guidelines and Tools for Vulnerable Road Users Safety in India and Brazil
8	HighNoon: adaptation to changing water resources availability in northern India with Himalayan glacier retreat and changing monsoon pattern
9	European Union and India Enhanced Cooperation Framework for Improved Bilateral Dialogue in the Fields of Science and Technology
10	Enhancement of natural water systems and treatment methods for safe and sustainable water supply in India
11	Strengthening EU-India collaboration in networked monitoring and control systems technologies
12	Synchronising the Research Policy Dialogue to the Indian Dimension
13	"Trade, Agricultural Policies and Structural Changes in India's Agrifood System; Implications for National and Global Markets"
14	Support for the advancement of policy cooperation between India and Europe in Research and Innovation
15	New tools for monitoring drug resistance and treatment response in visceral leishmaniasis in the Indian subcontinent
16	Innovation driven Initiative for the Development and Integration of Indian and European Research
17	India-EU Joint House for Science & Innovation
18	Large scale innovative pro-poor programs focused on reducing maternal mortality in India: a proposal for impact evaluation
19	EU-India Platform for the Social Sciences and Humanities
20	Euro-Indo forum for nano-materials research coordination & cooperation of researchers in sustainable energy technologies
21	The antiretroviral roll out for HIV in India – strengthening capacity to promote adherence and patient follow-up in the context
22	"Health system stewardship and regulation in Vietnam, India and China"
23	The role of Governance in the Resolution of Socioeconomic and Political Conflict in India and Europe

24	Strengthening networking on BiomAss 36iotechn and biowaste conversion – 36iotechnology for EurOpe India inteGration
25	India-Europe cooperation to promote Ipv6 adoption
26	Sustainable e-Infrastructures across Europe and India

Source: European Union Open Data Portal

A very small sampling of other projects have included topics such as:

- Food security and cultivation of high-yielding grasses
- Metal oxides for future nanoelectronics
- Drugs for Tuberculosis
- Flood resilience techniques and "Seismic wallpaper" to withstand earthquakes
- Agroforestry Sustainable aquaculture
- Biomass as a renewable energy
- Poverty reduction analysis

India also took a leadership role in many FP7 projects. In 19 cases, an Indian organisation assumed the role of project coordinator. These organisations include many of India's leading institutions, such as the Tata Institute of Fundamental Research (TIFR), Indian Institute of Science (IISc), and Indian Institute of Technology Delhi (IITD).

This data would seem to contradict the outlook presented by Basile and Regnier's report that Indian participation in FP7 projects is outside of India's scientific priorities.

Summary

Using the available quantitative and qualitative data, this review has demonstrated India's participation in FP7 was characterised by a vibrant diversity. Through FP7, Indian researchers investigated grand challenges across all thematic sectors—Health was the sector most represented. Research organisations, public bodies, higher education institutions, and even private entities found FP7 a valuable avenue for collaboration. These entities came from cities in all regions of India and included many of India's top institutions. Despite an average consortia size of more than 13 partners from across the world, they investigated not just grand challenges relevant for India, but often challenges within Indian conditions. Many even did so without EC funding-- particularly in the funding scheme of coordination and support actions.

Chapter 2 – India and Horizon 2020

This chapter introduces Horizon 2020, the removal of automatic funding for Indian participants in collaborative projects, and the consequences it has had for India's participation and that of other emerging economies.

Horizon 2020

FP7's successor Horizon 2020 is the largest EU Research & Innovation programme to date, targeting €80 billion of investment for over 7 years (2014 to 2020), promising breakthroughs in R&I, discoveries, and commercialisation of ideas from the research laboratory to the world market.[45]

It is important to realise that Indian participation in many components of Horizon 2020 remain unaffected compared to its predecessor FP7. The table below shows that while automatic funding has been removed in the classic collaborative projects (to be further discussed below), EU funding remains available for individual Indian participants to apply for Marie Skłodowska-Curie Actions (MSCAs) fellowships, European Research (ERC) Council Grants, Horizon 2020 evaluation experts, Erasmus+ scholarships, and mobility fellowships.

Moreover, the possibility of joint funding remains for coordinated calls (although none have been scheduled), INNO INDIGO calls (an FP7 project), and of course bilateral cooperation.

Figure 17 Funding Status for Indian Participants in Horizon 2020[46]

<table>
<tr><th></th><th>Types of Opportunities</th><th>Funding for Indian Participants</th></tr>
<tr><td rowspan="3">Collaborative research</td><td>Classical collaborative projects (open call for proposals)</td><td>No automatic funding. Funding may be available in some exceptional cases.[47]</td></tr>
<tr><td>Coordinated calls for proposals</td><td rowspan="2">Joint funding by Indian Funding agencies and EU</td></tr>
<tr><td>Multilateral (INNO INDIGO and other ERA-Nets or JPIs)</td></tr>
<tr><td rowspan="2">Opportunities for individual researchers / students</td><td>Marie Skłodowska-Curie Actions (MSCAs) fellowships</td><td rowspan="2">Funding available from EU</td></tr>
<tr><td>European Research Council (ERC) Grants</td></tr>
</table>

[45] http://europa.eu/rapid/press-release_IP-11-1475_en.htm

[46] Adapted from presentation slides of Denis Dambois, EU Delegation to India, Research & Innovation Section, "EU research & innovation collaboration with India" (15 April 2015)

[47] The agreement of a con-funding mechanism with DBT will provide funding to qualified Indian participants in select priority areas. This agreement is further discussed later.

	Evaluation experts for H2020	
	Erasmus+ scholarships	
	Mobility fellowships	

Removal of Automatic Funding in Collaborative Projects

Under FP7, India—like China, Russia, Brazil and Mexico—was one of 139 International Cooperation Partner Countries (ICPC) that received automatic funding in successful collaborative projects.[48] However, as previously stated, participation rules for these five countries (BRIC+Mexico) have changed under Horizon 2020.

While all countries are free to take part in Horizon 2020, not all countries are always entitled to funding. Non-EU countries in Horizon 2020 fall into two categories.

- Those automatically eligible for funding.[49]
- Those not automatically eligible for funding (though they still may be funded in exceptional cases).[50]

As was the case for industrialised countries before them, it seems that the general principle now for emerging economies is that participants from such countries should identify and secure their own funding sources.

Exceptional Cases for European Commission Funding

Nevertheless, there are possible exceptions to this rule. The table below specifies the cases where Indian participants (and those from other non-EU industrialised and emerging economies) could qualify for automatic funding from the EU.

• Funding is provided for in a bilateral scientific/technological agreement or similar arrangement between the EU and the country where the applicant is based.
• The call for proposals clearly states that applicants based in such countries are eligible for funding.
• Their participation is deemed essential for carrying out the action by the Commission or the relevant funding body because it provides:

1. outstanding competence/expertise
2. access to research infrastructure
3. access to particular geographical environments
4. access to data.

Source:
https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/3cpart/h

[48] ftp://ftp.cordis.europa.eu/pub/fp7/docs/icpc-list.pdf
[49] Funding eligibility rules are given in Article 10 of Horizon 2020 Rules for Participation and Dissemination (http://ec.europa.eu/research/participants/data/ref/h2020/legal_basis/rules_participation/h2020-rules-participation_en.pdf)
[50] https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/3cpart/h2020-hi-3cpart_en.pdf

2020-hi-3cpart_en.pdf

The case for such an exception is made in Part B of the Project Proposal. Section 3.3 "Consortium as a whole" includes the following request:

- **"Other countries**: If one or more of the participants requesting EU funding is based in a country that is not automatically eligible for such funding (entities from Member States of the EU, from Associated Countries and from one of the countries in the exhaustive list included in General Annex A of the work programme are automatically eligible for EU funding), explain why the participation of the entity in question is essential to carrying out the project."[51]

Here is where the Indian participant, together with the project coordinator, would make the case based on the above rationale as to why the participation of the Indian partner is essential to the project.

The effect these rules have had thus far on India's participation in Horizon 2020 collaborative projects is discussed later in the report.

The EU Approach to International STI Collaboration

The rationale for the policy decision to remove applicants of BRIC+Mexico countries from automatic funding of collaborative projects can be found in an official European Commission communication document, "Enhancing and focusing EU international cooperation in research and innovation: A strategic approach".[52]

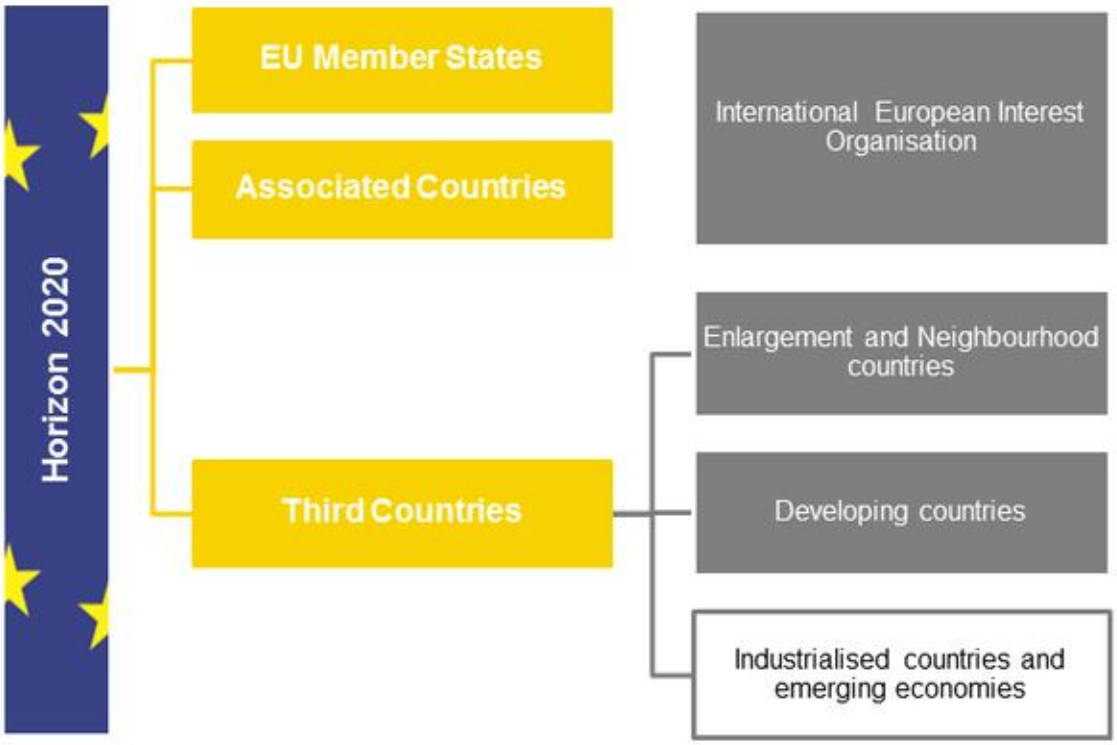
Its first chapter titled "A Changing World", the document notes Europe's continued leadership role in research and innovation in terms of expenditure, publications, and patents, but recognises the following change in the global STI landscape:

> "Over the past decade, however, the landscape has evolved rapidly. Global research and innovation were, until recently, dominated by the European Union, the USA and Japan. As the emerging economies continue to strengthen their research and innovation systems, a multipolar system is developing in which countries such as Brazil, China, India and South Korea exert increasing influence. The share of the BRICS in global expenditure on R&D doubled between 2000 and 2009. The Union also has a clear interest in its neighbouring countries developing their research and innovation capacity."[53]

[51] https://szie.hu/sites/default/files/h**2020_part_b_template**.doc (See Section 3.3, Page 7)
[52] http://era.gv.at/object/document/501/attach/ST14000EN12.pdf
[53] http://era.gv.at/object/document/501/attach/ST14000EN12.pdf

The changes in the global research and innovation landscape explain the following organisation of countries, where India is therefore seen to be more appropriately grouped with "Industrialised countries and emerging economies" rather than developing countries.

Figure 18 Categorisation of Countries in Horizon 2020



Source: LUX Innovation Horizon 2020 Toolbox[54]

Determining which category to place India in a global scheme is always a challenging endeavour. With its amazing diversity and scale, India could be considered developed and developing, industrialised and emerging all at the same time. Accordingly, when it comes to global issues, such as negotiations regarding climate change or generic pharmaceuticals, India's multiple identities are sure to surface.[55]

Placing India into a category for Horizon 2020 can be considered a similar conflict. However, looking beyond the BRIC or emerging economy label alone, when evaluating India strictly on the basis of a research and innovation system, it certainly could warrant the equal footing status. For example, while some aspects of its methodology (or such

[54] http://www.horizon2020.lu/Toolbox/FAQ/Non-EU-Partners

[55] For a similar discussion, see Rohan Mukherjee, "The False Promise of India's Soft Power"(2014): https://scholar.princeton.edu/sites/default/files/rmukherj/files/mukherjee_softpower.pdf

rankings in general) may be contestable,[56] the SCImago Journal & Country Rank places India ninth in the world, and in comparison to European countries behind only the United Kingdom, Germany, France, and Italy.[57]

However, the removal of automatic funding does not necessarily imply a negative development. Many Third Countries, as this report will demonstrate, participate in the EU Framework Programme without automatic funding, and certainly many in India recognise this point and are eager to see development of more sustainable models of collaboration, as the DBT co-funding mechanism suggests.

Participation Impact among BRIC+Mexico Countries

Not surprisingly, according to the analysis here, most if not all of the countries included in this policy change have seen negative consequences in terms of their overall participation in the programme (see Figure 13).[58] India though seems to have been especially impacted.

The table below (Figure 13) depicts the participation from each affected country in Horizon 2020 collaborative projects thus far. Taking the year of project start date as the organising metric, it is possible to compare the first two years of FP7 (2007 to 2008) and nearly the first 23 months of Horizon 2020 (2014 to Nov 2015).[59] The purpose of this analysis is only to acquire a basis for understanding the clear decline in participation.

Applying these conditions, comparing the first two years of FP7 and the first 23 months of Horizon 2020, India had the largest percentage drop among BRIC+Mexico countries in the following categories:

- Number of projects with at least 1 Indian participant: from 42 to 6
- Total cost of projects with at least 1 Indian participant: from €175 million to €19 million
- Number of Indian participants in all projects: from 58 to 7[60]

India has also seen its number of participants receiving EC funding drop from 11 to 6, and the EC contribution to those participants fall from €2.2 million to €1.1 million.

Certainly, the other BRIC+Mexico countries have witnessed a considerable decrease in participation comparing the early years of FP7 to Horizon 2020: Russia from 98 to 20;

[56] See Jorge Mañana-Rodríguez, "A critical review of SCImago Journal & Country Rank" (2014): http://rev.oxfordjournals.org/content/early/2014/03/14/reseval.rvu008
[57] http://www.scimagojr.com/countryrank.php
[58] See Chapter 4.
[59] It also does not take into account the number of calls or funding available during that period.
[60] Data here is from European Union Open Data Portal.

Mexico from 12 to 4; China from 64 to 27; and Brazil from 37 to 15.[61] However, India's drop from 58 to 7 is the largest percentage decline.

This drop-off in participation from these countries has not gone without notice. In a discussion of the first year of Horizon 2020, the Deputy Director-General, DG Research & Innovation, Rudolf Strohmeier, highlighted the reduced interest from these countries as an important problem, citing the difficulty of researchers in Brazil, Russia, India and China to find funds to cover the costs of their participation.[62]

According to Strohmeier, "It is taking some time for these countries to adapt so they can provide their own money." He also recognised, "We have to be more outspoken, and make it clear to our partners in the BRIC countries that their participation is important."[63]

While the relevant participation data is included below on each of the emerging economies, they are discussed in greater depth in Chapter 3's section on "Response of Emerging Economies".

[61] European Union Open Data Portal
[62] http://rbi.ie/brics-missing-out-on-horizon-2020/
[63] Idem

Figure 19 FP7 & H2020 Collaborative Projects Participation Data by Country (Emerging Economies)[64]

Emerging Economies (BRIC+Mexico)					
Country	**Metric**	**FP7 (2007-2013)**	**Early FP7 (2007-2008)**	**Horizon 2020 (2014-Nov15)**	**% Change (Early FP7 to H2020)**
India	Number of Projects with at least 1 Participant	181	42	6	-86%
	Total Cost of Projects with at least 1 Participant (€)	779,771,351.42	175,375,516.96	19,016,592.50	-89%
	Number of Participants	305	58	7	-88%
	Total EC Contribution Received by Participants (€)	35,844,468.58	2,209,586.00	1,095,857.50	-50%
	Number of Participants Receiving EC Funds	206	11	6	-45%
	Percentage of Participants Receiving EC Funding	68%	19%	86%	67%
Mexico	Number of Projects with at least 1 Participant	83	11	4	-64%
	Total Cost of Projects with at least 1 Participant (€)	296,228,393.50	37,482,888.11	14,790,091.87	-61%
	Number of Participants	124	12	4	-67%
	Total EC Contribution Received by Participants (€)	10,582,291.47	38,006.00	0	-100%
	Number of Participants Receiving EC Funds	74	1	0	-100%
	Percentage of Participants Receiving EC Funding	60%	8%	0%	-8%
Russia	Number of Projects with at least 1 Participant	325	62	13	-79%
	Total Cost of Projects with at least 1 Participant (€)	2,401,740,887.91	483,315,773.19	57,029,149.83	-88%
	Number of Participants	562	98	20	-80%
	Total EC Contribution Received by Participants (€)	53,157,123.04	1,943,167.00	1,295,767.24	-33%
	Number of Participants Receiving EC Funds	366	25	15	-40%
	Percentage of Participants Receiving EC Funding	65%	26%	75%	49%

[64] To clarify, participant in the second column refers to a participant from the country listed in the first column. For example, "Number of Projects with at least 1 Participant" in the first row, actually means "Number of Projects with at least 1 Indian Participant". This dataset does not include any projects resulting from coordinated calls.

China	Number of Projects with at least 1 Participant	235	44	16	-64%
	Total Cost of Projects with at least 1 Participant (€)	1,266,087,877.12	281,191,440.65	82,435,646.87	-71%
	Number of Participants	393	64	27	-58%
	Total EC Contribution Received by Participants (€)	26,601,473.81	2133827.5	1,160,096.00	-46%
	Number of Participants Receiving EC Funds	281	17	8	-53%
	Percentage of Participants Receiving EC Funding	72%	27%	30%	11%
Brazil	Number of Projects with at least 1 Participant	167	17	11	-35%
	Total Cost of Projects with at least 1 Participant (€)	704,498,393.89	43,153,512.12	59,841,549.01	39%
	Number of Participants	235	37	15	-59%
	Total EC Contribution Received by Participants (€)	26,185,646.02	637,804.80	1,084,670.63	70%
	Number of Participants Receiving EC Funds	163	7	2	-71%
	Percentage of Participants Receiving EC Funding	69%	19%	13%	-32%

Source: European Union Open Data Portal

Wider Context

The data above strongly suggests that the removal of automatic funding for the BRIC+Mexico countries has had an important negative impact on their participation. However, an alternative explanation could be considered.

It is possible that all Third Countries (not just the BRIC+Mexico countries) have seen a decrease in their participation figures—perhaps as a general feature of Horizon 2020 itself. As this is a new concept than FP7, it may take time for participants to acclimatize to it, and of course adapt to changes in funding rules.

Examining participation trends in countries other than BRIC+Mexico provides a kind of control group against which to test this hypothesis. In light of this, this study conducted a similar analysis on two groups of non-EU countries: industrialised countries that participate without automatic funding and developing countries that still qualify for automatic funding under Horizon 2020. With their funding status unchanged, presumably their early FP7 data should somewhat reflect their early Horizon 2020 performance.

As shown in the tables below, the results are somewhat surprising. Most industrialised countries are participating in Horizon 2020 thus far at a rate below their early FP7 figures. Excluding a small increase in Taiwan, the other five industrialised countries reviewed (Korea, Australia, Canada, Japan, and the United States) have participant and project figures in Horizon 2020 below their respective early FP7 figures.

Surprisingly though, while their Horizon 2020 participation figures are below their early FP7 performance, the number of participants receiving EC funding under Horizon 2020, and the total EC contribution that these participants have received, is higher than their early FP7 figures in all six industrialised countries reviewed. Compared to their early FP7 trend, more participants from these industrialised countries are receiving EC funding through exceptions rather than participating with their own funding.

The same trend is visible amongst the five developing countries, and one associated country reviewed (Turkey). Comparing early FP7 and Horizon 2020 performance thus far, project and participant figures for Horizon 2020 are below their early FP7 rate. However, the European Commission is funding participants in these countries to a greater extent. While qualifying for automatic funding, fewer participants from these developing countries are bringing their own funding than was the case in FP7.

What this analysis has shown is that the removal of automatic funding for emerging economies, while arguably the most important, may not be the only explanatory variable. There may be other factors at play, outside the context of this particular study

and policy report, such as a broader transition to Horizon 2020, that are also having an impact.

Nevertheless, our analysis clearly suggests that the removal of automatic funding had a high negative impact on India´s participation on Horizon 2020. This of course can be expected in part as participants would need to seek alternative sources of funding and Indian ministries would need time to evaluate co-funding possibilities as no Third Countries have been involved in the design of Horizon 2020.

Considering the importance of EU-India relations, this has been a key target issue for policymakers to target, featuring on the agenda of the latest India-EU Joint Steering Committee on S&T Cooperation held in November 2015. In particular, discussions have focused on development of a co-funding mechanism through which Indian participants in Horizon 2020 collaborative projects could receive funding from Indian Ministries, subject to a positive evaluation.

Figure 20 FP7 & H2020 Collaborative Projects Participation Data by Country (Industrialised Countries)

Industrialised Countries (Not Recipients of Automatic Funding under FP7, Horizon 2020)					
Country	**Metric**	**FP7 (2007-2013)**	**Early FP7 (2007-2008)**	**Horizon 2020 (2014-Nov15)**	**Percent Change**
Korea	Number of Projects with at least 1 Participant	55	10	6	-40%
	Total Cost of Projects with at least 1 Participant (€)	533,872,447.70	112,446,385.88	34,640,728.75	-69%
	Number of Participants	69	12	7	-42%
	Total EC Contribution Received by Participants (€)	1,137,414.50	-	231,497.50	N/A
	Number of Participants Receiving EC Funds	7	0	3	N/A
	Percentage of Participants Receiving EC Funding	10%	0%	43%	43%
Taiwan	Number of Projects with at least 1 Participant	37	5	9	80%
	Total Cost of Projects with at least 1 Participant (€)	344,094,319.85	65,544,092.97	704,742,576.29	975%
	Number of Participants	40	5	10	100%
	Total EC Contribution Received by Participants (€)	-	-	129,375.00	N/A
	Number of Participants Receiving EC Funds	0	0	1	N/A
	Percentage of Participants Receiving EC Funding	0%	0%	10%	10%
Australia	Number of Projects with at least 1 Participant	168	20	15	-25%
	Total Cost of Projects with at least 1 Participant (€)	1,412,842,335.63	188,689,510.49	125,161,442.24	-34%
	Number of Participants	195	23	16	-30%
	Total EC Contribution Received by Participants (€)	7,746,841.98	-	284,632.50	N/A
	Number of Participants Receiving EC Funds	37	0	2	N/A
	Percentage of Participants Receiving EC Funding	19%	0%	13%	13%
Japan	Number of Projects with at least 1 Participant	96	13	9	-31%
	Total Cost of Projects with at least 1 Participant (€)	798,740,873.72	118,408,587.60	42,475,198.54	-64%
	Number of Participants	112	14	10	-29%
	Total EC Contribution Received by Participants (€)	7,047,916.39	114,300.00	905,406.64	692%

	Number of Participants Receiving EC Funds	38	1	4	300%
	Percentage of Participants Receiving EC Funding	34%	7%	40%	33%
Canada	Number of Projects with at least 1 Participant	204	28	23	-18%
	Total Cost of Projects with at least 1 Participant (€)	1,362,267,203.09	185,998,752.12	162,732,112.02	-13%
	Number of Participants	273	36	26	-28%
	Total EC Contribution Received by Participants (€)	57,451,233.56	581,940.00	867,360.00	49%
	Number of Participants Receiving EC Funds	128	4	6	50%
	Percentage of Participants Receiving EC Funding	47%	11%	23%	12%
United States	Number of Projects with at least 1 Participant	407	58	29	-50%
	Total Cost of Projects with at least 1 Participant (€)	2,715,872,530.20 [65]	373,226,978.53	183,735,991.95	-51%
	Number of Participants	513	69	33	-52%
	Total EC Contribution Received by Participants (€)	67,912,593.84	1,251,309.25	5,064,104.25	305%
	Number of Participants Receiving EC Funds	195	7	18	157%
	Percentage of Participants Receiving EC Funding	38%	10%	55%	45%

Source: European Union Open Data Portal

[65] Total cost of one project not reported.

Figure 21 FP7 & Horizon 2020 Participation Data by Country (Developing Countries)

Developing Countries (Recipients of Automatic Funding under FP7, Horizon 2020)					
Country	**Metric**	**FP7 (2007-2013)**	**Early FP7 (2007-2008)**	**Horizon 2020 (2014-Nov15)**	**Percent Change**
South Africa	Number of Projects with at least 1 Participant	190	37	22	-41%
	Total Cost of Projects with at least 1 Participant (€)	861,945,356.57	157,947,311.96	136,390,557.83	-14%
	Number of Participants	241	41	30	-27%
	Total EC Contribution Received by Participants (€)	28,771,178.75	288,927.00	4,575,359.00	1484%
	Number of Participants Receiving EC Funds	170	4	28	600%
	Percentage of Participants Receiving EC Funding	71%	10%	93%	83%
Chile	Number of Projects with at least 1 Participant	58	12	3	-75%
	Total Cost of Projects with at least 1 Participant (€)	283,314,590.81	31,179,985.81	10,292,697.50	-67%
	Number of Participants	77	22	3	-86%
	Total EC Contribution Received by Participants (€)	7,776,925.25	50,525.00	363,450.00	619%
	Number of Participants Receiving EC Funds	46	1	3	200%
	Percentage of Participants Receiving EC Funding	60%	5%	100%	95%
Argentina	Number of Projects with at least 1 Participant	86	21	4	-81%
	Total Cost of Projects with at least 1 Participant (€)	297,586,418.51	58,500,341.76	13,456,694.18	-77%
	Number of Participants	117	30	4	-87%
	Total EC Contribution Received by Participants (€)	12,193,577.08	890,387.93	550,746.60	-38%
	Number of Participants Receiving EC Funds	86	6	4	-33%
	Percentage of Participants Receiving EC Funding	74%	20%	100%	80%
Egypt	Number of Projects with at least 1 Participant	94	12	5	-58%
	Total Cost of Projects with at least 1 Participant (€)	346,693,750.86	40,183,667.75	10,010,429.25	-75%
	Number of Participants	126	15	5	-67%
	Total EC Contribution Received by Participants (€)	11,721,722.99	52,665.00	330,750.00	528%

	Number of Participants Receiving EC Funds	94	1	5	400%
	Percentage of Participants Receiving EC Funding	75%	8%	100%	92%
Morocco	Number of Projects with at least 1 Participant	99	14	5	-64%
	Total Cost of Projects with at least 1 Participant (€)	460,774,537.41	32,556,096.33	29,234,726.72	-10%
	Number of Participants	126	20	5	-75%
	Total EC Contribution Received by Participants (€)	10,702,581.45	38,969.00	1,312,759.19	3269%
	Number of Participants Receiving EC Funds	95	1	5	400%
	Percentage of Participants Receiving EC Funding	73%	5%	100%	95%
Turkey (Associated Country)	Number of Projects with at least 1 Participant	736	96	74	-23%
	Total Cost of Projects with at least 1 Participant (€)	4,034,015,559.71	470,958,338.46	507,791,251.85	8%
	Number of Participants	1215	117	122	4%
	Total EC Contribution Received by Participants (€)	163,349,079.52	706,239.80	8,971,187.39	1170%
	Number of Participants Receiving EC Funds	943	7	95	1257%
	Percentage of Participants Receiving EC Funding	78%	6%	78%	72%

Source: European Union Open Data Portal

Indian Participation in Horizon 2020

Having examined the broad participation trends in emerging economies, industrialised countries and developing countries, it is possible now to turn attention more closely to India within the framework of Horizon 2020.

Returning to the above results, the first 23 months of Horizon 2020 have garnered almost no Indian participation. Of course, the removal of automatic funding for Indian participants in collaborative projects will greatly reduce the EC contribution to Indian participants.

However, the even greater loss is the total value of the projects that Indian participants would have joined if funding was otherwise available. **Over the course of FP7, Indian participants joined projects with a total value of nearly €780m. In nearly the first two years of Horizon 2020, the total value of projects with Indian participants is only €19m.**

Figure 22 Indian Participation in FP7 & Horizon 2020

India	FP7 (2007-2013)	Early FP7 (2007-2008)	Horizon 2020 (2014-Nov15)	% Change
Number of Projects with at least 1 Participant	181	42	6	-86%
Total Cost of Projects with at least 1 Participant (€)	779,771,351.42	175,375,516.96	19,016,592.50	-89%
Number of Participants	305	58	7	-88%
Total EC Contribution Received by Participants (€)	35,844,468.58	2,209,586.00	1,095,857.50	-50%
Number of Participants Receiving EC Funds	206	11	6	-45%
Percentage of Participants Receiving EC Funding	68%	19%	86%	67%

Source: European Union Open Data Portal

In the research team's meetings with the concerned individuals at the Department of Science & Technology (DST), Department of Biotechnology (DBT), and the EU Delegation in India, it is clear that all parties have been highly aware of this problem and were actively looking for solutions. In fact, in the India-EU Joint Steering Committee on S&T Cooperation held in November 2015, this issue was included in the agenda. As

previously stated and discussed below, a co-funding agreement with DBT has been reached, and discussions are still on-going with DST at time of publication.

While recognizing the course of action lies only with the Indian ministries and scientific community, the EU has suggested the following:

> "Indian participants themselves determine the sources of funding for their Indian part of the project: these may be own funds of the participating institutions, as well as funds received from Indian ministries, departments, foundations and other organisations that fund research and development activities in India. Contributions can also be made in kind.
>
> Potential Indian participants are therefore encouraged to contact relevant research and innovation funding bodies and organisations (e.g. DST, DBT, ICMR, etc.) to seek support for their participation in Horizon 2020. **No jointly agreed mechanism is currently in place for co-funding Horizon 2020 research and innovation projects."** (bold in original)[66]

Despite this impasse, as of November 2015, seven Indian participants in the table below have joined six Horizon 2020 collaborative projects.

[66] http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_india_en.pdf (This is no longer true in the case of DBT after March 2016).

Figure 23 Indian Participants in Horizon 2020 Collaborative Projects (November 2015)

Reference	Funding Scheme	Project Title & Acronym	Organisation Name	Organisation Type	EC Contribution
642258	IA – Innovation Action	Managing crOp water Saving with Enterprise Services (MOSES)	Aryavarta Space Organization	Research Organisation (REC)	€0
642147	RIA – Research & Innovation Action	Linking Climate and Development Policies - Leveraging International Networks and Knowledge Sharing (CD-LINKS)	The Energy and Resources Institute (TERI)	Research Organisation (REC)	€204,375
642147	RIA – Research & Innovation Action	Linking Climate and Development Policies - Leveraging International Networks and Knowledge Sharing (CD-LINKS)	Indian Institute of Management (IIM) Ahmedabad	Public Body (PUB)	€65,000
649796	RIA – Research & Innovation Action	OPTi Optimisation of District Heating Cooling systems (OPTi)	IBM India Private Limited	Private For-Profit Entity (PRC)	€321,005
643774	RIA – Research & Innovation Action	Family-based intervention to improve healthy lifestyle and prevent Type 2 Diabetes amongst South Asians with central obesity and pre diabetes (iHealth-T2D)	Devki Devi Foundation Society	Research Organisation (REC)	€247,050
641615	CSA – Coordination & Support Action	Industrial cooperation across continents (GNSS.asia2)	Euro Club	Other (OTH)	€113,248.75
664771	CSA – Coordination & Support Action	Creating and enhancing TRUSTworthy, responsible and equitable partnerships in international research (TRUST)	Forum for Ethics Review Committees in India	Research Organisation (REC)	€145,178.80

Source: European Union Open Data Portal

DBT Co-Funding Mechanism

A major breakthrough to this policy dilemma was announced at the EU-India Summit in Brussels on 30 March 2016.[67] After a long series of discussions, including during the November 2015 EU-India Joint Steering Committee Meetings, India's DBT and the European Commission have agreed to jointly fund certain EU-India collaborative projects under Horizon 2020.[68]

This co-funding mechanism makes available a maximum of three crore rupees (INR 30,000,000) (≈€400,000) per project provided by DBT to successful Indian participants in joint collaborative projects with European partners under Horizon 2020.

DBT has will pre-identify eligible Horizon 2020 calls for proposals in the following priority areas: agriculture (including food), biotechnologies, bio-energy, health, water resources, new materials and nanotechnology. From now until 14 March 2017, twenty-one Horizon 2020 calls have been selected. These include topics such as Health, Bio-Nano-Tech, Secure Clean and Efficient Energy, Biotech, and Marine-Biotech.

The structure of this co-funding mechanism is that following the publication of Horizon 2020 calls, for any call identified by DBT, a proposal is submitted simultaneously to DBT by the Indian participant and to the European Commission by the project coordinator. The EC proposal is the classic, complete Horizon 2020 proposal. The DBT proposal must include 'Part B' of the Horizon 2020 proposal and a financial plan.

The DBT and the European Commission evaluate proposals. If both sides positively evaluate a project, DBT will provide a grant to the Indian researchers, while the European Commission will fund EU participants.

Discussions for a presumably similar co-funding mechanism continue with DST. It remains to be seen if other Indian ministries will pursue a similar strategy.

Analysis

While the DBT co-funding mechanism promises to improve the existing situation, having reviewed the data available from the European Open Data Portal and spoken to two institutions, a few key points standout regarding India's limited participation in Horizon 2020:

[67] http://eeas.europa.eu/factsheets/docs/eu-india_factsheet_en.pdf
[68] Please see the official notice for all details: http://www.dbtindia.nic.in/wp-content/uploads/DBT-EUcallsunderH2020-.pdf

- **Six of these seven Indian participants in Horizon 2020 are reported to have received funding from the European Commission.**

Thus far, the European Commission's desire for Indian participants to secure their own funding has not been realised. Only one Indian organisation, the Aryavarta Space Organisation, is participating in Horizon 2020 without receiving European Commission funding. The other six, despite the change in policy, must have been granted exceptions to receive EC funding.

While admittedly a small sample size, Indian participants are actually receiving European Commission funding at higher percentage under Horizon 2020 than was the case under FP7.

Given that 32% (99/305) of India's FP7 participants joined FP7 projects without receiving EC funding, the current EC funding rate under Horizon 2020 of 86% (6 of 7) is actually far higher. While only 13% of EC funding to Indian organisations came under the funding scheme of coordination and support actions, both Indian organisations here participating in a CSA are receiving EC funding.

Not only is this the reverse of what the policy was intended to achieve, the consequences have gone far beyond as the percentage of Indian organisations securing their own funding has decreased under Horizon 2020.

Additional research is needed to fully understand the reasons for the decline in participation among those organisations that previously participated with their own funding.

- **Four of five organisation types are included.**

Four are categorised as Research Organisations (REC), one as a Public Body (PUB), one as a Private For-Profit Entity (PRC), and one as Other (OTH). None are categorised as a Higher or Secondary Education Establishment (HES). However, despite its public status, the Indian Institute of Management would seemingly qualify as a HES more so than a PUB.

This variety is encouraging that, while limited, a variety of organisation types have found a way to collaborate despite the lack of automatic funding.

- **No Indian participants are project coordinators.**

19 Indian institutions led FP7 projects as the Project Coordinator. This has yet to happen under Horizon 2020. Thus far, all Indian participants in Horizon 2020 collaborative projects have been in the role of "participant."

- **Three projects are categorised as a Research and Innovation Action (RIA), two as a Coordination & Support Action (CSA), and one as an Innovation Action (IA).**

Based on the rationale for exceptions provided by the European Commission, it is possible that Indian participants would be more likely to qualify for a funding exception in a Coordination & Support Action (CSA).[69] Projects aimed at building global networks demand international collaboration from Third Countries. India in particular, considering its size alone, is key to developing any global network. However, these are the same areas where Indian organisations were more likely to participate without EC funding under FP7.

Nevertheless, this logic helps explain the exception granted for an Indian participant to be funded in the TRUST and GNSS.asia2 projects. The TRUST project[70] is a global collaborative effort to improve adherence to ethical standards in research and GNSS.asia2 [71] concerns European-Asian industry collaboration in global navigation satellite systems (GNSS). For both CSA projects, it is possible to see how the European Commission could grant a funding exception under the logic that access to the particular geographic environment of India is essential to the project.

- **Particular project topics would seem to lend themselves to exceptions more than others.**

In addition to the two Coordination & Support Action projects, the rationale for an exception is particularly easy to demonstrate in two of the Research & Innovation Action projects.

iHealth-T2D is a "Family-based intervention to improve healthy lifestyle and prevent Type 2 Diabetes amongst South Asians with central obesity and prediabetes." The

[69]Coordination & Support Actions are "Actions consisting primarily of accompanying measures such as standardisation, dissemination, awareness-raising and communication, networking, coordination or support services, policy dialogues and mutual learning exercises and studies, including design studies for new infrastructure and may also include complementary activities of strategic planning, networking and coordination between programmes in different countries.
http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-d-csa_en.pdf

[70] http://cordis.europa.eu/project/rcn/197442_en.html

[71] http://cordis.europa.eu/project/rcn/193838_en.html

project objective includes "a cluster-randomised clinical trial at 120 locations across India, Pakistan, Sri Lanka and the UK."[72]

CD-LINKS, in which both The Energy and Resources Institute (TERI) and the Indian Institute of Management (IIM) Ahmedabad are participating, is on "Linking Climate and Development Policies – Leveraging International Networks and Knowledge Sharing".[73] It hopes to "establish a research network and capacity building platform in order to leverage knowledge-exchange among institutions from Europe and other key players within the G20." A key outcome is "a list of country-specific policy recommendations for effectively managing the long-term transformation process."

It would be seemingly impossible to achieve either of the above projects' objectives without Indian participation. Access to the particular geographic environment (and the local knowledge it holds) would be essential to the success of the project. Projects that have a social aspect, particularly those global in nature, could seemingly justify an exception for an Indian partner to receive funding more so than purely fundamental research where location is of no advantage.

- **Many of India's top scientific institutions are completely absent.**

Revisiting Figure 8 of the most active Indian institutions in FP7 reveals a major change. While FP7 was able to attract many of India's best institutions, many are missing in Horizon 2020 so far. Not one Council of Scientific & Industrial Research (CSIR) lab or Indian Institute of Technology (IIT) has participated in a Horizon 2020 collaborative project thus far. The Indian Institute of Science (IISc) and Tata Institute of Fundamental Research (TIFR) are also notably absent. All of the above were some of the most active institutions in FP7, but are absent in Horizon 2020.

In addition to compromising the existing research network developed over previous Framework Programmes, Horizon 2020 has also so far been unable to collaborate with India's emerging STI landscape. The new Indian Institutes of Technology (IITs), new Indian Institutes of Science Education & Research (IISERs), new Indian Institutes of Information Technology (IIITs), and new private universities are nowhere to be found.

- **There is a lack of clarity in the exception granting process.**

As discussed earlier in the report, Section 3.3 of Part B of the Horizon 2020 Project Proposal includes a section for the project coordinator and Indian participant to make a case for the essentialness of the Indian partner and necessity for them to receive European Commission funding.

[72] http://cordis.europa.eu/project/rcn/194100_en.html
[73] http://cordis.europa.eu/project/rcn/196822_en.html

However, discussions with the Indian investigators of the TRUST[74] and CD-Links[75] projects suggest that a lack of understanding of the exception granting process, and the broader policy change from FP7 to Horizon 2020.

While publishing the guidelines under which an exception can be granted, as far as the Indian investigators are concerned, the European Commission does not formally declare the reason for which an exception has been given and funding has been provided. Moreover, nowhere in the call for proposals does it indicate in which topics Indian participants might qualify for an exception.

Therefore, the six Indian Horizon 2020 participants receiving EC funding completed their portion of the project application without certainty that they would receive EC funding if their consortia's project submission was accepted. They applied based on their previous experience and confidence in European consortium partners. The consortium partners also took a leap of faith including an Indian partner without any confirmation that the European Commission would grant them funding.

If the European Commission were willing to make an exception to fund an Indian participant in a project such as climate change for example (as it has done for CD-LINKS), it would benefit all involved to inform Indian participants that funding is available for that particular call topic.

Not only does the current system discourage Indian participants, these conditions also hinder European participants who would have legitimate concerns in including an Indian participant in a consortium if they must rely on the European Commission to grant an exception for them.

[74] http://cordis.europa.eu/project/rcn/197442_en.html
[75] http://cordis.europa.eu/project/rcn/196822_en.html

Summary

Having reviewed India's participation in Horizon 2020 thus far, it is clear that participation across the board has been greatly reduced, which is not entirely dissimilar to other emerging and even industrialised countries. While a reduction is surely to be expected given the removal of automatic funding, the number of Indian participants securing their own funding is paradoxically also lower than it had previously been.

While the logic for Indian participants to be granted an exception to receive European Commission funding is often strong because of access to a particular geographic environment or data, the nature of such exceptions is unclear, which reduces interest from both Indian participants and European counterparts who may wish to include them in consortia.

Having established an understanding of the impact the removal of automatic funding has had for India's participation in Horizon 2020 collaborative projects, the next chapter focuses on models of EU Framework Programme participation that do not rely on automatic funding, and therefore could have value for the Indian case.

Chapter 3 – Horizon 2020 Participation without Automatic Funding

Previous chapters have reviewed India's participation in previous EU Framework Programmes, particularly FP7, and presented the decline of India's participation in Horizon 2020 thus far following the removal of automatic funding for collaborative projects.

This chapter presents case studies of how other countries (both industrialised and emerging economies) participate in the EU Framework Programme collaborative projects without automatic funding. This analysis is done with a view to mapping a wide variety of paths forward that hold possible relevance for the Indian scenario.

Open to the World

Despite the removal of automatic funding in collaborative projects for participants of BRIC+Mexico countries, Horizon 2020 remains "Open to the World". In fact, there are at least 129 calls in the current Work Programme that specifically target international cooperation.[76]

Some of these even particularly target India. For example, one recently closed call on the topic "Supporting structural change in research organisations to promote Responsible Research and Innovation" noted the following:

> "The proposals should include an international dimension in particular with the following countries: Brazil, Republic of South Africa, India, Canada, Australia, Russia, United States of America, Japan and China."[77]

Rather than marking the end of participation, the policy change instead encourages the growth of collaboration under new models based on equal footing. Emerging economies must join the industrialised countries under the principle that they bring their own funding.

A December 2013 European Commission press release quoted below lays out this logic particularly well for China, but is equally applicable to India and other emerging economies.

> "China has become one of the EU's key international partners in research and innovation. It is now in a position to fully contribute to and benefit from Europe's

[76] http://www.euussciencetechnology.eu/content/horizon-2020-open-calls
[77] https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/324-issi-5-2015.html

research and innovation capacity under the same conditions and financial rules for participation as their peers from other emerging economies and industrialised countries. Overall, the international cooperation strategy of Horizon 2020 offers for China a more active and balanced approach for cooperation focussed on mutual interest and common benefit."[78]

One advantage is that India can draw from considerable experience when drafting its own path forward. Many non-EU industrialised countries have a strong track record of EU Framework Programme participation without automatic funding. Awareness of such models is important for EU and Indian stakeholders when examining how to address the Indian scenario.

Moreover, some countries in India's class of emerging economies have come up with their own strategies to Horizon 2020 participation since being removed from automatic funding.

The following table from the European Commission gives a brief overview of these responses. It shows a variety of co-funding mechanisms have been developed between the European Commission and non-EU countries to arrange for local support for Horizon 2020 participants.

Figure 24 Available Local Support for Horizon 2020 Participants in Select non-EU Countries

	Industrialised Countries	***Emerging Economies***
Countries with jointly agreed co-funding mechanism covering all thematic areas	Republic of Korea, Taiwan	Mexico, China
Countries with jointly agreed co-funding mechanism covering selected thematic areas	Australia, Japan	Russia
Countries with co-funding by a region	Canada	
Countries without jointly agreed co-funding mechanism	New Zealand, USA (EC-NIH Reciprocity Agreement)	India, Brazil* (letter of intent signed)

Source: Participant Portal Horizon 2020 Online Manual[79]

[78] http://www.forskningsradet.no/servlet/Satellite?blobcol=urldata&blobheader=application%2Fpdf&blobheadername1=Content-Disposition%3A&blobheadervalue1=+attachment%3B+filename%3DH2020callsChina.pdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1274503582776&ssbinary=true

[79] http://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/international-cooperation_en.htm; NB: The original source of this chart previously classified China as co-funding in a select thematic area. A new agreement has given cause to reclassify it as a co-funding mechanism covering all thematic areas; Russia was initially classified as a having a CFM covering all

This chapter first presents models of collaboration found in industrialised countries. As these countries have participated in the EU Framework Programme since at least FP7 without automatic funding for collaborative projects, they have a track record and experience that holds value for India. They are taken in the order of:

- Co-funding covering all thematic areas (Korea, Taiwan)
- Co-funding covering selected thematic areas (Australia, Japan)
- Co-funding by a region (Canada)
- Reciprocity Agreement (United States)

With a variety of options established, the report then presents the response of emerging economies that, like India, have recently been removed from automatic funding under Horizon 2020. While these responses have a shorter track record to judge, it is important for India to be aware of the actions of its peer countries.

thematic areas, but it is more appropriately described as covering selected thematic areas, given new information. The terms industrialized countries and emerging economies are given by the EC and used to distinguish between countries that did not receive automatic funding in collaborative projects since at least FP7 and those that received automatic funding in FP7 but do not under Horizon 2020.

Co-Funding Across All Thematic Areas

The first model to examine is a co-funding mechanism across all thematic areas. Broadly speaking, participants from Korean and Taiwan are able to find funding from their relevant national ministries if part of a successful Horizon 2020 consortium.

Korea

Categorised as a non-EU industrialised country, Korea has been a strong partner of the EU Framework Programme, having 69 participants join 55 projects in FP7. Now in Horizon 2020, 40 Korean participants have already joined 6 projects. In addition to participating in open calls, Korea is also targeted for specific calls on topics such as 5G networks and nano-materials.[80]

Figure 25 Korean Participation in FP7 & Horizon 2020

Republic of Korea	FP7 (2007-2013)	Early FP7 (2007-2008)	Horizon 2020 (2014-Nov15)	% Change
Number of Projects with at least 1 Participant	55	10	6	-40%
Total Cost of Projects with at least 1 Participant (€)	533,872,447.70	112,446,385.88	34,640,728.75	-69%
Number of Participants	69	12	7	-42%
Total EC Contribution Received by Participants (€)	1,137,414.50	-	231,497.50	N/A
Number of Participants Receiving EC Funds	7	0	3	N/A
Percentage of Participants Receiving EC Funding	10%	0%	43%	43%

Source: European Union Open Data Portal

As an industrialised country, Korea does not receive automatic funding in EU Framework Programmes, but instead has a jointly agreed co-funding mechanism covering all thematic areas. The Korean government, specifically the Ministry of Science, ICT and Future Planning (MSIP) and Ministry of Trade, Industry and Energy (MOTIE) regularly hold public calls for proposals to co-fund Korean participants in Horizon 2020 projects selected for European Union funding.[81]

[80] http://www.haneurope.or.kr/member/en/board/HorizonOCEn_BoardList.do
[81] http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_korea_en.pdf

For instance, MOTIE recently launched a 51.5 billion KRW (approximately €39.1 million) 2015 International Collaborative Research and Development Programme.[82] Within this budget, earmarked for multilateral international collaborative R&D programmes, such as EUREKA, EUROSTARS, Horizon 2020, M-ERA-NET etc., the programme has a budget of 4.89 billion KRW (approximately €3.7 million) to give approximately 500 million KRW (approximately €380,000) per year for no longer than 5 years.

According to the rules, funding is provided to projects for which a consortium has been formed with European partners and official approval thereof has already been obtained.

The stated purpose of participation is to "enhance Korea's technical competitiveness and penetrate into European markets by participating in Europe's multilateral R&D programmes."[83] According to our interviews, the Korean ministries see great value in being able to leverage their own R&D budgets through collaboration with research partners in Europe and around the world.

Taiwan

Similar to Korea, Taiwan is another non-EU industrialised country that has a co-funding mechanism covering all thematic areas for Taiwanese participants. 40 Taiwanese participants joined 37 projects in FP7, and 10 participants have joined 9 projects thus far under Horizon 2020.

Figure 26 Taiwanese Participation in FP7 & Horizon 2020

Taiwan	FP7 (2007-2013)	Early FP7 (2007-2008)	Horizon 2020 (2014-Nov15)	% Change
Number of Projects with at least 1 Participant	37	5	9	80%
Total Cost of Projects with at least 1 Participant (€)	344,094,319.85	65,544,092.97	704,742,576.29	975%
Number of Participants	40	5	10	100%
Total EC Contribution Received by Participants (€)	-	-	129,375.00	N/A
Number of Participants Receiving EC Funds	0	0	1	N/A
Percentage of Participants Receiving EC Funding	0%	0%	10%	10%

[82] http://www.kiat.or.kr/site/program/board/detail.jsp?boardTypeID=98&searchSelect=&keyWord=&boardCategory=&currentPage=1&menuID=002003&finishIsYN=&boardID=44557&mode=detail

[83] Ibid

Source: European Union Open Data Portal

Taiwan's government actively looks to promote collaboration with Europe. Taiwan's Ministry of Science and Technology (MOST) provides funding for EC-approved projects with Taiwanese involvement to universities and research organisations, while the Ministry of Economic Affairs (MOEA) does the same for SMEs.[84] Its rationale for doing so is clearly laid out by SME NCP Taiwan:

> "Taiwanese companies are fully eligible and cover their own costs within a H2020 project, while contributing their expertise in the respective work packages. This is based on win-win thinking from both sides: The EU gains access to markets and networks beyond EU 28 while the framework of a H2020 project gives Taiwanese companies the opportunity to know their European peers and establish long-term relationships in a rather protected environment."[85]

A similar win-win logic applies to collaboration in academic or fundamental research. Having reviewed co-funding mechanisms covering all thematic areas, it is now possible to examine its applicability to the Indian scenario.

Considerations for the Indian Scenario

While small, industrialised countries, the cases of Korea and Taiwan still highlight a few key points for EU and Indian policymakers to consider when assessing the Indian scenario.

The strategy of a co-funding mechanism covering all thematic areas recognizes the value of international collaboration, whether that is with the EU, EU Members States, or other partners around the world.

The assurance of funding for a wide range of collaboration opportunities gives autonomy to researchers to collaborate freely.

While Korea and Taiwan are both small countries, the value of leveraging additional resources and expertise through international collaboration remains powerful for large countries like India.

[84] http://www.ncp.tw/en/index.php?id=ae4517807a7a3708da1dd211f3d3e9a4
[85] https://eutwnet.itri.org.tw/eng/Taiwanseligibility/Taiwanseligibility.aspx

Co-Funding Covering Select Thematic Areas

While Korea and Taiwan have developed co-funding mechanisms that cover all thematic areas, other countries, such as Australia and Japan, have similar co-funding models of Framework Programme collaboration, but are limited to select thematic areas as determined by national priorities.

Australia

Australia is another non-EU industrialised country whose researchers have found opportunities in the EU Framework Programme. 195 Australian participants joined 168 projects in FP7. Thus far Australian participation has seen a modest decline with 16 participants in 15 Horizon 2020 projects.

Figure 27 Australian Participation in FP7 & Horizon 2020

Australia	FP7 (2007-2013)	Early FP7 (2007-2008)	Horizon 2020 (2014-Nov15)	% Change
Number of Projects with at least 1 Participant	168	20	15	-25%
Total Cost of Projects with at least 1 Participant (€)	1,412,842,335.63	188,689,510.49	125,161,442.24	-34%
Number of Participants	195	23	16	-30%
Total EC Contribution Received by Participants (€)	7,746,841.98	-	284,632.50	N/A
Number of Participants Receiving EC Funds	37	0	2	N/A
Percentage of Participants Receiving EC Funding	19%	0%	13%	13%

Source: European Union Open Data Portal

As a non-EU industrialised country, Australia does not qualify for automatic funding in collaborative projects. Like other non-EU industrialised countries and (now) emerging economies, Australian participants only receive EC funding when participation is deemed essential for carrying out the action (i.e. outstanding competence/expertise, access to research infrastructure, access to particular geographic environments, access to data). CAESIE, a BILAT supporting EU-Australia cooperation, advises potential applicants that such cases have previously occurred in FP7.[86]

[86] http://www.caesie.org/horizon-2020-australia-faq-2014/

Unlike Korea and Taiwan, which have jointly agreed co-funding mechanisms covering all thematic areas, Australia has multiple co-funding mechanisms with the European Commission that cover selected thematic areas.

One such thematic area is the Health, Demographic Change and Wellbeing Societal Challenge.[87] The National Health and Medical Research Council (NHMRC)–European Union (EU) Collaborative Research Grants scheme aims to provide assistance to Australian researchers to participate in collaborative projects that have been selected for funding in calls under this Horizon 2020 thematic area.[88]

To receive the NHMRC-EU Collaborative Research Grant, an application is not submitted to the NHMRC office until notice of a successful Horizon 2020 project passing the peer review evaluation. According to the NHMRC website, "Applications successful through this process represent the highest quality research being conducted in the EU. NHMRC considers Australian participation in these projects to represent considerable value for money for Australia."[89] By leveraging the peer review in Horizon 2020, the subsequent application to the NHMRC focuses on eligibility criteria and scrutiny of budget requests.

A testament to the success of the programme is that for funding commencing in 2017 calls in the area of "Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy" have been made eligible.[90] For funding commencing in 2013, 2014 and 2015, recent outcomes show that 26 applications have received nearly $12m (AUD).[91]

NHMRC however is not the only Australian agency supporting the participation of its researchers in Horizon 2020. With funding from the Australian Government Department of Industry, the Australian Academy of Science launched an Australia-European Union Collaboration Program in 2014.[92] This program made available two grants of $200,000 (AUD) as seed funding to encourage Australian consortia to participate in the first tranche of Horizon 2020 calls. It required a two-stage application process, the second coming after notification of a successful decision from the European Commission.

In addition to this type of targeted government support for Horizon 2020 collaboration, a number of higher education institutions, publically funded research agencies, and

[87] http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_australia_en.pdf
[88] https://www.nhmrc.gov.au/grants-funding/apply-funding/nhmrc-european-union-collaborative-research-grant
[89] https://www.nhmrc.gov.au/book/nhmrc-funding-rules-2015/nhmrc-european-union-collaborative-research-grants-scheme-specific-f-0
[90] https://www.nhmrc.gov.au/grants-funding/apply-funding/nhmrc-european-union-collaborative-research-grants-funding-commencing-0
[91] https://www.nhmrc.gov.au/grants-funding/outcomes-funding-rounds
[92] https://www.science.org.au/australia-european-union-collaboration-program-2014

private enterprises support their involvement in FP projects from their internal budgets, based on the projects aligning with their organisational strategic interests.[93]

Japan

Like Australia, Japan is a non-EU industrialised country that has a co-funding mechanism covering a specific sector. 112 Japanese participants joined 96 FP7 projects, and 10 participants have joined 9 projects thus far under Horizon 2020.

Figure 28 Japanese Participation in FP7 & Horizon 2020

Japan	FP7 (2007-2013)	Early FP7 (2007-2008)	Horizon 2020 (2014-Nov15)	% Change
Number of Projects with at least 1 Participant	96	13	9	-31%
Total Cost of Projects with at least 1 Participant (€)	798,740,873.72	118,408,587.60	42,475,198.54	-64%
Number of Participants	112	14	10	-29%
Total EC Contribution Received by Participants (€)	7,047,916.39	114,300.00	905,406.64	692%
Number of Participants Receiving EC Funds	38	1	4	300%
Percentage of Participants Receiving EC Funding	34%	7%	40%	33%

Source: European Union Open Data Portal

Similar to what Australia's NHMRC has done for the Health, Demographic Change and Wellbeing call, the Japanese Science and Technology Agency (JST) selected two particular calls from the Horizon 2020 Work Programme and pledged funding for successful Japanese participants in order to encourage Japanese participation in those particular fields.

These calls were "NMBP-02-2016: Advanced Materials for Power Electronics based on wide bandgap semiconductor devices technology" and "NMBP-03-2016: Innovative and sustainable materials solutions for the substitution of critical raw materials in the electronic power system."

Rather than selecting a thematic area, this is a more fine-tooth approach of selecting a specific call. Further details on the programme are forthcoming and will be made available here.

[93] Ibid.

Japan however does not leverage the Horizon 2020 peer review in the way that Australia does in the case of the NHMRC-EU Collaborative Research Grant. For example, the Japan Science and Technology Agency (JST) conducts its own evaluation process in parallel to the Horizon 2020 peer review. Only proposals that both the European Commission and JST deem worthy of funding will receive JST funding. The European Commission could of course deem the Japanese participant essential to the project and make an exception to fund them, but they would not receive JST funding.[94]

According to the interviewed officer, participants receiving JST funding then must adhere to JST's own funding regulations, such as required ethics training and submission of detailed annual reports and research plans. The maximum envisaged funding amount is 60 million JPY in total over the support period, inclusive of indirect costs (max 30% of direct costs).[95]

Lastly, in contrast to some countries, Japan has a one-stage rather than two-stage application process. Rather than submitting an application at the time of the EC bid, as well as later if notified of a success, Japanese partners only apply to JST at the second stage of the application.[96] This can be an important distinction for the Indian ministries if considering how to design an effective co-funding mechanism as it affects the administrative execution and ultimate delivery of funds.

[94] Interviews with JST.
[95] Ibid.
[96] Ibid.

Considerations for the Indian Scenario

As a co-funding mechanism covering select thematic areas is one of the most likely models for the Indian ministries to adopt, it is particularly important to study the cases of Australia and Japan.

As Australia and Japan both saw its participants receive over €7m from the European Commission during FP7, precedents abound for countries to satisfy exceptions to receive European Commission funding. While not a strategy in itself, the justification for Indian participants to be deemed *essential to a project* (and therefore receive EC funding) could seemingly occur on a number of grounds within the EC guidelines for doing so. In particular, access to the particular geographic environment and populations could render Indian participation essential.

Rather than a more blanket approach seen in Korea or Taiwan, that may be more appropriate for smaller countries, co-funding mechanisms in select thematic areas allow individual government funding agencies to select areas or even individual calls of interest to them and promote collaboration in their chosen priority areas. This is a particularly attractive way to leverage funding as funding already targeted for a particular area will be strengthened through collaboration with EU budgets, resources and talent.

Although both adopting co-funding mechanisms that cover select thematic areas, Australia and Japan take different approaches to the evaluation process. While Australia's NHMRC-EU Collaborative Research Grant leverages the Horizon 2020 peer review and their own subsequent application focuses on eligibility and budget scrutiny, Japan's JST runs its own parallel evaluation and awards funding to applicants passing both reviews. If deciding to co-fund, studying the pros and cons of these two options would be beneficial for Indian ministries.

It is also not to be forgotten that co-funding mechanisms allow funding agencies to implement national funding rules for international projects. The case of Japan for example highlights how recipients of JST funding for a Horizon 2020 project are still held to JST's national funding rules, such as mandatory ethics training and annual reviews.

Co-Funding by a Region

Previous cases have shown co-funding mechanisms covering all thematic areas (Korea, Taiwan) and select thematic areas (Australia, Japan). Co-funding agreements however can also be done on a regional level. Canada, discussed below, is one example of such a scenario.

Canada

Canada, among other tools to participate in EU Framework Programmes, has a regional co-funding mechanism. Rather than covering a particular thematic area at the national level, the agreement occurs at the provincial or state level.

This agreement is just one reason that Canada has been an important partner in the EU Framework Programme, with 273 participants joining 204 projects in FP7 and already 26 participants in 23 projects in Horizon 2020.

Figure 29 Canadian Participation in FP7 & Horizon 2020

Canada	FP7 (2007-2013)	Early FP7 (2007-2008)	Horizon 2020 (2014-Nov15)	% Change
Number of Projects with at least 1 Participant	204	28	23	-18%
Total Cost of Projects with at least 1 Participant (€)	1,362,267,203.09	185,998,752.12	162,732,112.02	-13%
Number of Participants	273	36	26	-28%
Total EC Contribution Received by Participants (€)	57,451,233.56	581,940.00	867,360.00	49%
Number of Participants Receiving EC Funds	128	4	6	50%
Percentage of Participants Receiving EC Funding	47%	11%	23%	12%

Source: European Union Open Data Portal

Like other non-EU industrialised countries, the principle is for Canadian researchers to identify and secure their own funding. Before entering a proposal for Horizon 2020,

Canadian researchers must first seek funding in Canada, from their own operating budgets or funds from a granting council.

Nevertheless, 63 Canadian researchers were able to receive EC funding in FP7, meeting one of the same exceptions necessary for non-EU industrialised or emerging economies (a bilateral agreement, explicitly stated in the call, or participation is deemed essential due to access to outstanding expertise, research infrastructure, particular geographic environments, or data).[97]

To support Horizon 2020 participation, Canadian researchers can apply for funding from national, provincial, institutional and private sector sources to participate in any activity within Horizon 2020. In particular though the province of Quebec has made available funding to support EU Framework Programme participation.

With the goal being to increase the number of high-level international research and innovation partnerships in strategic and priority areas for Quebec, *Programme de soutien à la recherche* (PSR) - *Soutien à des initiatives internationales de recherche et d'innovation* (SIIRI) is a provincial support programme for international cooperation, including Horizon 2020.[98]

Through a separate evaluation based on factors such as scientific relevance, quality, and strategic interest, Quebec researchers can qualify for awards to cover up to 50% of eligible expenses.

Such awards can be used for bilateral projects, multilateral projects, or large projects like Horizon 2020. However, successful projects will align with the government's strategic direction in research and innovation, with preference given to projects in eight sectors such as aerospace or the Quebec Maritime Strategy.[99]

Preference is also given to projects including collaboration with sixteen priority countries, ranging from European countries like the United Kingdom, France and Germany to Asian countries like China, India and Japan.[100]

Moreover, the Social Sciences and Humanities Research Council (SSHRC) is currently developing a virtual pot model through the T-AP (Trans-Atlantic Platform for Social

[97] file:///Users/seanangiolillo/Downloads/GuideH2020_Content_EN_PRINT_A4.pdf
[98] http://www.economie.gouv.qc.ca/objectifs/informer/recherche-et-innovation/page/programmes-18980/?tx_igaffichagepages_pi1%5Bmode%5D=single&tx_igaffichagepages_pi1%5BbackPid%5D=18870&tx_igaffichagepages_pi1%5BcurrentCat%5D=&tx_igaffichagepages_pi1%5BparentPid%5D=18979&cHash=452195212337a15fbb202a11eab8edf0
[99] Ibid.
[100] Ibid.

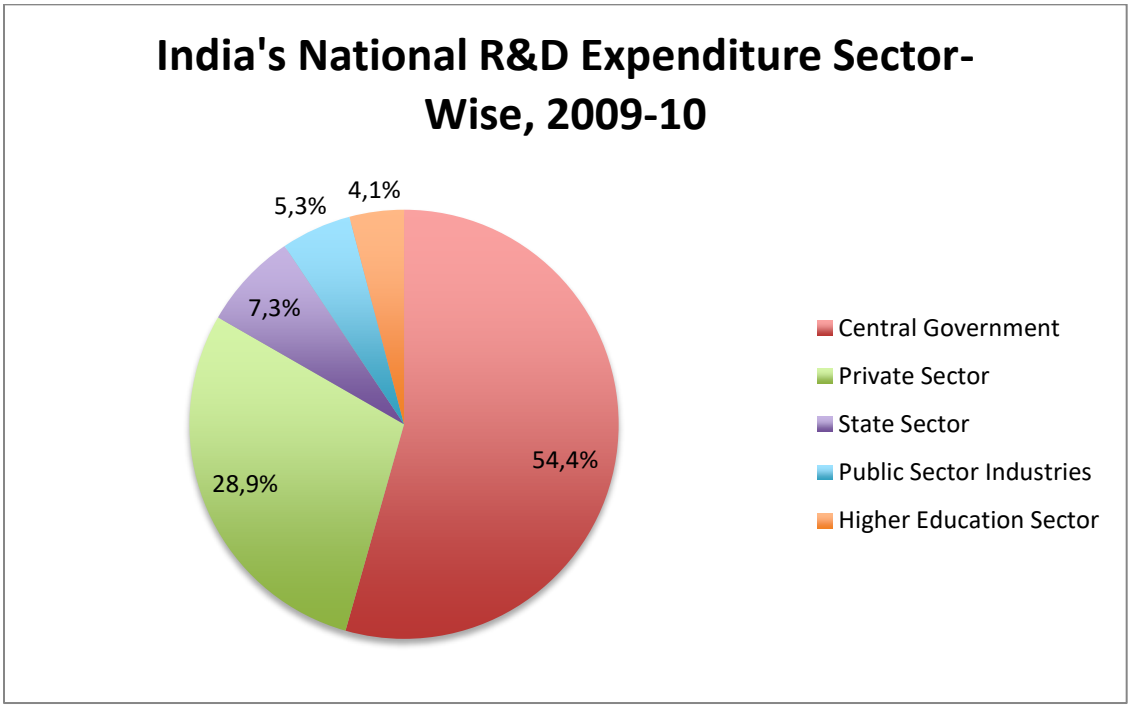
Sciences and Humanities), which could be used to match EC, with the SSHRC funding Canadian researchers successful in Horizon 2020 applications.[101]

Considerations for the Indian Scenario

While the degree of devolution of power and funding is undoubtedly different, Canada and India are both federal systems, making the case of co-funding by a region a particularly important case to review.

Reviewing India's national R&D expenditure sector-wise shows that while the Central Government is the dominant player in India's STI landscape, accounting for 54.4% of all R&D spending, it is not the only one. 7.3% comes from the State sector according to the latest data available.[102]

Figure 30 India's National R&D Expenditure Sector-Wise, 2009-10



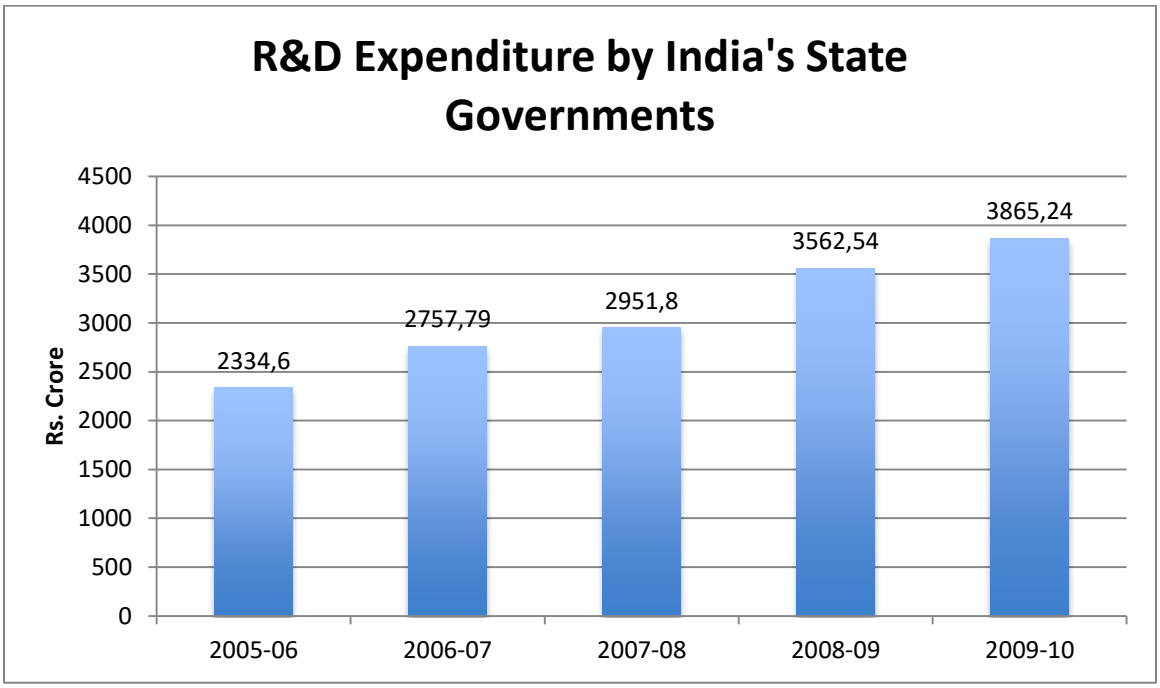
Source: Research and Development Statistics at a Glance 2011-12 published by Department of Science and Technology, Government of India[103]

While the budget is smaller compared to the Central Government ministries, it is not insubstantial, particularly when considering the scope of India's FP7 participation. In 2009-10 for example, 22 state governments spent a combined total of Rs. 3865.25

[101] Questionnaire
[102] http://www.nstmis-dst.org/pdf/finalrndstatisticsataglance2011121.pdf
[103] http://www.nstmis-dst.org/pdf/finalrndstatisticsataglance2011121.pdf

crore, or over €536 million based on today's conversion rates. Moreover, the trend has been steadily increasing, and so is most likely much higher today.[104]

Figure 31 R&D Expenditure by India's State Governments



Source: Data collected and compiled by DST[105]

These budgets are typically in the hands of the State S&T Council. As early as 1971, India's DST led the initiative to establish State S&T Councils to promote science and technology in their respective states. Karnataka, Kerala, Uttar Pradesh and West Bengal established their state S&T council by the end of the Fifth Year Plan (1978), but now almost all states have such a council. In addition, some states have separately created State Innovation Councils (SIC).[106]

While budget constraints have been generally cited as a challenge, some states have made R&D a definite state-level priority. In 2009-10, Gujarat led all state governments in R&D spending Rs. 472.40 crore (approximately €63.4 million), followed by Maharashtra at Rs. 413.87 crore (approximately €63.4 million), Karnataka at Rs. 334.09 crore (approximately €44.9 million), and Andhra Pradesh at Rs. 272.32 crore (approximately €36.6 million).[107]

[104] ISTIP Policy Bulletin No. 5 Nov 2014, "Role of State S&T Councils in the Indian Innovation System: Policy Perspective (Page 10): http://www.nistads.res.in/images/bulletin/istip_bulletin5.pdf
[105] Cited in ISTIP Policy Bulletin No. 5 Nov 2014, "Role of State S&T Councils in the Indian Innovation System: Policy Perspective (Page 10): http://www.nistads.res.in/images/bulletin/istip_bulletin5.pdf
[106] Ibid.
[107] Ibid.

Although funding research is not the only mission of these state S&T councils, (science popularisation is often a priority), funding scientific research activities is in fact a key activity for many. The Gujarat State Council on Science & Technology (GUJCOST), for example, has made nanotechnology a priority, striving to conduct R&D at an international level.[108]

International collaboration amongst these State S&T Councils appears to be fairly limited, suggesting a possible opportunity for Horizon 2020 co-funding. One example in particular highlights the range of what is possible. The Karnataka State Council for Science and Technology (KSCST) has established a bilateral program with Israel for joint industrial R&D ventures.[109] This Karnataka-Israel Program for Industrial R&D (KIRD) has created a mechanism for SMEs in Karnataka to seek funding support for joint bilateral R&D projects involving at least one company in Israel. The first call focused on topics such as nanotechnology, wastewater management, and solar energy. The second call for proposals included topics such as clean/green technologies, medical/biotechnology, and bioinformatics.[110]

While international collaboration stemming from India's State S&T councils has thus far not been realised, the desire would surely be there. For example, the S&T Council of Uttar Pradesh, India's largest state, even pledged to create an international collaboration division to coordinate with international agencies working for promotion of S&T, including the EU.[111]

[108] http://www.gujcost.gujarat.gov.in/gujarat-nano-mission.htm
[109] http://www.kscst.org.in/kird.html
[110] http://www.kscst.org.in/kird_second_call.html
[111] ISTIP Policy Bulletin No. 5 Nov 2014, "Role of State S&T Councils in the Indian Innovation System: Policy Perspective (Page 10): http://www.nistads.res.in/images/bulletin/istip_bulletin5.pdf

From the Canadian case, it is particularly clear that there does not need to be only one strategy to increase EU Framework Programme participation. India's DST and DBT may be two of the most important actors, but they are not the only concerned stakeholders that could be part of a comprehensive strategy, as demonstrated by the above data and work of India's State S&T Councils.

As seen in Canada, action can occur at the federal, provincial and even local/institutional levels. The overall dominance of India's national ministries would make them the key actors for a co-funding mechanism, but the State S&T Councils should not be overlooked. Certain states particularly desirous of international collaboration may wish to consider options to support institutions from their state to partiipate as an efficient way to use limited resources and leverage international expertise.

Reciprocity Agreements

Exemplifying an even greater display of openness than a co-funding mechanism is a reciprocity agreement where both countries open their national programmes to participants from the respective country. One such example has led to enhanced Framework Programme participation from the United States.

United States

The United States does not have a jointly agreed co-funding mechanism with the European Commission,[112] but is still an interesting model of Third Country-EU Framework Programme collaboration, chiefly for the 2008 EC-National Institutes of Health (NIH) Reciprocity Agreement.

513 US participants joined 407 projects in FP7. 33 US participants have already joined 29 projects in Horizon 2020.

Figure 32 United States' Participation in FP7 & Horizon 2020

United States	FP7 (2007-2013)	Early FP7 (2007-2008)	Horizon 2020 (2014-Nov15)	% Change
Number of Projects with at least 1 Participant	407	58	29	-50%
Total Cost of Projects with at least 1 Participant (€)	2,715,872,530.20[113]	373,226,978.53	183,735,991.95	-51%
Number of Participants	513	69	33	-52%
Total EC Contribution Received by Participants (€)	67,912,593.84	1,251,309.25	5,064,104.25	305%
Number of Participants Receiving EC Funds	195	7	18	157%
Percentage of Participants Receiving EC Funding	38%	10%	55%	45%

Source: European Union Open Data Portal

[112] http://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/international-cooperation_en.htm

[113] Total cost of one project not reported.

As a non-EU industrialised country not qualifying for automatic funding, the United States' participation figures, and in particular the EC financial contribution data above, may be surprising.

What helps explain these figures is the 2008 reciprocity agreement between the European Commission and the National Institutes of Health (NIH). Following this agreement, US participants were fully eligible for all topics under the FP7 Health, Demographic Change, and Wellbeing call. In exchange, European researchers are also fully eligible to participate and receive funding in open NIH calls.[114]

As a result of this agreement, 63% of the EC's financial contributions to US participants came in the Health sector from just 31% of participants.[115]

The success of the agreement in fostering greater collaboration has led to its continuation under Horizon 2020. Under Horizon 2020's Societal Challenge "Health, Demographic Change, and Wellbeing", topics such "Global Alliances for Chronic Diseases: prevention and treatment of type 2 diabetes" are marked with the following advisor under topic conditions and documents:

> "In recognition of the opening of the US National Institutes of Health's programmes to European researchers, any legal entity established in the United States of America is eligible to receive Union funding to support its participation in projects supported under all topics in calls under the Societal Challenge 'Health, demographic change and well-being'."[116]

Cooperation in the health sector has been boosted through the reciprocity agreement, but it is certainly not the only priority area. As with other countries, the European Commission has targeted US participation in certain areas—in this case "Blue Growth" arctic research.[117] A complete list of Horizon 2020 components and US eligibility with respect to funding can be found here.

Like other industrialised countries, scientific excellence drives participation with the United States. Survey results have characterised the motivation for EU Framework Participation from US participants as the "improvement of scientific excellence of the research endeavour, access to specific expertise, establishment of a wider cooperation

[114] http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_usa_en.pdf
[115] http://www.euussciencetechnology.eu/sites/default/files/D2.1%20Report%20US%20FP7%20participation.pdf
[116] https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/445-hco-05-2014.html
[117] http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_usa_en.pdf

network and improved relations to European researchers."[118] These motivations apply similarly to researchers from all countries.

Considerations for the Indian Scenario

In an exercise of this nature, it is important to examine a full range of options, particularly innovative and successful ones, regardless of their likelihood of implementation. Having reviewed the case of the United States, the following point remains salient.

The NIH-EC reciprocity agreement has surely helped foster collaboration between Europe and the United States. However, it is unclear what interest India would have in opening its national programmes to European participants in a similar type of reciprocity agreement. If this is not an option, the models found in Australia and Japan presented above would have greater relevance for further study.

[118] http://www.euussciencetechnology.eu/sites/default/files/D2.1%20Report%20US%20FP7%20participation.pdf

Response of Emerging Economies

The models of collaboration that industrialised countries have implemented to collaborate with the EU Framework Programme are important to investigate as they have a longer track record that can be analysed.

It is also important however to examine the response of other emerging economies. The governments of Brazil, Russia, Mexico and China were placed into similar positions when the European Commission decided that automatic funding for Horizon 2020 collaborative projects would no longer be made available.

While details (and obviously results) of some actions these governments have taken remain to be seen, it is useful for India to take note of the responses of their peer countries.

Mexico

In response to this situation, Mexico was the first country to take action with a complementary funding mechanism called "CONACYT-Horizon 2020" to provide support for participants of its country to join Horizon 2020 projects.

While this co-funding mechanism was announced in February 2014, Mexican participation in Horizon 2020 thus far is still below its early FP7 rate. A smaller sample size could be part of this result, as the Mexico's participation in the beginning of FP7 was not predictive of its overall performance.

Figure 33 Mexican Participation in FP7 & Horizon 2020

Mexico	FP7 (2007-2013)	Early FP7 (2007-2008)	Horizon 2020 (2014-Nov15)	% Change
Number of Projects with at least 1 Participant	83	11	4	-64%
Total Cost of Projects with at least 1 Participant (€)	296,228,393.50	37,482,888.11	14,790,091.87	-61%
Number of Participants	124	12	4	-67%
Total EC Contribution Received by Participants (€)	10,582,291.47	38,006.00	0	-100%
Number of Participants Receiving EC Funds	74	1	0	-100%
Percentage of Participants Receiving EC Funding	60%	8%	0%	-8%

Source: European Union Open Data Portal

CONACYT-Horizon 2020 intends to provide a source of financing "project-by-project participation" to Mexican partners in successful Horizon 2020 projects. This earmarked budget (FOINS) is managed by the International cooperation Directorate of the National Council for Research and Innovation (CONACYT).[119]

The co-funding mechanism has adopted the following procedures:

- "When a proposal with a Mexican participant is selected for funding by the EC, the Mexican participant can apply to the CONACYT-Horizon 2020 for funding.
- The National Mexican Agency for Research and Innovation (CONACYT) will re-evaluate the proposal by a panel of three Mexican experts according to its requirements and guidelines (excellence, efficiency and impact of the proposal).
- No later than 30 calendar days afterwards CONACYT will inform the Mexican participant of the result of the evaluation.
- CONACYT will finance up to an 85% of the total amount requested and approved in the case of public entities (Institutions of Higher Education (IHE), Technologic and Research Centres) and private IHE; and up to 70% of the total amount requested and approved for private entities, except IHE. The complementary amount must be provided by the Mexican entity."[120]

Applications are accepted in all thematic areas, but the following areas are marked as priorities: Health (Diabetes, obesity and infectious diseases), Energy, Technologic Development (Advanced materials, nanotechnology, advanced manufactures, Information and Communication Technologies), Environment (Climate change, Water Management and Natural Disasters Prevention), Sustainable Development (Food Security, Urban Development) and Society.[121]

While it may be too early to evaluate the effectiveness of the co-funding mechanism, in its second call, two proposals were funded through the CONACYT-H2020 scheme: "Middleware for collaborative Applications and Global Communities (MAGIC)" and "A Paradigm Shift in Reactor Safety with the Molten Salt Fast Reactor (SAMOFAR)".[122]

In addition to this co-funding mechanism, a coordinated call between the EU and Mexico on the topic of geothermal energy was included in the 2016-2017 Horizon 2020 Work Programme with a total budget of €20 million with each side contributing an equal amount.[123]

---

[119] http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_mexico_en.pdf
[120] http://ec.europa.eu/research/iscp/index.cfm?lg=en&pg=mexico
[121] http://ec.europa.eu/research/iscp/index.cfm?lg=en&pg=mexico
[122] http://www.conacyt.mx/index.php/el-conacyt/convocatorias-y-resultados-conacyt/convocatoria-conacyt-horizon2020/8719-resultados-de-la-segunda-convocatoria-conacyt-h2020/file
[123] http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_mexico_en.pdf

Russia

Russia has also taken early action to address the removal of automatic funding. This was a particularly pertinent issue for Russia because, in terms of both the number of participants and the EC financial contribution received, Russia was the most successful Third Country in FP7. Eight coordinated calls were also more than any other country.[124]

Despite establishing a co-funding mechanism (discussed below), with the removal of automatic funding for collaborative projects, Russia has thus far not yet been able to achieve similar collaborative success in Horizon 2020. Compared to its early rate of participation in FP7, its participation in Horizon 2020 is far less.

Surprisingly however, the amount of funding Russian partners has received thus far under Horizon 2020 is not too far below its early FP7 pace—particularly when compared to the reduction in projects and participants.

Figure 34 Russian Participation in FP7 & Horizon 2020

Russia	FP7 (2007-2013)	Early FP7 (2007-2008)	Horizon 2020 (2014-Nov15)	% Change
Number of Projects with at least 1 Participant	325	62	13	-79%
Total Cost of Projects with at least 1 Participant (€)	2,401,740,887.91	483,315,773.19	57,029,149.83	-88%
Number of Participants	562	98	20	-80%
Total EC Contribution Received by Participants (€)	53,157,123.04	1,943,167.00	1,295,767.24	-33%
Number of Participants Receiving EC Funds	366	25	15	-40%
Percentage of Participants Receiving EC Funding	65%	26%	75%	49%

Source: European Union Open Data Portal

Similar to the case of Mexico above, Russia has agreed upon a co-funding mechanism with the European Commission to support Russian participants in successful Horizon 2020 projects that could reverse this trend.

According to the European Commission release,

> "…[Russia's Ministry of Education and Science (MON)] publishes dedicated calls to offer funding support for Russian Horizon 2020 participants in accordance

[124] http://www.hse.ru/data/2012/05/30/1252304237/ABezlepkina_Russia_FP_to_Horizon2020.pdf

with its own call procedures (Russian Federal Programme (FTP) "R&D in Priority Areas of Development of the Russian S&T Complex 2014-2020"). Russian applicants to these calls will have to provide a document acknowledging their participation in the consortium of the joint Horizon 2020 proposal, submitted under the Horizon 2020 call."[125]

In terms of the size of this scheme, Russia has pledged 6.18b rubles (approximately €125m) for collaboration with the EU and Member States and up to a maximum of 50m rubles (approximately € 1m) per project for a period of up to 4 years. This budget would be used for open collaboration in selected priority areas of Horizon 2020 and coordinated EU-Russia calls.

While Russian participants are welcome in all Horizon 2020 calls, the steps below describe the process whereby a Russian participant requires and requests funding support from the MON. As seen in other countries such as Japan and Australia, Russia's co-funding mechanism is targeted to specific topics prioritised and selected in advance by the MON. Moreover, rather than leveraging the Horizon 2020 evaluation process, it conducts its own parallel evaluation based on its own national rules.

The steps below are laid out in great detail because, given an understanding of India's STI collaboration priorities, it is quite possible that Russia's co-funding mechanism may reflect many of the same principles that India would support in a potential co-funding mechanism.

[125] http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_russia_en.pdf

Figure 35 Procedure for Horizon 2020 Cooperation with Funding from Russian MON

Source: Irina Kuklina and Richard Burger, "Co-Funding Mechanisms of Russian-European S&T Cooperation" (25 Nov 2014)[126]

[126] www.ifmo.ru/file/news/4592/co-funding_mechanisms_for_ru-eu.ppt

China

China is a rapidly emerging research and innovation zone and a high priority area for EU collaboration, as evidenced by the number of Horizon 2020 calls specifically targeting Chinese participation.[127]

Like other emerging economies, China's participation has also not fared well in the transition to Horizon 2020 amidst the removal of automatic funding. While highest among emerging economies, China's Horizon 2020 participation figures (as of Nov 2016) of 16 projects and 27 participants are still well below their FP7 participation under a similar timeframe.

Figure 36 Chinese Participation in FP7 & Horizon 2020

China	FP7 (2007-2013)	Early FP7 (2007-2008)	Horizon 2020 (2014-Nov15)	% Change
Number of Projects with at least 1 Participant	235	44	16	-64%
Total Cost of Projects with at least 1 Participant (€)	1,266,087,877.12	281,191,440.65	82,435,646.87	-71%
Number of Participants	393	64	27	-58%
Total EC Contribution Received by Participants (€)	26,601,473.81	2133827.5	1,160,096.00	-46%
Number of Participants Receiving EC Funds	281	17	8	-53%
Percentage of Participants Receiving EC Funding	72%	27%	30%	11%

Source: European Union Open Data Portal

China and the European Commission hope that the recent agreement of a co-funding mechanism initially announced on 7 Sept 2015 begins to turns this tide and restores more active Chinese participation.[128] Described as an "enormous boost to our cooperation"[129] by the European Commission's DG Research & Innovation Robert Jan Smits, the Chinese government will make available funding for China-based entities that are part of successful Horizon 2020 consortia.

According to the European Commission release:

[127] https://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/List%20of%20calls%20targeting%20China%20in%20Horizon%202020%20work%20programme%20for%202014%20and%202015_2.pdf
[128] http://ec.europa.eu/research/index.cfm?pg=newsalert&year=2015&na=na-070915
[129] http://english.cri.cn/7146/2015/11/06/3262s902975.htm

"Under the co-funding mechanism, up to 200 million RMB, or €28 million, will be made available annually by the Chinese Ministry of Science and Technology (MOST) on the Chinese side for the benefit of China-based entities that will participate in joint projects with European partners under Horizon 2020. The European Commission expects to continue spending over 100 million per year for the benefit of Europe-based entities in joint projects under H2020 with Chinese participants.

As of 2016, MOST is expected to issue regular calls for applications at least twice a year. The CFM will be primarily used for Horizon 2020 topics targeting China (see list of Horizon WP 2016-17 topics targeting China at point 2 below) but it will also be open to many other areas of Horizon 2020."[130]

In particular, this fund will support China-based entities passing both the Horizon 2020 and a national evaluation in fields of a wide array of Horizon 2020 areas, including:

- "Leadership in Enabling and Industrial Technologies (ICT, nano, new materials, biotechnology, manufacturing and processing, space)
- Societal Challenges (health, food/agriculture, energy, transport, climate/environment, inclusive societies)
- Future and Emerging Technologies
- Research Infrastructures
- Marie Sklodowska-Curie Actions/Research and Innovation Staff Exchange
- Nuclear Energy"[131]

As shown above, this co-funding mechanism extends to not only collaborative projects, but also other aspects of Horizon 2020, such as mobility (Marie Sklodowska-Curie Actions).

This new agreement also goes beyond an earlier agreed upon thematic-based co-funding mechanism with the Chinese Academy of Agricultural Sciences (CAAS) that supports research and innovation cooperation in food, agriculture and biotechnology.[132]

[130] http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_china_en.pdf
[131] http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_china_en.pdf
[132] https://ec.europa.eu/research/iscp/pdf/news/letter_of_intent_china.pdf

Brazil

The last case this report examines has yet to take action in response to their new categorisation under Horizon 2020. Finding itself in the same position as India, the Brazilian government has yet to take official action to fund successful Brazilian participants in Horizon 2020, but has signed a Letter of Intent to do so.

Facing the same set of circumstances as the other emerging economies, not surprisingly, Brazil has also seen a negative impact on its Framework Programme participation.

Figure 37 Brazilian Participation in FP7 & Horizon 2020

Brazil	FP7 (2007-2013)	Early FP7 (2007-2008)	Horizon 2020 (2014-Nov15)	% Change
Number of Projects with at least 1 Participant	167	17	11	-35%
Total Cost of Projects with at least 1 Participant (€)	704,498,393.89	43,153,512.12	59,841,549.01	39%
Number of Participants	235	37	15	-59%
Total EC Contribution Received by Participants (€)	26,185,646.02	637,804.80	1,084,670.63	70%
Number of Participants Receiving EC Funds	163	7	2	-71%
Percentage of Participants Receiving EC Funding	69%	19%	13%	-32%

Source: European Union Open Data Portal

The European Commission currently has the same instructions for Brazil that it does for India:

> "Brazilian participants themselves determine the sources of funding for their Brazilian part of the project and find resources: these may be own funds of the participating institutions, as well as funds received from Brazilian ministries, foundations and other organisations that fund research and develops activities in Brazil. Contributions can also be made in kind.
>
> Potential Brazilian participants are therefore encouraged to contact relevant research and innovation funding bodies and organisations such as the State Foundation for Research Support (FAPS), National Research Council (CNPq), Ministry of Science Technology and Innovation (MCTI) to seek funding for their participation in Horizon 2020. **No jointly agreed mechanism is currently in place**

for co-funding Horizon 2020 research and innovation projects."[133] (bold in original)

The lack of any type of co-funding agreement however has not stopped the European Commission from drafting specific calls for EU-Brazilian cooperation in the Work Programme. While not representing an entitlement to EC funding, call topics such as Cloud Computing,[134] IoT Pilots,[135] and "International Cooperation with Brazil on advanced lignocellulosic biofuels"[136] all specifically mention EU-Brazil collaboration in their descriptions. A full list of calls targeting Brazil can be found here.

Most importantly, there are signs that the Brazilian government is considering taking action to support its researchers' participation in Horizon 2020.

In December 2014, the Head of the EU Delegation to Brazil Ambassador Ana Paula Zacarias and the President of CONFAP (Brazilian Council of Sate Funding Agencies) Professor Sergio Gargioni signed a Letter of Intent with the aim of exchanging relevant information on the participation of Brazilian institutions in Horizon 2020 and encourage the Brazilian Research Support Foundations (FAPs) to fund institutions and researchers in their States that are engaged in the proposals selected by the European Commission.[137] Further details can be found in press releases here and here.

[133] http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_brazil_en.pdf
[134] https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/2079-eub-01-2017.html
[135] https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/2080-eub-02-2017.html
[136] https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/2150-lce-22-2016.html
[137] http://ec.europa.eu/research/iscp/index.cfm?pg=brazil

Considerations for the Indian Scenario

Reviewing the responses of emerging economies to the removal of automatic funding for Horizon 2020 collaborative projects has yielded a number of interesting points for consideration.

- While all of the emerging economies have suffered a steep decline in their EU Framework Programme participation, all governments have recently taken action (or in the case of Brazil pledged to take action) to develop various co-funding mechanisms to provide funding for participants of its respective countries to join successful Horizon 2020 projects. As of November 2015, the Indian ministries were the last of the affected emerging economies to not have established a co-funding mechanism (or publically pledged to do so). With the recent announcement from DBT, one Indian ministry thus far will participate.
- It is important to keep in mind that the recent nature of these co-funding mechanisms (for example China only having been announced in September 2015) makes their impact difficult to evaluate. It may be too early to see an effect on participation data, which is still quite poor across all emerging economies.
- If opting to co-fund Indian participants, the Indian ministries would have to decide whether to open the scheme to all thematic areas or select specific areas or even individual calls for which Indian participants could receive funding (DBT has chosen the latter). The country case studies demonstrate that a country's national scientific priorities can be advanced here in a number of ways. Among emerging economies, the trend is to select specific thematic areas. Some, such as Russia, explicitly select eligible calls and topics, whereas others, such as Mexico, cover all thematic areas but make priorities known in advance.
- Another important question for the Indian ministries if devising a co-funding mechanism would be the timing and nature of the evaluation. All co-funding mechanisms established among emerging economies thus far include their own parallel evaluation procedures based on national funding rules. None were found to rely solely on the Horizon 2020 peer review evaluation. DBT is no exception. Australia's NHMRC-EU Collaborative Research Grant however is an interesting case where the NHMRC is able to leverage the Horizon 2020 peer review. Applicants only apply to the NHMRC once passing the Horizon 2020 peer review, and their subsequent application focuses only on eligibility and budget scrutiny.
- The decision of instituting a parallel review also affects the timing of the application for a co-funding mechanism. In some cases, such as Mexico, an application to the national co-funding mechanism is done after notification of a

successful Horizon 2020 bid, whereas in others, such as Russia, an application to the national co-funding mechanism is submitted in conjunction with the initial Horizon 2020 application. DBT's co-funding mechanism calls for a simultaneous submission like that found in Russia.

- An obvious question for Indian ministries in devising a co-funding scheme would be the level of funding (in absolute and relative terms) successful participants would receive. Not all co-funding mechanisms reviewed here are intended to support 100% of the costs of national participants. In Mexico, for example, the available funding contribution ranges from 70-85% of a participant's project costs. DBT has opted for an overall limit of three crore rupees per project rather than a percentage.
- An alternative to a traditional co-funding mechanism, the Indian ministries could choose to explore a reciprocity agreement with their European counterparts, as the US NIH has done with the European Commission. However, no other emerging economies (or industrialised country for that matter) have developed such a scheme.

Chapter 4 – Paths Forward to Enhanced Participation

The aim of the last chapter of this report is to put the above research and analysis into a number of possible paths forward, and to synthesise what potential impact they could have if applied to the Indian scenario.

Paths Forward

Having reviewed a number of EU Framework Programme collaboration models without automatic funding, we now briefly outline a number of options that EU and Indian stakeholders may wish to consider in their efforts to revitalise India's participation in Horizon 2020 and, more broadly, Indo-European STI Cooperation. While an agreement with DBT has now been concluded, other ministries may still act, and so it is important to keep these options in mind.

1. India becomes an Associated Country to Horizon 2020

Legal entities from Associated Countries can participate in Horizon 2020 under the same conditions as legal entities from the Member States. Association to Horizon 2020 takes place through the conclusion of an International Agreement.[138] Under the terms of such an agreement, the country may make a financial contribution to all or part of Horizon 2020.[139]

[138] https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/3cpart/h2020-hi-list-ac_en.pdf
[139] https://erc.europa.eu/glossary/term/224

Typically, Associated Countries have a geographic tie to Europe, but this is not always the case. Israel, for example, is an Associated Country. In today's interconnected world, it seems one's geographic neighbourhood can become much larger.

Many Associated Countries have strong participation records in the EU Framework Programme. Turkey, for example, saw 1,215 participants join 736 projects in FP7, receiving a total of €136m in European Commission funding. Moreover, 122 participants have already joined 96 projects in Horizon 2020, bringing in a total of nearly €9m in European Commission funding.

This option would likely have a strong positive impact on Indian participation (as automatic funding would be restored), but would require the most political will.

2. Selective Restoration of Automatic Funding from the European Commission

One option is the restoration through European Commission of automatic funding to Indian participants in Horizon 2020 collaborative projects. Considering the decrease in Indian participation, the Commission could reverse its previous decision and allow Indian participants to receive automatic funding and ensure an EU-India rapprochement in S&T.

It would be possible to do so under any number of qualifying conditions, such as particular calls where Indian participation is highly recommended, or time-based (until other co-funding mechanisms have been agreed upon or prove sufficiently effective). If the Indian ministries agreed on a thematic-specific co-funding mechanism, the European Commission might wish to select additional areas where an Indian participant could qualify for automatic funding. This way, it would be possible that in some calls, an Indian participant would be eligible for funding from the Indian ministries; in other areas, the participant would be eligible for European Commission funding; and in remaining areas, the participant could make a justification for an exception to receive European Commission funding.

This would likely have a positive effect on India's participation, but would not immediately encourage new models of collaboration based on equal footing. It might also have a negative effect on the European Commission's relations with the other emerging economies if funding was not restored for all peer countries.

4. Greater Exercise of Exceptions by the European Commission

Instead of formally restoring automatic funding for Indian participants, the European Commission could further develop and expand its exercise of exceptions. Analysing the participation of industrialised and emerging economies in FP7 and Horizon 2020 has shown that exceptions to receive European Commission funding are indeed awarded.

The language of the actual exception clause allows the participation of an Indian partner deemed as “essential” for the success of a research project. Moreover, an exception to fund an Indian partner could be justified on a variety of reasons. More importantly however, it does not appear that this actually is formally done, leaving it open to interpretation.

The European Commission might not wish to promote exceptions as a general strategy, but it may wish to clarify particular calls in which an Indian participant may be looked favourably upon to receive EC funding. It could be possible to provide greater guidance as to what is required for Section 3.3 of Part B of the Project Proposal, where the case for required funding must be made.

The European Commission might not wish to promote exceptions as a general strategy. In some cases Indian participation could still be desired funded by the Commission. A greater guidance through requirements of submitting such a proposal (such as Section 3.3 of Part B of the Project Proposal, where the case for required funding must be made) might be a starting point to foster this way of expanding the European Indian research collaboration.

As participants have already received exceptions for funding, it is clearly in the European Commission’s interest and power to fund such partners it deems essential. Greater clarity for which calls this is possible would benefit not only Indian participants and their prospective European consortia partners but also scientists from other countries not eligible for automatic funding.

Given the resources an application requires, the current lack of clarity over funding exceptions is barrier to greater Indian participation.

6. Opening of India's national programmes through a Reciprocity Agreement

As seen in the case of the European Commission – National Institutes of Health (NIH) Reciprocity Agreement, the mutual opening of national programmes to participants from respective sides, can be a powerful tool to enhance collaboration. Under such an arrangement, Indian participants would be funded by the European Commission in a selected section of Horizon 2020 in exchange for opening sections, as well as funding, of their own national programmes to European participation.

The Science and Technology Cooperation Agreement (STCA) between the European Union and India seemingly has in place the initial framework for such an agreement, citing "reciprocal access to the activities of research and technological development undertaken by each Party"[140] as one principle of cooperation.

Moreover, "participation of Indian research entities in RTD projects under the framework programme and reciprocal participation of research entities established in the Community in Indian projects in similar sectors of RTD"[141] is given as the first listed form of cooperation.

While there is a track record of Indian institutions participating in the European Framework Programme, comparatively very little is known about how European institutions would respond to the opening of India's national programmes and/or the desire of Indian ministries to open their national programmes to global participation. However, the fact that no other emerging economy has opted for such an arrangement thus far makes this option less likely.

7. Development of EU-India Co-Funding Mechanisms for Horizon 2020

The most likely alternative to a reciprocity agreement is that the EU and India could develop a co-funding mechanism—as the other emerging economies have done (or pledged to do) and many other Third Countries have done for a number of years. As shown in the cases above, there is a variety of mechanisms through which India's national ministries could agree to co-fund (subject to their own selection criteria) Indian participants attached to successful Horizon 2020 consortia (in certain calls or whole areas to be agreed in advance) without having to open their national programmes to

[140] http://eeas.europa.eu/delegations/india/documents/eu_india/eu_india_science_and_technology_agreement_en.pdf
[141] Ibid

European participation. This is the option that DBT has agreed upon and DST is still discussing.

Taking into account the experience of other countries, the Indian ministries could craft a policy to suit its specific needs and interests. Having analysed many co-funding mechanisms of industrialised and emerging economies, the issues below are some of the most pertinent to consider in the design of a co-funding mechanism.

Scientific Priorities

- As seen above, some co-funding mechanisms cover all thematic areas, whereas others mark in advance selected priority areas. Still others cover all areas, but at the same time make priorities known.
- As DBT has done, it is likely that India's respective ministries and government agencies would want to make their priorities known in advance to give greater assurance and guidance to researchers that their project would be funded if successful. Adopting this policy would be one way India could specifically leverage European resources and expertise to work on key national scientific priorities. By identifying areas of the Horizon 2020 Work Programme that closely align with their own scientific priorities, India can leverage its own investment. Instead of needing to fund an entire project, the Indian ministries need to fund only the Indian scientist (as it would do anyway), but benefit from having them collaborate with a team of fellow scientists and researchers from Europe and around the world.

Funding Conditions

- In addition to thematic restrictions, some co-funding mechanisms place other conditions on the funding provided to successful participants. These could include a cap on the total financial contribution a participant can receive, the number of years a project is eligible to receive funding, or a percentage of financial support with respect to overall participant costs. For example, Mexican participants applying to the CONACYT-Horizon 2020 scheme are eligible for 70-85% of their costs depending on organisation type rather than a full 100%.
- Indian policymakers should consider what other available resources, if any, participants would be able to draw from in designing any co-funding mechanism, as well as other conditions that would make Horizon 2020 participation not only possible, but also highly desirable. What is clear from the reviewed cases however is that national funding rules can be applied to funding provided through co-funding mechanisms.

Parallel Evaluation

- A minority of cases presented above accept the result of the Horizon 2020 peer review and fund successful participants of their country—with their own evaluation instead focusing on eligibility and budget scrutiny. In other cases however, and in all of the emerging economies thus far, a separate parallel evaluation occurs under national rules. If opting for a co-funding mechanism, an important decision for India's national ministries will be whether to conduct a parallel evaluation and how to synchronise with the Horizon 2020 project timelines.
- The parallel evaluation amounts to a duplication of efforts and can cause problems when the respective evaluations come to different conclusions. On the other hand, all governments do have a responsibility to ensure their budgets are spent in the best interests of their country and are often reluctant to concede that authority without their own review procedures. The cases of Australia and Japan in particular have different approaches with track records that can be further investigated for their consequences in this regard.

Application Submission Timing

- Related to the decision of parallel evaluation is structuring the application process itself. In some cases shown above, an application to the national co-funding mechanism is not required until notification of a successful Horizon 2020 bid (a one-stage application), whereas in other cases an initial application is sent to the respective national agency at the time of the Horizon 2020 bid submission (a two-stage application).
- This decision is important as it could impact the timeliness of the Indian participant's funding if not synchronised with the Horizon 2020 project deadlines. Managing different S&T bureaucracies is always part of the challenge of international S&T collaboration.

8. Development of State-Level Co-Funding Mechanisms

Canada was one case that demonstrated the possibility of co-funding mechanisms operating at a provincial rather than national level. It is often not recognised that only a little more than half of India's R&D expenditure comes from Central ministries. Having collectively spent a total of Rs. 3865.25 crore in 2009-10 (or over €536 million by today's conversion rates), India's state S&T Councils could represent a new willing co-funding partner.

Internationalisation is needed at India's states perhaps even more so than at the Centre. Moreover, the case of the Karnataka-Israel Program for Industrial R&D (KIRD) gives already at least one precedent for a joint bilateral funding programme between an EU Associated Country and an Indian state. It is quite logical that these State S&T Councils would be eager to leverage their limited S&T budgets by funding their state's successful participants in Horizon 2020 projects matching their own state priorities—particularly now that DBT has set an example to follow.

9. Resumption (and/or Expansion) of Coordinated Calls

Alongside the FP7 open calls, the European Commission and Indian ministries held five coordinated calls under FP7 on topics of computational materials science, food and nutrition, solar energy, biomass and biowaste, and water.

While this is a preferred collaboration tool for the Indian ministries as equal footing is given to both parties at each step, the administrative difficulties of managing such calls has led to none being scheduled in the Horizon 2020 era as of yet. If such difficulties could be mutually resolved, coordinated calls could be resumed as an effective form of EU-India collaboration.

10. New Geographic ERA-NETs and JPIs

While outside the scope of this report's investigation, geographic ERA-NETs were also a tool for promoting EU-India collaboration under FP7. Two FP7 projects in particular, New Indigo and Inno Indigo, have been successful geographic ERA-NETs reaching India. As an ERA-NET, thematic calls between Indian ministries and several European Member State funding agencies were held with the support of top-up funding from the European Commission.

New Indigo for example helped launch four multilateral calls from 2010 to 2013, with 28 EU-India projects receiving a funding volume of more than €6.4m.[142] Its successor Inno Indigo has held multilateral calls on topics such as biotechnology and health, water related challenges, and energy.[143]

[142] http://issuu.com/new-indigo/docs/new_indigo_brosch__re_pdf_einzelsei?e=10085444/5841565
[143] https://indigoprojects.eu/funding/indigo-calls

Geographic ERA-NETs, as well as JPIs,[144] could be another alternative to advance EU-India STI collaboration, which have the added advantage of leveraging the already strong bilateral relationships and giving the Indian ministries a more active role in the call's execution. Additionally, some JPIs are actually open to international participation, and India is considered a key scientific player for strategic areas, such as Antimicrobial Resistance and Water Challenges for a Changing World.

11. Complementary Support to Indian Participants Bringing their Own Funding

As discussed in Chapter 1, despite qualifying for automatic funding, 99 institutions (32% of all Indian participants) brought their own funding to FP7 projects, particularly when it came to coordination and support actions. At least one institution has done the same under Horizon 2020 thus far.

Based on this analysis, it stands to reason that many such institutions would be keen to leverage their own research budgets and gain from the unique experience of collaborating with a large number of European and global partners.

More effort can be taken to support institutions that are prepared to participate with their own funding. This could take the form of disseminating information to like-minded institutions, which have their own sources of funding and would be interested in avenues to European collaboration.

Other options could be special benefits like hands-on training in application submission and use of other tools such as CORDIS for those Indian participants, which have secured their own funding. The Indigo Policy Focal Point Network could be one avenue for this activity.

[144] "The overall aim of the Joint Programming process is to pool national research efforts in order to make better use of Europe's precious public R&D resources and to tackle common European challenges more effectively in a few key areas. It is a structured and strategic process whereby Member States agree, on a voluntary basis and in a partnership approach, on common visions and Strategic Research Agendas (SRA) to address major societal challenges. On a variable geometry basis, Member States commit to Joint Programming Initiatives (JPIs) where they implement together joint Strategic Research Agendas". For further information, http://ec.europa.eu/research/era/what-joint-programming_en.html

Targeted Outreach to India's R&D Centres

India's large pool of technical talent and increasingly favourable FDI policies have spurred the growth of multinational corporation (MNC) R&D centres in India—many of which could serve as an untapped resource for EU Framework Programme Participation.

According to one study, a Zinnov report placed the number of MNC R&D centres in India at 1,031 until the end of 2013. Another 2014 study estimates that more than 1/3 of the top 1000 global spenders in R&D have a centre in India.[145]

As discussed earlier, MNCs like AstraZeneca, IBM, Honeywell, Hewlett-Packard, and Volkswagen participated in FP7. Many did so with their own funding. While this is not always the case (IBM is receiving EC funding in a Horizon 2020 project), it is possible that greater awareness of Horizon 2020 opportunities within MNC R&D centres could result in more Indian participants ready to collaborate with their own funding.

The R&D centres of India's own corporates (Infosys, Tata Consultancy Services etc.) have also been entirely absent from EU Framework Programme participation. Further research should investigate reasons behind this observation, as behind the Central government, India's private sector holds the largest R&D expenditure.[146]

12. Enhanced Dissemination Outreach to all Prospective Partners

If automatic funding is not available and Indian co-funding mechanisms are not put into place, it is important that dissemination activities and outreach continues to the Indian scientific community.

99 Indian participants brought their own funding despite the availability of automatic funding in FP7. This suggests that the removal of automatic funding should not have quite the almost total impact the beginning of Horizon 2020 has had on Indian participation.

[145] http://publications.drdo.gov.in/ojs/index.php/djlit/article/viewFile/5419/4395
[146] http://www.nstmis-dst.org/pdf/finalrndstatisticsataglance2011121.pdf

Services such as EURAXESS Links India[147], or the Indigo Policy Focal Point Network[148], should continue to educate prospective Indian researchers about the possibilities for European collaboration, regardless if European Commission funding is available.

Australia is a particularly good case study of the adoption of the National Contact Point (NCP) system in a Third Country. There, NCPs in sectors and locations across the country have an official responsibility to provide guidance and advice on navigating Framework Programme proposal development and submission processes.[149]

[147] http://ec.europa.eu/euraxess/index.cfm/links/eurRes/india
[148] http://indigoprojects.eu/funding/indian_contact_points/about
[149] http://www.caesie.org/national-contact-points/

CONCLUSION

This report has investigated the impact of the removal of automatic funding for Indian participants in the classic collaborative projects of Horizon 2020, and possible frameworks, such as co-funding mechanisms, to restore Indian participation. This chapter summarises the key findings of the above chapters.

- Particularly since the signing of the EU-India Science and Technology Cooperation Agreement (STCA) in 2001, **the European Union and India have become important research and innovation partners.**[150] Indigo Policy's co-publication and co-patenting studies underscore the growing ties between these two knowledge zones. Europe is 7% of the world, yet generates 24% of the world's expenditure on research, 32% of high-impact publications, and 32% of patent applications. India, on the other hand, home to 1/6 of the world's population, is ranked 9th in the world according to SCImago Journal & Country Rank. The EU is India's first cooperation partner in terms of joint academic publications. India's advancements in fields as diverse as space technology, nuclear technology, pharmaceuticals, biotechnology, and ICT have led to greater recognition of its growing capabilities as a knowledge economy. Perhaps above all, Europe and India are **key partners for addressing global challenges**. India's low cost missions to the Moon and Mars have inspired the rest of the world, sparking interest in the concept of frugal innovation. Imagining solutions to global challenges such as climate change, water, health, and energy is simply unforeseeable without active participation from and collaboration with India. This context undoubtedly heightens the importance of India's participation in the EU Framework Programme.

- India's EU Framework Programme participation was a testament to the EU-India research and innovation partnership. **In terms of Third Country participation in FP7, the predecessor to Horizon 2020, India ranked 4th—behind only Russia, the United States, and China.**[151] To be precise, 305 Indian institutions, receiving a collective total of over €35m in funding from the European Commission, participated in 181 projects, worth a collective total of over €779m. These 181 projects had a total of 2,471 consortium partners from 102 different countries,

[150] See Pages 10-11.
[151] See Pages 11-23.

covering not just Europe but the entire world. India's participants included the top institutions all across the country and worked on thematic areas of national importance to India, such as health, water, environment, and energy. Despite having an average of more than 13 consortium partners, the word "India" was included in the project title in 14% of projects with at least one Indian participant, suggesting India's FP7 participation not only explored global challenges relevant to India, but often times in Indian conditions as well. Lastly, one third of the time, Indian organisations participated in FP7 without EC funding. This participation without EC funding was particularly pronounced in the funding scheme of coordination and support actions, giving reason to believe that this eagerness for European collaboration will continue.

- India's participation in Horizon 2020 thus far presents a different picture. **Only 7 Indian participants have joined 6 Horizon 2020 projects as of November 2015.** [152] Comparing this to the first two years of FP7 equates to an approximately 85% decrease in terms of number of projects, total cost of project and number of participants. What is especially troubling is that the policy change has not only affected those previously relying on automatic funding, which would naturally see a decrease, but also those who previously secured their own funding. **In FP7, 32% of Indian participants secured their own funding. However, under Horizon 2020, so far only one participant has done so.**

- India has not been the only country affected. **The other emerging economies losing automatic funding in Horizon 2020 have similarly seen a sharp decline in participation figures.**[153] Although many industrialised and developing countries have also posted declines in participation, the drop in participation among emerging economies like India is so great not to assign accountability to the removal of automatic funding. While other factors, such as the transition to Horizon 2020, may also be at play, the removal of automatic funding has surely been an obstacle, and one that policymakers should direct focus.

- While the removal of automatic funding has thus far had a strong negative impact on India's participation figures, there is an abundance of models currently used to collaborate with the EU Framework Programme without automatic funding, where national governments provide funding for participants

[152] See Pages 28-31, 38-45.
[153] See Pages 28-37.

of their country to join successful Framework Programme bids**. India can learn best practices from co-funding mechanisms around the world to design a policy that best suits its own needs.**[154] As described above, such a mechanism could cover all thematic areas (such as in Korea and Taiwan) or select priorities (such as in Australia and Japan). It could conduct a parallel evaluation (as in Japan) or leverage the Horizon 2020 peer review (as in Australia). In addition to design options for national ministries, similar sets of choices could occur at state/provincial governments (as in Canada). **With 7.3% of India's R&D expenditure coming from state governments, outreach should be made to India's state S&T councils for regional co-funding mechanisms.**[155]

- The response of emerging economies to the removal of automatic funding demonstrates the popularity of co-funding mechanisms as a tool to leverage EU resources to further national scientific priorities. **Mexico, followed by Russia, and most recently China, have all established co-funding mechanisms to support participants of their country to join successful Horizon 2020 projects.**[156] Brazil has signed a letter of intent pledging to do so.

- When assessing the Indian scenario, EU and Indian policymakers have a plethora of options. While the European Commission could choose to roll back its policy of removing automatic funding for Indian participants, or clarify in which calls Indian participants may be more likely to qualify for an exception, Indian policymakers similarly have choices. **Autonomy rests with them to determine if and how funding should be made available to Indian participants successful in Horizon 2020 projects.**[157]

- DBT has led the way among Indian ministries in establishing a co-funding mechanism that hopes to restore Indian participation in the collaborative projects of the EU Framework Programme. We look forward to seeing the implementation of the agreement, its reception amongst India's scientific community, and of course further developments from other Indian ministries, such as DST, and to what extent, if at all, the DBT co-funding mechanism becomes a model for other ministries.

[154] See Chapter 3.
[155] See Pages 59-61.
[156] See Pages 65-75.
[157] See Chapter 4.

Bibliography

All online sources accurate as of time of publication.

European Commission Sources

CORDIS (5 May 2015) GNSS.asia2: Industrial cooperation across continents [Online]. Available: http://cordis.europa.eu/project/rcn/193838_en.html

CORDIS (5 May 2015) iHealth-T2D: Family-based intervention to improve healthy lifestyle and prevent Type 2 Diabetes amongst South Asians with central obesity and prediabetes [Online]. Available: http://cordis.europa.eu/project/rcn/194100_en.html

CORDIS (2 June 2015) CD-Links: Linking Climate and Development Policies - Leveraging International Networks and Knowledge Sharing [Online]. Available: http://cordis.europa.eu/project/rcn/196822_en.html

CORDIS (18 June 2015) TRUST: Creating and enhancing TRUSTworthy, responsible and equitable partnerships in international research [Online]. Available: http://cordis.europa.eu/project/rcn/197442_en.html

Delegation of the European Union to India (July 2012) Compendium of European Mobility Schemes for Students and Researchers India ←→ Europe [Online]. Available: http://eeas.europa.eu/delegations/india/documents/snt_update_26_oct_12/compendium_mobility_schemes_july_2012.pdf

Delegation of the European Union to India (March 2015) Overview of EU and Member States Research and Innovation Cooperation with India [Online]. Available: http://eeas.europa.eu/delegations/india/documents/snt_update_26_oct_12/overview_of_research_and_innovation_coop_july_2012.pdf

Department of Biotechnology, Government of India and European Union (Mar 2016) Research & Innovation Cooperation between DBT and the EU under Horizon 2020 [Online]. Available: http://www.dbtindia.nic.in/wp-content/uploads/DBT-EUcallsunderH2020-.pdf

European Commission (?) The European Union's 7th Research Framework Programme: EU-India Relations in Science and Technology and possibilities for cooperation [Online]. Available: http://www.oir.iitm.ac.in/wp-content/uploads/2013/05/EuropeanUnionFunding.pdf

European Commission (2011) Assessing the Coordinated Call with India "Computational Material Science", Ed. By Johan Veiga Benesch [Online]. Available:

https://ec.europa.eu/research/industrial_technologies/pdf/eu-india-workshop-report_en.pdf

European Commission (14 Sept 2012) COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS: Enhancing and focusing EU international cooperation in research and innovation: A strategic approach [Online]. Available: http://era.gv.at/object/document/501/attach/ST14000EN12.pdf

European Commission (2014) Horizon 2020 Work Programme 2014-2015: D.Types of action: specific provisions and funding rates [Online]. Available: http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-d-csa_en.pdf

European Commission (2014) List of calls targeting China in Horizon 2020 work programme for 2014 and 2015 [Online]. Available: https://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/List%20of%20calls%20targeting%20China%20in%20Horizon%202020%20work%20programme%20for%202014%20and%202015_2.pdf

European Commission (14 Feb 2014) Horizon 2020: Funding of applicants from non-EU countries & international organisations (Version 1.0) [Online]. Available: https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/3cpart/h2020-hi-3cpart_en.pdf

European Commission (11 Nov 2014) Roadmaps for international cooperation Accompanying the document REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS: Report on the implementation of the strategy for international cooperation in research and innovation [Online]. Available: http://ec.europa.eu/research/iscp/pdf/policy/annex_roadmaps_sep-2014.pdf

European Commission (Oct 2015) Australia – Country page [Online]. Available: http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_australia_en.pdf

European Commission (Dec 2015) Brazil – Country page [Online]. Available: http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_brazil_en.pdf

European Commission (Oct 2015) India – Country page [Online]. Available: http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_india_en.pdf

European Commission (Oct 2015) Mexico – Country page [Online]. Available: http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_mexico_en.pdf

European Commission (Dec 2015) People's Republic of China – Country page [Online]. Available: http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_china_en.pdf

European Commission (Oct 2015) Republic of Korea – Country page [Online]. Available: http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_korea_en.pdf

European Commission (Oct 2015) Russia – Country page [Online]. Available: http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_russia_en.pdf

European Commission (Oct 2015) USA – Country page [Online]. Available: http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_usa_en.pdf

European Commission: Annex 1 of the 210 Cooperation Work Programme [Online]. Available: ftp://ftp.cordis.europa.eu/pub/fp7/docs/icpc-list.pdf

European Commission Directorate-General for Research and Innovation (11 March 2015) Seventh FP7 Monitoring Report: Monitoring Report 2013 [Online]. Available: http://ec.europa.eu/research/evaluations/pdf/archive/fp7_monitoring_reports/7th_fp7_monitoring_report.pdf

European Commission Horizon 2020 Part B Proposal Template [Online] Available: https://szie.hu/sites/default/files/h2020_part_b_template.doc

European Commission Research & Innovation (2014) Participant Portal H2020 Online Manual: International cooperation "Open to the world" [Online]. Available: http://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/international-cooperation_en.htm

European Commission Research & Innovation: Mexico (13 Nov 2015) EU-Mexico enhanced cooperation in Research and Innovation [Online]. Available: http://ec.europa.eu/research/iscp/index.cfm?lg=en&pg=mexico

European Commission Research and Innovation Information Centre (4 April 2013) Adapting to climate change in northern India [Online]. Available: http://ec.europa.eu/research/infocentre/article_en.cfm?id=/research/headlines/news/article_13_04_04_en.html&item=Countries&artid=29555&caller=SuccessStories

European Commission Research and Innovation Information Centre (29 Oct 2013) Innovative and sustainable water treatment systems for India [Online]. Available: http://ec.europa.eu/research/infocentre/article_en.cfm?id=/research/headlines/news/article_13_10_29_en.html&item=Countries&artid=31297&caller=SuccessStories

European Commission Research & Innovation News Alert (23 Mar 2015) Strengthening cooperation between the EU and Brazil [Online]. Available: http://ec.europa.eu/research/iscp/index.cfm?pg=brazil

European Commission Research & Innovation News Alert (7 Sept 2015) EU and China launch new Co-Funding Mechanism for research and innovation [Online]. Available: http://ec.europa.eu/research/index.cfm?pg=newsalert&year=2015&na=na-070915

European Commission Research & Innovation Portal (8 Jan 2016) Projects and success stories: India [Online]. Available: http://ec.europa.eu/research/infocentre/success_stories_en.cfm?item=Countries&subitem=India

European Commission Press Release (30 Nov 2011) Horizon 2020: Commission proposes €80 billion investment in research and innovation, to boost growth and jobs [Online]. Available: http://europa.eu/rapid/press-release_IP-11-1475_en.htm

European Commission Press Release (17 September 2012) Commission focuses on international science cooperation to meet global challenges [Online]. Available: http://europa.eu/rapid/press-release_IP-12-967_en.htm?locale=en

European Commission Press Release (11 Dec 2013) Horizon 2020 launched with €15 billion over first two years [Online]. Available: http://www.forskningsradet.no/servlet/Satellite?blobcol=urldata&blobheader=application%2Fpdf&blobheadername1=Content-Disposition%3A&blobheadervalue1=+attachment%3B+filename%3DH2020callsChina.pdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1274503582776&ssbinary=true

European Community and the Government of India (3 Dec 2007) AGREEMENT RENEWING THE AGREEMENT FOR SCIENTIFIC AND TECHNOLOGICAL COOPERATION BETWEEN THE EUROPEAN COMMUNITY AND THE GOVERNMENT OF THE REPUBLIC OF INDIA [Online]. Available: http://eeas.europa.eu/delegations/india/documents/eu_india/eu_india_science_and_technology_agreement_en.pdf

European Union External Action (29 Mar 2016) Fact Sheet: EU-India Relations [Online]. Available: http://eeas.europa.eu/factsheets/docs/eu-india_factsheet_en.pdf

European Union Open Data Portal (11 Nov 2015) CORDIS - EU research projects under FP7 (2007-2013) [Online]. Available: https://open-data.europa.eu/en/data/dataset/cordisfp7projects

European Union Open Data Portal (11 Nov 2015) CORDIS - EU research projects under Horizon 2020 (2014-2020) [Online]. Available: https://open-data.europa.eu/en/data/dataset/cordis-h2020projects-under-horizon-2020-2014-2020

Official Journal of the European Union (20 Dec 2013) REGULATION (EU) No 1290/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2013 laying down the rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)" and repealing Regulation (EC) No 1906/2006 [Online]. Available: http://ec.europa.eu/research/participants/data/ref/h2020/legal_basis/rules_participation/h2020-rules-participation_en.pdf

Participant Portal (11 Dec 2013) H2020-HCO-2014-2015: TOPIC : Global Alliance for Chronic Diseases: prevention and treatment of type 2 diabetes [Online]. Available: https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/445-hco-05-2014.html

Participant Portal (11 Dec 2013) H2020-ISSI-2014-2015: TOPIC : Supporting structural change in research organisations to promote Responsible Research and Innovation [Online]. Available: https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/324-issi-5-2015.html

Participant Portal (14 Oct 2015) H2020-EUB-2017: Topic: Cloud Computing [Online]. Available: https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/2079-eub-01-2017.html

Participant Portal (14 October 2015) H2020-EUB-2017: TOPIC: IoT Pilots [Online]. Available: https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/2080-eub-02-2017.html

Participant Portal (14 Oct 2015) H2020-LCE-2016-2017: TOPIC : International Cooperation with Brazil on advanced lignocellulosic biofuels [Online]. Available: https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/2150-lce-22-2016.html

Books and Articles

Basant, Rakesh and Mani, Sunil (Jan 2012) Foreign R&D Centres in India: An Analysis of their Size, Structure and Implications [Online]. Available: http://www.iimahd.ernet.in/assets/snippets/workingpaperpdf/8040799502012-01-06.pdf

Basile, Elisabetta and Régnier, Philippe (2012) Review of the S&T cooperation Agreement between the European Union and the Government of the Republic of India 2007-2011 [Online]. Available: https://ec.europa.eu/research/iscp/pdf/policy/india-review-brochure.pdf

Basu, Aparna and Aggarwal, Ritu (2001) International collaboration in science in India and its impact on institutional performance, *Scientometrics*, Vol. 52, No. 3, 379-394 [Online]. Available: http://link.springer.com/article/10.1023/A:1014239731175

Bezlepkina, Anna (?) From "FP" to Horizon 2020: European Union-Russia Cooperation in Research & Innovation, Presentation [Online]. Available: http://www.hse.ru/data/2012/05/30/1252304237/ABezlepkina_Russia_FP_to_Horizon2020.pdf

BILAT USA 2.0 (June 2015) US FP7 Participation in collaborative research projects and support actions [Online]. Available: http://www.euussciencetechnology.eu/sites/default/files/D2.1%20Report%20US%20FP7%20participation.pdf

Dambois, Denis (15 April 2015) EU research & innovation collaboration with India [Presentation].

De Oliveira, Teresa (15 Oct 2015) Impacts analysis of the FP7 projects connecting Europe and India [Online] EU-India STI Cooperation Days 2015. Available: https://indigoprojects.eu/page/67/attach/6_TDO_FP7_projects.pdf

Degelsegger, Alexander (June 2011) New Indigo Project: Bringing Europe and India Closer, *Biotech News*, Vol. 6, No. 3 [Online]. Available: https://indigoprojects.eu/page/31/attach/CoverStoryDBTNewsletter-draft.pdf

DST (Sept 2013) Research and Development Statistics at a Glance 2011-12 [Online]. Available: http://www.nstmis-dst.org/pdf/finalrndstatisticsataglance2011121.pdf

ERA Can+ (?) Guide to Horizon 2020 for Canadian Researchers [Online]. Available: http://www.era-can.net/resources/guide-to-h2020/

Galsworthy, Michael (8 May 2013) "Is Horizon 2020 really simpler than the FP7?" Horizon 2020 Projects [Online]. Available: http://horizon2020projects.com/pr-interviews/is-horizon-2020-really-simpler-than-fp7/

Granqvist, Kaisa and Büsel, Katharina (2015) Policy Brief: Co-publishing patterns of EU-India—The international dimension of co-publishing in India with special regard to the European Union [Online]. Available: https://indigoprojects.eu/page/31/attach/INDIGO_Policy_Broschuere_Co-publishing_View.pdf

Gruber, Florian and Piroi, Florina (2014) Policy Brief: Co-patenting patterns in India—The international dimension of patenting in India with special regard to the European Union [Online]. Available: https://indigoprojects.eu/page/31/attach/1_INDIGO_Policy_Brochure_Co-patenting_View.pdf

Gupta, Rita and Gupta, B.M. (July 2014) Foreign MNC R&D Centers in India: A Study of their Publications, 2003-12, DESIDOC Journal of Library & Information Technology, Vol. 34, No. 4 [Online]. Available: http://publications.drdo.gov.in/ojs/index.php/djlit/article/viewFile/5419/4395

Huiguang, Chi (6 Nov 2015) Horizon 2020: Co-funding Mechanism for China, CRIEnglish.com [Online]. Available: http://english.cri.cn/7146/2015/11/06/3262s902975.htm

Jamal, Tabassum (Nov 2014) Role of State S&T Councils in the Indian Innovation System: Policy Perspective. *ISTIP Policy Bulletin* [Online] No. 5. Available: http://www.nistads.res.in/images/bulletin/istip_bulletin5.pdf

Kleintop, Jeffrey (23 Nov 2015) India Becomes World's Fastest Growing Economy: What Investors Need to Know, Charles Schwab [Online]. Available: http://www.schwab.com/public/schwab/nn/articles/India-Becomes-World-s-Fastest-Growing-Economy-What-Investors-Need-to-Know

Kuklina, Irina and Birger, Richard (25 Nov 2014) Co-funding Mechanisms of Russian-European S&T Cooperation [Online] Presentation. Available: www.ifmo.ru/file/news/4592/co-funding_mechanisms_for_ru-eu.ppt

Mañana-Rodríguez, Jorge (14 Mar 2014) A critical review of SCImago Journal & Country Rank. Research Evaluation [Online]. Available: http://rev.oxfordjournals.org/content/early/2014/03/14/reseval.rvu008

Mukherjee, Rohan (2014) The False Promise of India's Soft Power. *Geopolitics, History, and International Relations* [Online] 6 (1). Available: https://scholar.princeton.edu/sites/default/files/rmukherj/files/mukherjee_softpower.pdf

The New Indigo Project (2013) Breaking Grounds in Science, Technology and Innovation through Indo-European Partnerships [Online]. Available: http://www.newindigo.eu/attach/New_INDIGO_Brosch%C3%BCre_PDF.pdf

Ní Shé, Caitriona (19 Nov 2014) BRICs missing out on Horizon 2020, Research Brazil Ireland (RBI) [Online]. Available: http://rbi.ie/brics-missing-out-on-horizon-2020/

Wülbers, Shahia Aziz (2010) The Paradox of EU-Indian Relations: Missed Opportunities in Politics, Economics, Development Cooperation, and Culture. *Lexington Books.*

Other Websites

Australian Academy of Science (13 Jan 2014) Australia-European Union Collaboration Program 2014 [Online] Available:https://www.science.org.au/australia-european-union-collaboration-program-2014

Australian Government, NHMRC (21 Jan 2015) NHMRC Funding Rules [Online] Available: https://www.nhmrc.gov.au/book/nhmrc-funding-rules-2015/nhmrc-european-union-collaborative-research-grants-scheme-specific-f-0

Australian Government, NHMRC (23 Oct 2015) NHMRC-European Union Collaborative Research Grants [Online] Available: https://www.nhmrc.gov.au/grants-funding/apply-funding/nhmrc-european-union-collaborative-research-grants

Australian Government, NHMRC (13 Nov 2015) NHMRC-European Union Collaborative Research Grants for funding commencing in 2017 [Online] Available: https://www.nhmrc.gov.au/grants-funding/apply-funding/nhmrc-european-union-collaborative-research-grants-funding-commencing-0

Australian Government, NHMRC (18 Dec 2015) Outcomes of funding rounds [Online] Available: https://www.nhmrc.gov.au/grants-funding/outcomes-funding-rounds

BILAT USA 2.0 (2015) Horizon 2020 Open Calls [Online]. Available: http://www.euussciencetechnology.eu/content/horizon-2020-open-calls

CAESIE (30 July 2014) AUSTRALIAN PARTICIPATION IN HORIZON 2020 – THE EUROPEAN COMMISSION'S (EC) FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION (2014 – 2020) Frequently Asked Questions [Online]. Available: http://www.caesie.org/horizon-2020-australia-faq-2014/

CAESIE (2015) National Contact Points [Online]. Available: http://www.caesie.org/national-contact-points/

Chinese Academy of Agricultural Sciences (14 Nov 2013) Letter of Intent on Research and Innovation Cooperation in Food, Agriculture and Biotechnology between the European Commission and the Chinese Academy of Agricultural Sciences [Online]. Available: https://ec.europa.eu/research/iscp/pdf/news/letter_of_intent_china.pdf

CONACYT (19 June 2015) CONACYT-Horizon 2020: Resultados de la Segunda Convocatoria [Online]. Available: http://www.conacyt.mx/index.php/el-conacyt/convocatorias-y-resultados-conacyt/convocatoria-conacyt-horizon2020/8719-resultados-de-la-segunda-convocatoria-conacyt-h2020/file

Économie, Innovation et Exportations Québec (12 Nov 2015) Programme de soutien à la recherche (PSR) [Online]. Available: http://www.economie.gouv.qc.ca/objectifs/informer/recherche-et-innovation/page/programmes-18980/?tx_igaffichagepages_pi1%5Bmode%5D=single&tx_igaffichagepages_pi1%5BbackPid%5D=18870&tx_igaffichagepages_pi1%5BcurrentCat%5D=&tx_igaffichagepages_pi1%5BparentPid%5D=18979&cHash=452195212337a15fbb202a11eab8edf0

EURAXESS Researchers in Motion (8 Jan 2016) EURAXESS Links India [Online]. Available: http://ec.europa.eu/euraxess/index.cfm/links/eurRes/india

FP7-Horizon 2020 comparison, EU Projects Office. [Online]. Available: http://cerneu.web.cern.ch/horizon2020/fp7-comparison

Gujarat Council on Science & Technology (4 Jan 2016) Gujarat Nano Mission [Online]. Available: http://www.gujcost.gujarat.gov.in/gujarat-nano-mission.htm

Indigo Projects (2016) Focal Points [Online]. Available: http://indigoprojects.eu/funding/indian_contact_points/about

Karnataka State Council for Science and Technology (30 Jan 2015) Karnataka-Israel Program for Industrial R&D (KIRD) [Online]. Available: http://www.kscst.org.in/kird.html

LuxInnovation (2014) Non-EU Partners: International Cooperation in Horizon 2020 [Online]. Available: http://www.horizon2020.lu/Toolbox/FAQ/Non-EU-Partners

Korea EU-STI Cooperation (2014) The list of Horizon 2020 target call for Korea (2014-2015) [Online]. Available: http://www.haneurope.or.kr/member/en/board/HorizonOCEn_BoardList.do

Korea Institute for the Advancement of Technology (KIAT) (14 Jan 2015) 2015 Calls for Proposal for Projects under International Collaborative Research and Development Programme [Online]. Available: http://www.kiat.or.kr/site/program/board/detail.jsp?boardTypeID=98&searchSelect=&keyWord=&boardCategory=&currentPage=1&menuID=002003&finishIsYN=&boardID=44557&mode=detail

National Contact Point (NCP) Taiwan (2015) Taiwan Funding Programs [Online]. Available: http://www.ncp.tw/en/index.php?id=ae4517807a7a3708da1dd211f3d3e9a4

SCImago Country Rankings [Online]. Available: http://www.scimagojr.com/countryrank.php

SME NCP Taiwan (2015) Taiwan's eligibility [Online]. Availability: https://eutwnet.itri.org.tw/eng/Taiwanseligibility/Taiwanseligibility.aspx

Appendix 1: Template Questionnaire[158]

No Automatic Funding; No Problem?

Questionnaire on Horizon 2020 Participation in Third Countries without Automatic Funding

Our Task: The aim of our present task is to provide support for the use of Horizon 2020 as an instrument for EU-India STI Cooperation. Whereas in FP7, Indian project participants were automatically funded by the European Commission, in Horizon 2020, funding in general calls for collaborative projects will not be automatic anymore.

Objectives: We are reviewing possible paths forward based on evidence from other emerging and industrialised countries to support the participation of their researchers in framework programmes in the absence of automatic funding from the EC.

Our Request: Given your experience supporting EU-[Country] collaboration, we would greatly appreciate your expertise in helping us map out the path forward taken by [Country]. As a country that has participated in EU Framework Programmes without automatic funding, the experience of [Country] may have useful learning for the Indian case. We have highlighted the key issues comprising this scenario. We would kindly request you to share with us your knowledge of the [Country] case with respect to its participation in the EU Framework Programme without automatic funding from the EC.

Questions and dimension of analysis

- **Overview:**

  A) [Country] participated in [n] FP7 projects.
  B) How did this participation occur without automatic funding from the EC?

  c) How would you characterise [Country] participation in the first calls for proposals of Horizon 2020 collaborative projects?

  D) How many applications have been received and selected? What is the financial value of selected projects?

- **Scientific Priorities:**

  A) How has [Country] identified and aligned their national scientific priorities along with Horizon 2020 Work Programmes?

- **Evaluation:**

[158] This questionnaire has been developed in the framework of Indigo Policy. The Indigo Policy project is a three-year FP7 coordination and support action project with India. It supports and coordinates bilateral activities and initiatives between Europe and India in order to build mutual areas of interest between the two regions in Scientific, Technological and Innovation fields.

A) While the selection process for Horizon 2020 evaluators is open to all, Third Countries are not involved in the evaluation of collaborative projects. Has this posed a problem for [Country]?
B) And if so, has any remedy been proposed or implemented?
C) If [Country] funds its own national teams (or were to fund national teams), does it (or would it) rely on the H2020 evaluation or develop its own parallel evaluation?

- **Funding:**

A) Without automatic funding from the EC, how do [Country] researchers participate in Horizon 2020?
B) If attached to a successful application, from where will an [Country] scientist receive funding?

- **Coordinated Calls:**

A) Are any coordinated calls for collaborative projects in the thematic areas of H2020 being held or planned between [Country] and the EU?

- **Other Actions and Instruments:**

A) Have any special instruments or actions been taken either by the EU or [Country] to facilitate collaboration through H2020?
B) For example, ERA-NETS/JPIs? Is there any separate plan for an opening of [Country] national programmes to European participation?

INDIGO POLICY

Supporting the Science-Technology-Innovation dialogue India-EU

Project	INDIGO POLICY
FP7 GA No.	609535
Deliverable Number:	D 2.4
Submission Date	30.11.2016
Responsible author(s):	Main redactor: Nick Booker, IndoGenius, India Contributor: Katie Jo Walter, IndoGenius, India

Deliverable: Policy Paper on Horizon 2020 opportunities for India

Addendum: New and Upcoming Agreements Facilitating Cooperation between EU and India under Horizon 2020

Abstract: This policy paper addendum addresses a number of actions taken to increase Horizon 2020 participation with India following the initial paper's publication. Specifically, this addendum presents updated information on funding actions and instruments as they are being implemented in India, Brazil and Canada.

Work package	WP 2 – Support to EU-India Policy Dialogue
Deliverable	Policy Paper on Horizon 2020 opportunities for India
Contributors	Nick Booker, IndoGenius, India Katie Jo Walter, IndoGenius, India
Dissemination level	PU
Due submission date	
Actual submission date	30.11.2016
Project	INDIGO POLICY
FP7 contract number	609535
Start date of project	01/11/2013
Duration	42 months

Author's Note

The authors are solely responsible for the content of this technical presentation. The technical presentation does not necessarily reflect the official position of the European Commission.

India

In March of 2016, India's Department of Biotechnology (DBT) renewed its commitment to co-fund Indian participation in Horizon 2020 for research in the following priority areas:

- Health, demographic change and wellbeing (Horizon 2020 Societal Challenge 1)
- Food security, sustainable agriculture and forestry, marine and maritime and inland water research, and the Bioeconomy (Horizon 2020 Societal Challenge 2)
- Secure, clean and efficient energy (Horizon 2020 Societal Challenge 3)
- Nanotechnologies,
- Advanced Materials
- Biotechnology
- Advanced Manufacturing and Processing.[1]

DBT co-funding is available for projects under the Horizon 2020 Work Program 2016/17 (ending March 2017) under the following conditions:

- Funding: maximum project duration is three years, maximum funding is INR 30,000,000 for any single project and adherence to national/regional regulations and scientific remits as detailed by DBT.
- Parallel evaluation: In addition to the Horizon 2020 proposal, Indian applicants must submit to DBT a portion of their proposal along with a financial plan showing expected expenditures by all Indian applicants on the proposed project.
- Application submission timing: A two-stage application process requires applicants to submit proposals to the European Commission and DBT simultaneously.[2]

Furthermore, The Department of Science and Technology (DST) has agreed to co-fund three specific projects under the Horizon 2020 Work Program 2016/17:

- Architectured /Advanced material concepts for intelligent bulk material structures
- Improved material durability in buildings and infrastructures, including offshore
- Cross-cutting KETs for diagnostics at the point-of-care

As with DBT co-funded projects, DST has implemented parallel evaluation via a two-stage application process. DST funding conditions, however are different in two respects: there is no time limitation to projects and the cap on funding is set at INR 10,000,000[3]

These co-funding mechanisms are a welcome continuation and broadening of EU–India funding cooperation under Horizon 2020. However, continued cofunding for future Horizon 2020 Work Plan

[1] http://www.kowi.de/en/desktopdefault.aspx/tabid-36/1812_read-7305/
[2] http://www.dbtindia.nic.in/wp-content/uploads/DBT-EU-calls-under-H2020-.pdf
[3] http://dst.gov.in/sites/default/files/DST-EC-Call%20note-co-funding-2016-DST-version-%282%29-revised-100816-clean.pdf

projects is uncertain. To this end, the policy analysis and suggestions contained in our original paper continue to be relevant to developing solutions to India's decreased participation in collaborative projects with the EU following the removal of automatic funding.

Brazil

Several Brazilian State Funding Agencies have established independent schemes for providing Horizon 2020 participation funding. In 2015, the Research Foundation of the State of São Paulo (FAPESP) was the first agency to do so. To date, the National Council of Research Foundations (CONFAP) has worked with other State Funding Agencies to launch their own schemes.[4] To date, schemes launched include the following:

- Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP)
- Fundação de Amparo à Pesquisa e Inovação do Estado de Santa Catarina (FAPESC)
- Fundação de Amparo à Pesquisa do Estado de Goiás (FAPEG)
- Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG)
- Fundação de amparo à Pesquisa do Distrito Federal (FAPDF)
- Fundação Araucária de Apoio ao Desenvolvimento Científico e Tecnológico do Estado do Paraná (FAPPR)
- Fundação de Amparo à Pesquisa e Inovação de Espírito Santo
  Conselho Nacional das Fundações Estaduais de Amparo à Pesquisa (CONFAP)[5]

Under these regional funding schemes, each State Funding Agency is able to provide funding according to their own research priorities. Funding conditions, parallel evaluation requirements and application submission timing also vary between different State Funding Agencies.

This paper's suggestion that Indian state funding agencies be approached now deserves even greater emphasis and consideration now that Brazil is following this strategy. The Brazilian scenario can join that of Canada as a case study for India's state funding agencies should they consider individual schemes to promote Horizon 2020 participation.

Canada

In 2016, the EU and Canada signed an administrative Agreement meant to increase Canadian participation in Horizon 2020 projects. The agreement is meant to pave the way for Government of Canada Science Based Departments and Agencies (SBDA) and Granting Agencies (GA) to co-fund selected Horizon 2020 projects for Canadian applicants. The agreement is valid for the full duration of the Horizon 2020 initiative. [6]

[4]http://confap.org.br/news/wp-content/uploads/2016/03/QNL_1-1.pdf
[5]http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020_localsupp_brazil_en.pdf
[6]https://ec.europa.eu/research/iscp/pdf/policy/administrative_arrangement_canada-h2020_062016.pdf

This would allow for the establishment of co-funding mechanisms similar to those currently in effect with between EU and India's Department of Biotechnology and Department of Science and Technology. At time of writing, the new Canadian SBDA/GA funding schemes following the Administrative Agreement are yet to be launched.