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Indo-German Entanglements in Science and Technology: The Indian Institute of Technology Madras

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Introduction

In my current research project, I explore Indo-German scientific and technical collaboration during the Cold War through archival material on the history of the Indian Institute of Technology (IIT) Madras, available in India as well as in German archives. IIT Madras was founded and set up between 1956 and 1974 with the assistance of the Federal Republic of Germany in the context of an evolving development discourse. By the 1970s, IIT Madras had developed into "one of the Premier Institutions of its kind and the largest and most advanced technical education project undertaken by the Federal Republic of Germany outside Germany" (Fifth Indo-German Agreement, 1979). Between 20 and 40 German experts worked at any given time between 1959 and 1974 to set up laboratories and engineering curricula and establish a corresponding research agenda, while a first generation of Indian faculty in return received their training in Germany through a scholarship programme. German ideas and practices of engineering education and research are manifested and materialized in laboratory setups and large amounts of German scientific equipment.

What were the motives, aspirations and experiences of the Indian and German actors involved? Rich archival material in both countries facilitates an entangled history, bringing together both Indian and German perspectives and narratives. The status and accessibility to archival sources is rather asymmetric. IIT Madras has only recently taken first steps to establish its institutional archive. A survey of potential archival documents at IIT Madras has yielded large amounts of material but also the urgent need for conservation and preservation. The earliest documents on the planning of the institution in 1956 are found in the Political Archive of the Federal Foreign Office (Politisches Archiv des Auswärtigen Amts) in Berlin. The German Federal Archives (Bundesarchiv) in Koblenz hold an archive repository on IIT Madras by the Federal Ministry for Economic Cooperation and Development (Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung). Other key archives for the history of IIT Madras include the archives of the technical universities of Aachen, Berlin, Braunschweig, and Stuttgart, which were mentor institutions in setting up IIT Madras. Oral history interviews with former Indian and German faculty and officials and a large photo collection at the IIT Madras Heritage Centre complement the archival material.

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The entangled histories of IIT Madras

How did the German professors think Indian engineers should be trained given their own background from the German system of technical education? How did German conceptions correspond to the viewpoints and expectations of their Indian counterparts? How did Indian students, faculty and others experience the first decades of Indo-German collaboration? Which kinds of differences but also convergences in aspirations can be traced on both the Indian and German sides? How did ideas and practices of engineering education and research unfold and transform in the Indian, or we might rather say in the Madras environment? It comes as little surprise for a foundation with German involvement that Mechanical Engineering was, and still is, the largest faculty at IIT Madras. A 'sandwich system', where first year students spent every alternate week in the workshop has, however, been abandoned. While Indian IIT-graduates have become a successful brand within the international corporate world, the curriculum has gradually moved away from a focus on the laboratory and workshop, and towards computation and theory.

In my project, I trace the first generation of German experts, laboratory equipment and practices at IIT Madras and place them within concepts and traditions of science and engineering education and research. This history is embedded in a larger context of Indo-German political, economic, scientific and industrial relationships, and German involvement in technical education and aid. The history of the Indian Institutes of Technology has so far been understood as the import of a Massachusetts Institute of Technology (MIT)-type institution into post-independence Nehruvian India that facilitated outsourcing and the rise of the Indian IT industry (Bassett 2009 and 2016, Sharma 2016, Leslie and Kargon 1996 and 2006, and Selaby 1972). After decolonization, India was identified with underdevelopment. In the vision of Jawaharlal Nehru, the first Prime Minister of India, scientific and technical education was a primary engine to transform India into a modern and prosperous nation-state. The post-independence Sarkar Committee Report became a blueprint for the establishment of the Indian IITs. The report identified specifically the need for a number of "MIT-type Institutions" to develop and modernize science and engineering education in India (Sarkar Committee 1948).

The history of IIT Madras, however, reveals a more complex story. When it was inaugurated in 1959, IIT Madras was the third IIT after Kharagpur, founded independently in 1951, and IIT Bombay, founded with the assistance of the Soviet Union in 1958, just a year after the Sputnik shock. The IIT Kanpur Indo-American Programme came into existence only in 1961 (Selaby 1972). Accepting assistance from both, the Soviet Union and the United States was central to Indian non-alignment policy. The agreement that Germany would assist in setting up one of the IITs was made at the meeting between Nehru and Konrad Adenauer in 1956, which was dominated by discourses on the division of Germany and tensions between east and west. After obtaining sovereignty in 1955, the Federal Republic of Germany could explore its role as an international player and an articulated member of the Western Block while the Hallstein doctrine expressed the Federal Republic's claim to be the only legitimate representative of a German state. The governance of setting up IIT Madras, until 1961 directly under the Foreign Office, followed political guidelines, to which educational and

scientific aspects were subordinate. Seen from the West-German perspective, setting up IIT Madras was pursuing cold war foreign politics by other means.

Indo-German intellectual and scientific exchanges date back to the 18th and 19th centuries, when Germans were employed by the East India Company and the British Indian State, and studied Indian culture, languages and philosophy (Manjapra 2013). Freedom fighters saw in Germany the enemy of the despised British Raj, and therefore a potential ally. They also had a high regard for the Humboldtian university and German technical education. The German *Technische Hochschule* served at the fin de siècle as a model for higher engineering education in North America as well as in large parts of Eastern Europe and Scandinavia (Wittje 2006). I investigate how the establishment of IIT Madras compares to these earlier adaptations of a Technische Hochschule model. While the Indo-German relationship was re-cast in the post-WWII world order, where the US claimed a lead in Third World modernization, the *Wirtschaftswunder* brought Germany back as an economic player.

Companies like Siemens, Bosch, Daimler Benz and AEG established joint ventures and production plants in India and required local engineers and workers who were skilled to satisfy the needs of the German shop floor. It remains to be studied how IIT Madras fits into this picture. IIT Madras was the largest, but only one of the many German projects on technical education in India, which was mainly aimed at vocational training. Indo-German collaboration in technical education was not sheer selfless development aid but intended to meet the needs of German companies on the Indian market (Preuss 2013, Lubinski 2018, Tetzlaff 2018). Diverging aspirations for IIT Madras between the Indian and the German side became clear in the initial documents, whereby the Germans labelled the institute as a *Technische Lehranstalt*, an institution for practical training of hands-on engineering skills rather than an elite research university like MIT. It also needs to be studied how Indo-German cooperation in technical education relates to similar cooperation in Asian, Latin American and African countries where German companies had similar interests.

One of the aspects I study is how the establishment of IIT Madras related to the social, economic, and cultural texture of South India in general and Madras as a city, in particular. How did science and engineering education policy translate into practice locally? The German experts laid a large emphasis on practical education and lamented the lopsided theoretical orientation of their Indian colleagues. Did the German experts make attempts to connect practice in engineering education to the arguably skilful arts and craft communities of South India, or to develop an understanding for the low status accorded to practical knowledge and manual labour in Indian social structure and caste-based society? It seems that they replicated a German craft workshop instead. Their Indian colleagues agreed on the importance of practice, but only in theory, as Sabine Preuss has put it (Preuss 2013, p. 96). Instead of becoming engines of social transformation, as envisioned in the Nehruvian project, IIT Madras and the other IITs became engines of social reproduction, as pointed out by Anjantha Subramanian (Subramanian 2015).

The boundary between Germans and Indians seems to have been clearly drawn with the German community of experts primarily staying among themselves rather than socially mingling with their Indian colleagues. Neither the community of German experts nor their

Indian counterparts, however, can be understood as homogeneous groups. Both were composed of individuals and subgroups with diverging, if not opposing histories, opinions and interests. Among the German group, tensions seem to have been strongest between professors and technicians, and between experts on the ground in Chennai and the administrators in Germany.

Archival material on the history of IIT Madras in India

Important source material on the history of IIT Madras in India are found at the IIT Madras Heritage Centre and among the administrative documents of IIT Madras, for which the institute is currently setting up an archive.

The IIT Madras Heritage Centre

The IIT Madras Heritage Centre was founded in 2006 by retired IIT Madras Professor Ajit Kumar Kolar. It is located on the ground floor of the Administration Building of IIT Madras and houses a permanent exhibition on the history of the institution.

http://heritage.iitm.ac.in/

The Heritage Centre is not an archive but has built up three important online collections related to the history of IIT Madras: the collection of historical photographs, annual reports and student publications, and oral history interviews.

http://heritage.iitm.ac.in/#collection

The collection of photographs contains about 15,000 photographs of convocations, laboratories and workshops, official visits of Indian and German scientists and politicians, as well as photographs of animals and plants on campus. The metadata for the photographs is often missing.

The collection of annual reports and student publications contains about 150 documents.

The Heritage Centre has so far conducted 57 oral history video interviews with former faculty and alumni, of which 43 are available on the website.

Setting up the historical archive of IIT Madras

IIT Madras has started the process of setting up its archive. During a survey on potential archival holdings conducted in 2017 by Kumaran Sathasivam, Senior Executive at the Heritage Centre and myself, we found large amounts of material which should be preserved and made accessible for historical research and the wider public. We envision the archive at IIT Madras not just as an administrative unit but as a vibrant hub that facilitates engagement with faculty and students from a variety of academic fields in research and teaching projects.

To set up the archive, a planning committee has been formed with myself as its chair and faculty advisor. An archive project team will plan the physical archive and draft its governing documents over the course of three years. The archive project will be inaugurated as part of the 60th anniversary celebrations of IIT Madras in 2019. The historical archive as a permanent setup, including storage facilities and a reading room, is scheduled to open to

the public by 2022. In addition to the records of the central administration and the academic departments and centres, the IIT Madras Historical Archive will collect personal papers of professors and other key actors at IIT Madras. This will be done in collaboration with the oral history interviews that have already been conducted by the IIT Madras Heritage Centre.

IIT Madras in German archives

In comparison to Indian archives or collections, large archive holdings on the history of IIT Madras can be found in the Federal Archives of the Federal Republic of Germany, as well as in the archive of the Technical University of Berlin. These relatively large, systematised holdings in the Federal Archives reflect the political importance that was accorded to the project.

The Political Archive of the Federal Foreign Office in Berlin
The Political Archive of the Federal Foreign Office in Berlin holds the oldest documents on the Indio-German collaboration to set up IIT Madras since the project was organized initially directly under the Foreign Office. The documentation starts with the initial offer made by the government of the Federal Republic of Germany to the Indian Government to support an Indian Technical Institute at a meeting between Nehru and Adenauer in 1956 and the subsequent India visit of the Rucker mission to start the planning. The files of the German Consulate in Madras (AV Neues Amt – Generalkonsulat Chennai) are specifically illuminating since the Consulate was central to the local coordination. The folders, which are organised both chronologically and thematically, contain meeting protocols, reports, correspondence and newspaper clippings. They include documents related to the opening of the institute and the arrival of German faculty and staff, which was attended by the consulate.

The archives of the Federal Ministry for Economic Cooperation and Development in Koblenz
In 1961, the Ministry for Economic Cooperation and Development (Bundesministeriums für wirtschaftliche Zusammenarbeit und Entwicklung) took over the planning and administration of the German engagement at IIT Madras. The project ran into a crisis after the First Indo-German Agreement expired in 1964. A new agreement was only signed in 1966 after the cooperation was re-organized and the Madras-Committee (Madras-Ausschuss), consisting of representatives of the ministry and mentor universities (the technical universities of Aachen, Berlin, Braunschweig and Stuttgart) took over planning and administration.

The holdings of the Ministry for Economic Cooperation and Development contain large amounts of material from the Madras-Committee and other material related to the planning and administration of the collaboration from the mid 1960s onwards, including folders on the individual laboratories to be set up, correspondence with German faculty and staff, reports from German faculty and visitors in Madras, and minutes of the meetings of the Madras-Committee. The documents include a series of drafts of the Indo-German government agreements and a detailed report of the status of IIT Madras as well as the general situation of scientific and technical education in India, drafted in 1967.

The archive of the Technical University of Berlin

As the Technical University of Berlin was one of the mentor institutions for IIT Madras, its archive has comparatively large holdings on the cooperation, starting from the mid-1960s to the late 1970s, when the set-up phase had been completed and the cooperation had been transformed into a partnership. The holdings contain minutes of the meetings of the Madras-Committee, reports from German faculty visiting IIT Madras, documentation of collaborative projects, and brochures and reports sent by IIT Madras. A section of the material concerns acquisitions for the IIT Madras library, for which the library of the Technical University was a mentor.

The archive of the Technical University of Berlin is so far the only university archive of any of the mentor universities, where larger archival holdings on the cooperation with IIT Madras could be located. The university archive of the University of Braunschweig has some material on Professor Robert Kraus, the first German coordinator for IIT Madras between 1959 and 1964, before the Madras-Committee was set up. The university archive of the RWTH Aachen has some material on Hans A. Havemann, Professor of International Technical Cooperation, who was central to the reorganization of the collaboration in the mid-1960s.

Concluding remarks: Writing Indo-German history from German archives

The rich archival holdings on the Indo-German collaboration to set up IIT Madras in German archives, together with the equally rich material in India, allow us to write entangled histories far beyond the institutional perspective. They help us to extend our perspectives on the history of scientific and technical education in India and the formation of the Indian engineer beyond the existing narratives of the British colonial engineer, MIT, and Silicon Valley (Ramnath 2017, Bassett 2009 and 2016, Sharma 2016).

The documents at IIT Madras and the interviews of the Heritage Centre provide for a history of IIT Madras from the perspective of Indian actors while the files in the German archives facilitate a distinctive view. Despite the richness and availability of sources in German archives, and the circumstance that setting up IIT Madras has been the largest and most advanced technical education project undertaken by the Federal Republic of Germany outside of Germany, its history has so far not attracted any attention among German historians, not to mention historians of science and technology. The transnational biographies of scientists and engineers like Robert Krauss and Hans A. Havemann, who taught and worked in Britain, China, Germany, India, and the United States, and the global ambitions of institutions like the Institute for International Technical Cooperation in Aachen, building partnerships from Tokyo to Tennessee, and from Madras to Valparaiso, have so far left little, if any, traces in history writing. Such entangled histories would be crucial to facilitate a more global understanding of the dynamics of 20th century science and technology beyond the India-Germany binary.

Finally, a plea for archives in India. A common pattern I observe is historians of science and technology of and in India either walking on the beaten track of (post)colonial archives in the UK and other countries, or becoming themselves archivists in India – a third solution is, of course, not to look at archival material at all. We should not substitute writing

colonial histories of science and technology from the British Library with writing postcolonial histories of India from German archives. The more I read about IIT Madras in German archives, the more it becomes a German story, the less it remains Indian. While the historian obviously rejoices to find such rich archival sources on the history of IIT Madras in Germany, truly entangled histories need more perspectives and voices, specifically those from Indian archives.

Archives

Bundesarchiv Koblenz

Bestand 213 – Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung

Heritage Centre IIT Madras

Photograph Collection
http://heritage.iitm.ac.in/listing/categories/Photograph?select=Collection

Collection of Institute Publications
http://heritage.iitm.ac.in/listing/Categories/Publication?select=Publication

Oral History Archives
http://heritage.iitm.ac.in/listing/artefacts/Multimedia%20File?Category=Oral+History+Archives

Politisches Archiv des Auswärtigen Amts Berlin

AV Neues Amt – Bestände des Generalkonsulats der Bundesrepublik Deutschland in Madras (Chennai)

Bestände Zwischenarchiv – Technische Hilfe für Indien

Bestände Zwischenarchiv – Indische Technische Hochschule Madras

Bestand B 58:35 – Technische Lehranstalt

Universitätsarchiv der Technischen Universität Berlin

Bestand 111 Akademisches Auslandsamt

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