



## **Engineers and Social Change in Colonial and Postcolonial India: Considerations between Recent Literature and Future Research Possibilities**

STEFAN TETZLAFF  
[STEFAN.TETZLAFF@ZMO.DE](mailto:STEFAN.TETZLAFF@ZMO.DE)

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449

Discussing the social evolution and impact of engineers in India must inevitably mean addressing the subject in the period between 1947 and 1990. Future research might want to discuss and analyse differences within this specific period, possibly using successive political leaderships of Jawaharlal Nehru, Indira Gandhi and Rajiv Gandhi as demarcations. This will not diminish the general importance of this period, which is indicated by two facts in particular: the period differed strongly from the late colonial period and it was a precursor to even larger changes starting in the 1990s. Relevant concerns around engineers manifest themselves in a wide-range of political, economic and social initiatives in India during the immediate postcolonial period. The initiative of one of India's foremost industrialists, G.D. Birla, to establish an Engineering College or Technical School in Calcutta for foremanship in foundry and engineering in the mid-1950s is one example. Firmly assuming that engineers in India at the time were not able to '[...] work with their hands [...]', Birla found a necessity for more practical training to improve the country's engineering education (G.D. Birla to B.C. Roy, West Bengal Chief Minister, 23 June 1955, M/o Education, NAI).



State institutions and commercial bodies also showed increasing interest in promoting engineering training during this period. In the run-up to a conference of the Confederation of Asian Chambers of Commerce and Industry, the Federation of Indian Chambers of Commerce & Industry (FICCI) discussed plans with Prime Minister Indira Gandhi (PM 1966-77, 80-4) to encourage industrialists to train young engineers in their establishments in the early 1970s. It was also argued that industrialists could help engineers set up their own small industries and thus help the Indian government in the then rampant problem of unemployment in several ways (D.C. Kothari to Indira Gandhi, 5 May 1970, Prime Minister's Office, NAI).

This was only one side of the picture, however. Actually, the situation of engineers working in prominent engineering industrial establishments in large urban centres of India was beleaguered with certain problems throughout the 1947 to 1990 period. During this period, it was generally easy for young students to find a job as engineers and they very much aspired doing so. In post-independence India, graduates often specifically sought out companies that were technologically more advanced and had diverse tasks in the manufacturing process. The automobile manufacturer Hindustan Motors Ltd. (HML), with a large-scale factory in Uttarpara from 1958, was a prominent example in West Bengal. In the subsequent decades of its existence, the company's work environment changed, given mismanagement and large-scale industrial decline in West Bengal. It was in this context that engineers, who had worked for the company for a couple of years, decided to leave their jobs and to seek positions in smaller industrial establishments in the region (my own interviews conducted with two former HML engineers in Kolkata, 20 February 2016).<sup>1</sup> Obviously, the demands of the nation-state and the industrial establishments for engineering cadres often ran counter to the social experience of engineers, especially during periods of education, work and leisure.

Engineers were at the centre of numerous discussions between the state, commercial bodies and other social actors in post-independence India. That the realities and life-worlds of engineers might have been different underlines how this is an important and relevant subject of research in its own right. It gains greater prominence when we realise that few social figures in India are so ubiquitous and influential in different walks of life today as the engineer. And yet, the engineer, as a figure that is imbricated with and reflective of India's social structure



and development in the period after independence, remains highly understudied in the academic literature.

This research report highlights some newly emerging interests in the study of engineers and social change in colonial and postcolonial India. The immediate reference point for this report is my participation in the ANR-funded Indo-French research project "Engineers and Society in Colonial and Postcolonial India".<sup>2</sup> The report begins with a brief review of new literature and research on the trajectory of engineers in colonial and postcolonial India. Following this, I highlight how my own research in different archives in India, the UK and Germany contributes to this new subject. I will also make some suggestions of future possibilities for researching this theme and how this might contribute to the ongoing discussion.

### **Existing research on engineers and engineering in India**

The literature on the trajectory of engineers in India remains highly underdeveloped and it is only recently that a research field has begun to emerge from new literature on this theme. This is in stark contrast to the literature on engineers in Europe and the US, where special interest emerged under specific circumstances of high industrial development. Relevant studies for these regions have been around at least since the early twentieth century. There is now a large body of work addressing nearly every field of engineering and specific aspects such as engineering associations. For both regions, engineers have largely been held responsible for influencing economic and social change in one way or another. The argument that innovation comes from engineer-entrepreneurs who then market their products also stems from the example of industrialised countries (Feldhaus 1910). There are also important and deeply researched contributions about visions of engineers and how this might have influenced historical trajectories (Dienel 1992). This corpus of literature is also by and large a product of a sound source basis.

In comparison, writings on engineers and engineering in India are very few and recent. Certainly, further research is now being undertaken on this rather forgotten, but nonetheless important, topic than was the case in the 1990s and 2000s. But scholars have only started to scratch the surface and there remain substantial lacunae that need to be pursued in future research. This research will have to address the absence of engineers in the literature till date as well as methodological and source-related questions. However, this recent



resurging interest in engineers in India has several reasons. It comes at a time when the country's economic and political development seems to be increasingly influenced by a new set of social actors. Engineers rank rather high among these actors rendering them highly important as an object of study. The interest is largely focused on studying the specific role and contribution of engineers to the development process, and how development processes reflect in the engineering profession.

When historians looked for sources on the subject in India in the past, they could hardly hope to find much inside and outside the official archives at the central and state levels. This picture, however, is increasingly changing as a large number of institutional and company archives in India become accessible to historians. As a result, India's engineers now have a historical record that can be looked at to tell us more about their trajectory as social actors and as a phenomenon reflecting larger social change. As far as a new perception of engineers in India is concerned, several questions immediately emerge in this regard: did the connection between the British Empire and India as a colony have an effect on engineers, and if so what was the nature of this effect? Did the postcolonial period differ from the colonial period in this respect and if so how? How can we understand the transition to the 1990s economic reforms?

The existing literature shows two diverging trends in these respects. Older historical works address developments during late colonialism whereas more recent anthropological works focus by and large on the period since the 1990s respectively. Among earlier historical works, Rajat Kanta Ray's study stands out as the most important and sophisticated one (Ray 1983). Taking India's lack of industrial development during the colonial period as a given, Ray tries to explain, among others, the non-existence of a large engineering cadre in specific industries during late colonialism. According to Ray, the colonial state primarily fostered training in engineering subjects that were relevant to the state. This meant a high focus on public works' projects rather than state-aided industrial projects in the public and private sectors. At the other end of the spectrum, the state also staffed most of the higher engineering positions in state departments with engineers from abroad. This created imbalances and had a negative influence on the number of educational institutions for engineers in India.

On the other hand, more recent anthropological works focus primarily on the period since the 1990s. Around this time, India first



became part of a globalising software industry that sought well educated, but cheaper labour in non-industrialised countries. Large multinational companies like the US-based company IBM (founded in 1992) or Germany's SAP (1996) and their subsidiaries or contracted companies began to establish their own offices with lush campuses in India. This provided busy techies not only an unforeseen number of jobs, but also a new work culture and a new outlook on life. This, in turn, changed many other aspects of life ranging from consumption cultures and leisure activities to political perception and participation. However, few of these issues have actually been delved into and historicised clearly for the Indian context. More recent contributions focus primarily on the expansion of the software offshore and IT economy from the 1980s as such (Sharma 2015; Upadhyya 2016). They do not focus on the role and situation of the engineers and how they contributed to or changed these conditions as specific figures though a few exceptions do exist. One example is when anthropologists study specific situations and social implications of infrastructural projects to which engineers contribute (Björkman *forthcoming*). Despite such recent endeavours there is hardly any literature which historicises engineers in India in their specific social settings. Moreover, the period between late colonialism and the 1980s is largely absent from their discussions. Both aspects are immediately relevant for comprehending the present conditions.

More recently, a new generation of historians has taken up some of these missing links as to the relationship between engineers and different forms of social change. I discuss these contributions briefly in the following. All contributions are concerned with the transitions from late colonial to early postcolonial years India. But they differ in their content and assessment of the relationship between engineers and social change in these periods. Covering the trajectory between the late nineteenth century and the present, a recent study offers a compelling account of how and why Indian engineers became so important in the IT industry in India and in the US (Bassett 2016). Focusing on Indian graduates of the Massachusetts Institute of Technology, the book shows in particular how a sizeable number of Indian engineers consciously sought education abroad. As such, the account offers a long-durée and novel history of the co-evolution of IT industry and IT engineers in India (Bassett 2016). A second and even more recent work studies—the 'birth of the engineering profession' in India between 1900 and 1947 (Ramnath 2017).



Looking at the relationship between engineers, industry and the state, the book argues that 'Indianisation' of specific engineering tasks and industrial development were responsible for the growth of the profession. Consecutive chapters then follow up this argument for professional institutions and for specific engineering fields (which are public works, railways, steel industry). The idea of 'Indianisation' is also at the heart of a forthcoming work on the trajectory of Indian and European engineers in the Bombay Public Works Department (Caru 2016). Research till date has mostly argued that these two groups were treated differentially, which is by and large correct. However, Caru manages to show that Indian engineers tried to press their claims to be treated at par with their European contemporaries. In this process, Indian engineers re-fashioned the concept of the profession, as they were 'inspired by liberal and nationalist ideals, based on merit, technical qualifications and the national interest of the work they undertook' (ibid.: 12).

When looked upon together as a unit, this literature appears to have taken up some of the arguments of the first wave of historical writings. However, they also try to differentiate and explain the trajectory of Indian and foreign engineers more than the earlier literature. One might ask how do these works reflect on the state of engineers in India? What do they contribute to our vision informed by scholars working on the nineteenth and early twentieth century, and those working on the post-economic reforms India? First of all, these latest works are primarily interested in the relationship between engineers and different forms of social change. In the case of Bassett's work, there is a strong notion that Indian graduates aspired to go and be educated abroad—often supported by their families. Ramnath primarily looks at the ramifications of the social upward mobility of engineers in the emergence of the notion of a profession.

Caru, on the other hand, looks at attempts of Indian engineers to climb up the social hierarchy vis-à-vis European engineers in the Public Works Department. Except for Bassett's work, writings remain rather limited to India and focus on the question of 'Indianisation' in public services and large-scale foreign or state-owned engineering companies during the first half of the 1900s. Secondly, to arrive at their findings all works approach a different set of sources with a different set of new questions in comparison to earlier approaches. They are primarily informed by the use of numerous important and newly accessible archival collections produced by different institutions (such as the state, companies, engineering associations) to highlight changes that



came about during colonialism and after. These latest works point to the fact that new evidence exists in several institutions that, which though hitherto relatively underexplored, can nonetheless be used to argue for a veritable social change in the composition of engineers.

### **New research evidence and future research possibilities**

Historically inclined scholars test their disciplinary boundaries by introducing and analysing new sources as relevant evidence. Ideally, this process leads to posing and answering new questions and to sketching a view that has not been described before. The most recent literature on engineers has already introduced numerous new evidence and themes. Future work could devote itself to contributing further in the same direction. My own research experience on the history of engineers provide an entry points into the kinds of evidence and themes researchers might want to seek, and how this could be used in future research on India's engineers.

My research since 2015 has been devoted to a deeper probing into the establishment of automotive engineering plants in different regions of India since the 1940s. I was specifically interested in how one Indo-British (Hindustan Motors and Morris Motors) and one Indo-German automotive joint venture (Tata and Daimler-Benz) set up their manufacturing locations in Kolkata and Jamshedpur respectively. One of the core questions of my research has been engaging with the engineering demands that the companies faced given their new endeavours in this direction. More specifically, I asked in my past research whether or not and, if so then to which extent, these new enterprises also trained an adequate engineering cadre for their own factories as they knew that foreign collaboration would end at one point. In approaching my research questions, I was guided to some extent by the findings of an earlier research on the gradually changing engineering scenario in India up to 1950 in the context of the emerging politics of planning that continued to advocate engineering education and employment for a happy few (Ramnath 2007, 2012).

The findings of my research on engineers in the automotive manufacturing industry were not quite conclusive: on the one hand, I found out that companies for many decades used engineers with all kinds of different educational backgrounds (e.g. from the field of mechanical engineering) and that the automotive engineer emerged as a figure only from the 1980s. Moreover, education in mechanical and other engineering fields in a way continued to be streamlined according to



prerogatives of the state and the corporate world for much of the post-independence period. Specifically, the state seemed to push for a differentiation in the education of upper and lower-ranking engineers of all engineering branches. It did so by creating institutions of higher learning for engineers and institutions of intermediate learning for engineering trainees. With specific reference to the two companies I looked at, I found out that upon the start of their operations both mainly used foreign engineering expertise of their foreign collaboration partners. There was indeed vocational training in the companies and trainees were also sent abroad for training in European factories. By and large, however, it was only in later decades that the companies became increasingly interested in setting up engineering education for their own purposes. One milestone in this respect was the introduction of TELCO's graduate trainee programme in the late 1960s. This programme specifically addressed in-house engineering training for specific trainees based on merit.

I arrived at these findings following research in several archives across India. For the case study on Hindustan Motors, I conducted archival and field research for a couple of weeks in Uttarpara and Kolkata. Unfortunately, the company management did not grant access to the company archives as these were locked up within the factory premises that are still occupied by workers. Even the state archives of West Bengal would not be a relevant resource for as twentieth century archival collections are not made accessible. As a result, I had to draw most of my results from research with printed materials in the National Library in Kolkata and from documents of the Morris Motors archives in the UK. The process was not rendered easier for the case study of the Indo-German engineering firm in Jamshedpur. The Tata Central Archives (Pune) do contain enormous information on the evolution of the enterprise, but their employees do not surface substantially in the documents. Similarly, the archives of Daimler-Benz are mainly focused on the bigger picture of export numbers and profits rather than on technical issues within the production environment. As a result, the impossibility to manoeuvre around these difficulties compelled me to give up pursuing further research on this theme, at the very least, for the time being.

Future attempts to work on the history of engineers in India could profit by picking up some of the suggestions made by earlier research. This would help in streamlining the research that is necessary for the task at hand. The research literature shows that there are rather vast themes and archival collections that have not been looked at much





until now. This refers specifically to the archives of private corporations and their foreign collaboration partners as well as institutional collections. These are important in a double way: private enterprise and non-state institutions are still largely neglected in the study of post-independence engineering in India. This is an artificial divide and can only be regarded as a hangover in the academic realm from what was once seen as India's planning period. Similarly, looking at corporate and non-state institutional archives provides the chance to cast a fresh glance upon a discussion that has focussed on state-produced documents for too long. There is a high potential for conducting further wide-ranging research on the relationship between engineers and social change. This potential refers both to thematic content and argumentation, and to archives and sources that could be used to tell this story.

But which existing archives could be used to study India's engineers? Archives and libraries in the country do hold an abundance of material on twentieth century history in general and on the history of engineers in particular. The most recent works in the field (Bassett 2016; Ramnath 2017) indicate this quite clearly. However, there is a case to be made for using additional archives in India, of which archives of specific corporations in the engineering industry are the most important. We do not know how many records of engineering industrial establishments still remain with the parent companies across India though unattended and unknown to historians. So far, it is only a limited number of corporate archives, relating more or less directly to the history of engineers, that have become accessible.<sup>3</sup>

There are also an increasing number of records to be found in private collections of institutions. The Nehru Memorial Museum and Library (NMML) for example holds substantial archival material of the Hindustan Construction Company (for the period 1925-68) and of sister companies in the collection of the founder of the company, Seth Walchand Hirachand. These materials provide detailed information on the history of this construction company and also on its engineers. There are also the Godrej company archives, which were set up in Mumbai in the early 2000s and are now one of the most sophisticated Indian business archives. The archive holds a unique collection of materials on engineers and engineering topics and a large series of interviews with several hundreds of engineers from different departments of the company. This material covers a wide range of information on the establishment of the two companies, their



engineering operations and on how their respective engineering personnel contributed to these operations.

There is no doubt that working with and in economic and business archives in India poses certain problems. As I personally encountered, many companies do not, or even cannot, permit access to their records. In some cases, this has simple bureaucratic reasons or the wish not to tell the public too much about the company's trajectory. In other cases, company records simply do not exist anymore. My archival work in different parts of India was largely framed by this difficult situation of being able or unable to access company records.<sup>4</sup> Apart from this, it will also not be sufficient to study only company archives for engineering aspects. There is certain information that can only be studied from journals and newspapers and other media items. This is where archives and libraries in India often do not possess the necessary depth and width to study the evolution of India's engineers in wider contexts. Repositories are particularly weak when one attempts to study specific themes, such as the trajectory of engineering institutions or transnational connections of India's engineers.

In contrast to this, repositories in other parts of the world, especially in Europe and the US, often have a wide-range of unused sources that are unmatched by Indian repositories. This makes it important to supplement material from India with these sources. Resources in the Linda Hall Library in Kansas City, USA would be a great addition in continuing research on this topic. Specialised in the fields of engineering, technology and science, the library has an impressive and comprehensive number of engineering and other relevant journals. These provide a mass of information on engineers, their institutions and professional aspects that no other library in India can compete with.<sup>5</sup> Similarly, business archives of companies collaborating with Indian companies in Germany often contain information on the training of engineers abroad—something that remains more or less invisible in archives in India.<sup>6</sup>

Apart from specific archives, future research could also take larger considerations into account. This applies to both the content and methods of working on and with the topic. How should these new archives be used and what themes can be distilled from them? How can these archives provide a new insight into the study of engineers? How could these unexplored sources be operationalised to tell a different or more complex story? There is in fact a dearth of work in



Indian historiography that uses economic archives to tell a new and more sophisticated story of the trajectory of India's engineers. It is here that the interests and activities of economic actors might have grown exponentially, but more importantly they can also be followed up. Among economic archives, particularly company and business records in India could serve as a useful window to study social history in general and the history of engineers in their social settings in particular.

It is not that such material has not been used before. However, if so, then sources have primarily been utilised to argue about the trajectory of India's political economy after independence. A focus on engineers would demand reading the available documents in a different context and through a different analytical lens. Most importantly, research on engineers would need to work across the normally accepted temporal divide between colonial, postcolonial and post-economic reforms India. This would allow us to establish a long-durée history of engineers that does not fall prey to easy explanations. Also, new sites on which engineers worked need to be identified. We have already mentioned the private company as a prominent place, but there were several other sites that engaged engineers. In post-independence India, few state agencies expanded in personnel as strongly as the Public Works Department, as it gave many engineers jobs in the construction of roads, wells and other rural services.

459

The different and changing life-worlds of engineers would be another important topic to study. There is some new work on the social structure of IIT graduates in particular (Subramanian 2015), yet similar issues have not been addressed in the realm of public or private institutions employing engineers. Therefore, the historical literature does not address the social contexts of engineers (such as their origins, education and employment) as well as their work environment sufficiently to find out more about the relationship between engineers and social change in India.

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### Endnotes

<sup>1</sup> The names of these engineers are not stated so to protect their identity.

<sup>2</sup> The project was coordinated by Vanessa Caru from the South Asia Studies Centre (EHESS-CNRS) in Paris between 2014-2018. More information on the research project and sub-projects is available at <http://engind.hypotheses.org/>.

<sup>3</sup> Examples of relevant corporate archives include the archives of Tata (Pune, Jamshedpur), Godrej and CIPLA (both Mumbai).



<sup>4</sup> I was trying to enter the archives of Hindustan Motors during my research in Kolkata in early 2016, but the company management told me that workers were occupying their factory buildings and so hindered access to management records.

<sup>5</sup> The catalogue of the Linda Hall Library reveals that it holds substantial runs of publications of four engineering societies that existed in India in the period (among them, the *Institution of Engineers, India Society of Engineers, the Association of Engineers* and the *Engineers Guild of India*. There is also a rather long series of issues of the journal of the Engineers Guild—called *Professional engineer: India's own journal about the Engineering Profession* (1965-73). The library also holds the *Journal of Technology* (1956-70) published by the Bengal Engineering College at Howrah (now called Indian Institute of Engineering Science and Technology, Shibpur) and the *Journal of Science and Engineering Research* of the Indian Institute of Technology at Kharagpur (1957-70). *Both institutions were* among the most important engineering colleges in late colonial and postcolonial India so that they will provide highly useful information for my research.

<sup>6</sup> One example are the records about the engineering company Utkal Machinery Ltd., owned and operated by different German and Indian companies, among others Larsen & Toubro. Their records can be found in different repositories in Germany, such as in the Rheinisch-Westfälisches Wirtschaftsarchiv in Cologne.

### Primary sources

National Archives of India (NAI), Ministry of Education, 1958, Section T-4, F-3-2.

NAI, Prime Minister's Office, 1970, 17/548.

460

### Bibliography

Bassett, Ross. 2016. *The technological Indian*. Cambridge: Harvard University Press.

Björkman, Lisa. The engineer and the plumber: mediating Mumbai's conflicting infrastructural imaginaries. Forthcoming in *International Journal of Urban and Regional Research*.

Caru, Vanessa. The creation of a 'corps d'état'? Indian and European engineers of the Bombay public works department [1860's–1940's]. Presented at the midterm workshop of the ENGIND project: Engineers and Society in Colonial and Postcolonial India, Delhi, 11 January 2016.

Dienel, Hans-Liudger. 1997. *Herrschaft über die Natur? Naturvorstellungen deutscher Ingenieure 1871-1914*. Bassum: Verlag für Geschichte der Naturwissenschaften und der Technik.

Feldhaus, Franz Marie. 1910. *Der Ingenieur: seine kulturelle, gesellschaftliche und soziale Bedeutung mit einem historischen Überblick über das Ingenieurwesen*. Stuttgart: Franckh.



- 
- Radjou, Navi et. al., eds. 2012. *Jugaad innovation: think frugal, be flexible, generate breakthrough growth*. San Francisco: Jossey-Bass.
- Ramnath, Aparajith. 2017. *The birth of an Indian profession: engineers, industry, and the state, 1900–47*. New Delhi: Oxford University Press.
- Sharma, Dinesh C. 2015. *The outsourcer: the story of India's IT revolution*. Cambridge: MIT Press.
- Subramanian, Ajantha. 2015. Making merit: the Indian Institutes of Technology and the social life of caste. *Comparative Studies in Society and History*, 57 (2), pp. 291-322.
- Upadhya, Carol. 2016. *Reengineering India: work, capital, and class in an offshore economy*. New Delhi: Oxford University Press.