Supplementary: An Attempt at Using Mass Media Data to Analyze the Political Economy Around Some Key ICTD Policies in India

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1 Actors and their networks around policies

In our ongoing work, we are studying the state-capital network in India, to know more about the political economy around policies, in the form of interlocks between corporate and state entities. We have created a social network of these entities by crawling various structured and unstructured sources. The details of this network can be found in [4].

We analyze the state-capital networks for four ICTD policies, namely *Aadhaar, Digital India, Cashless Payments, and E-governance*. We analyze interlocks between important actors in the policy formulation around these four policies, to understand the role that these interconnections between political and corporate entities might play in policy formulation. We identify these actors in two ways. One, we use the list of most prominent entities covered in the mass media, in reference to the policy. Two, we start with a list of important ministries involved in each policy based on information obtained from external sources like *Wikipedia*. Finally, we consider the 2-hop neighborhood around these actors, to obtain the subgraph that helps us study these interlocks.

We first show a few interesting examples of corporate-government interlocks in table 1 corresponding to each of the four policies. We observe that both politicians and bureaucrats show examples of interlocks with corporations, some of which also belong to the media domain. This indicates a possible tendency of politicians to connect to media houses with an intention of shaping public opinion, even if at a regional level (*esakal* is a Marathi regional newspaper). We also find that family relations play a significant role in connecting political entities to corporations. This can be explained by the fact that quite often, relatives of influential politicians leverage their political connections to shape policies that could be beneficial to corporations linked to them[5]. Our intention is not to suggest that these interlocks lead to corruption and policy influence, but the fact that they exist and are quite dense, and as also pointed out in [4] that they have been getting denser over time, and hence, they should form a part of the analysis of the political economy behind different policies. We also show through an example that our system helps examine the ideological diversity in the social network around entities. In figure 1, we see the 2-hop interlock subgraphs for *Aadhaar* for one of the highest media covered entities, *Nandan Mohan Nilekani* (the proponent of Aadhaar). We can

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Aadhaar	Sharad Pawar — Pratap Govind Pawar — {The Indian Newspaper Society, Kirloskar Oil Engines Limited, Bharat Forge Limited, etc. }	*Pratap Govind Pawar*, the brother of NCP politician *Sharad Pawar*, is the director of a varied range of companies in the oil, agriculture, automobile, and media sectors. He is in the board of *The Indian Newspaper Society*, which is the central organization for the Press of India, an independent body authenticating circulation figures of newspapers. He is also a director in Abhijit Pawar Media Limited, which publishes the regional Marathi e-paper named *e-sakal*.
Cashless Payments	Anirudh Tewari — {Punjab Information and Communication Technology Corporation Limited, Punjab Communications Limited}	*Anirudh Tewari*, a bureaucrat in the finance ministry, is connected to several IT and communication firms. However, these are state owned firms and hence, may not indicate interlocks with the private sector.
Digital India	Anil Baijal — {IDFC Bank Limited, BS Broadcast and Communication Consultants Private Limited}	A former bureaucrat in the Ministry of Communications and IT, Anil Baijal is connected to IT and financial firms, including the IDFC group of companies. He is the current Lieutenant Governor of Delhi.
E-governance	Shri Vinod Rai—{IDFC Limited}—Chintamani Aniruddha Bhagat	*Vinod Rai*, the previous Comptroller and Auditor General of India (a bureaucrat) is connected to many large companies like IDFC Limited. IDFC is a finance and investment company with links to many other companies especially in the infrastructure sector. *Bhagat* is an executive director in the investments division of *Khazanah Nasional Berhad*. He used to serve several sovereign wealth funds, equity firms and family owned businesses.

Table 1: Some interesting examples of corporate-government interlocks present in the political economy subgraphs for the four policy events.
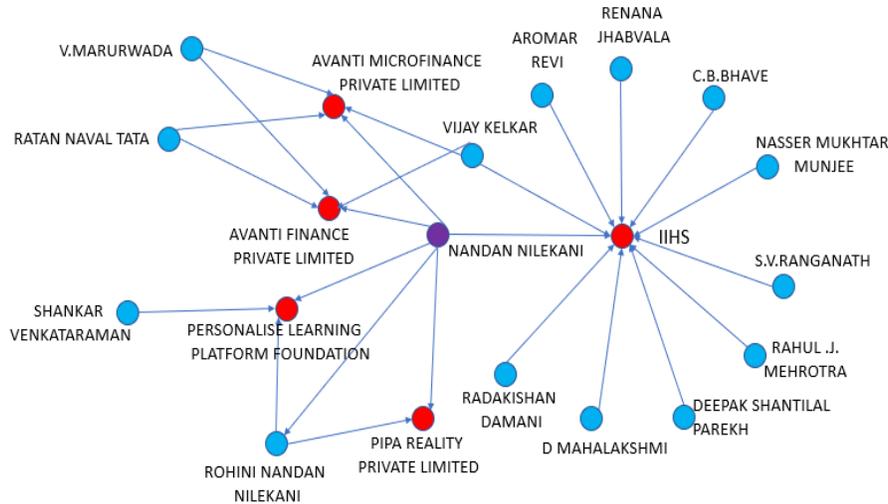
Figure 1: 2 hop interlock subgraph for Nandan Nilekani (Aadhaar), returned by our system

see some interlocks that represent issues highly covered by mass media. For example, *Nandan Nilekani* is seen to be connected to *Avanti Microfinance Limited* of which he is one of the prime investors, along with prominent industrialist *Ratan Naval Tata*. Avanti used India Stack which is a private platform based on *Aadhaar*, created by iSpirit which is a leading advocate of *Aadhaar*. Interlocks may not always indicate a potential for cronyism though – we find that *Nilekani* is connected through the Indian Institute of Human Settlements to *Renana Jhabvala* and *Aromar Revi*, both of whom are prominent social workers. Their influence could bring to *Aadhaar* more attention to issues of the poor. For example, in an article in *The Indian Express* on conditional cash transfer (related to *Aadhaar*), *Renana Jhabvala* writes regarding transition to Aadhaar seeded banking transactions [3], *"The burden of transition is falling on the poorest. Those most excluded have the least capacity to approach the system. The burden of change should be on the administration."* Clearly, this quote presents one of the problems that implementation of the policy suffers from. It must be noted that all entities in the subgraphs shown here may or may not be directly involved in the policy formulation. The presence of an entity in the subgraph only indicates that it is within a distance of two hops from the entity considered. Hence, the subgraph really indicates the potential for entities to influence the policy, rather than any evidence of actual influence asserted.

Our analysis in this section acts as a motivation to further study the state-capital interlock networks at an aggregate level, so as to find hotspots of policy influence. In other words, we want to see if groups of companies corresponding to an industry sector, or a group of state entities belonging to a few government ministries form hubs of interlocks, and hence, policy influence. In the next section, we carry out our analysis in this direction.

2 Ministry to Industry Interlocks

A high degree of interlock between ministries and industry sectors may indicate possible hotspots of policy influence and cronyism. We consider 99 industry sectors classified by the National Industrial Classification (NIC), and map them manually to 19 broad industry sectors based on their operations. We also consider 58 government ministries for our analysis. Next, we study the interlocks between these ministries and industry sectors, where we consider two hop *ministry—bureaucrat/politician—company* and three hop *ministry—bureaucrat/politician—company (subsidiary/owner)—company (owner/subsidiary)* paths between ministries and companies for our analysis. The interlocked bureaucrats (board members of companies) are further classified as: *influential* and *non-influential*. We perform this classification based on features like the number of weeks the bureaucrats spent in foreign training, their educational qualification, number of weeks spent in important departments, their designation, their appointment in central ministries, and total tenure till date. Further details about this classification can be found in our previous work [4]. We define a *large company* as a company which has an authorization capital[1] above 1 billion INR (14.5 million USD). Finally, we consider those government ministries as crony whose departments are listed by [1], for example *Coal, Steel, Petroleum, etc.* Following are some of the findings from our analysis:

The top three industries with the maximum number of ministry connections (industry-ministry interlocks) are *Manufacturing; Professional, Scientific, and Technical Activities (Management Consultancy); and Wholesale and Retail Trade*. Our finding of the Management Consultancy sector to be a highly interlocked can be justified by the study by Hayes et al. [2] where the authors argue that management consultancy firms are becoming increasingly important as relay nodes or mediators in the development chain especially in driving which ICTs are adopted or not.

The top three ministries with highest number of unique industry connections are *Finance, Commerce and Industry; Housing and Urban Affairs; and Agriculture and Farmers' Welfare*. These ministries are connected to some of the highly interlocked industry sectors. These are thus, the government hotspots to which the highly interlocked industries connect, and which could become hubs of cronyism.

We also find that within the three hop paths, 53.6% of the paths contain connections of bureaucrats to large firms, via subsidiary firms. Most of these owner companies are the primary firms of big business conglomerates like *Tata Steel Limited; Mahindra and Mahindra Limited; Adani Enterprises Limited; and ITC Limited*. These conglomerates operate across multiple industry sectors, which can further amplify the influence a bureaucrat might be able to exercise. It also must be noted that the corporate network in general has become more interlocked over the years, which further consolidates the ability of corporations and their directors to have wide-ranging influence.

There is a relatively high percentage of influential bureaucrats (16% of all connections) forming these ministry-industry interlocks. The overall percentage of influential bureaucrats in our data is 2.2%. This indicates interlocks also are more likely to be formed with influential bureaucrats that companies are interested to hire.

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[1]We decided this threshold based on a CDF of authorization capital of companies by taking the knee point of the distribution.

References

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