

Role of the Mass Media in Monitoring and Influencing the Performance of Social Welfare Schemes in India

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ABSTRACT

Abstract: The mass media plays an important role in democratic societies to impose checks and balances on the functioning of various institutions of the state, and in shaping public opinion by informing people about the performance of these institutions. The agenda of the mass media can however be influenced by the government in power, especially if the media is dependent on the government for funding, or the government is powerful and can compromise the safety of media personnel. In this paper, we carefully examine the interactions between three factors: the performance in India of a social welfare scheme on rural employment guarantee (obtained from official records), the volume and sentiment of coverage of these factors in the mass media (obtained through an analysis of news articles of six English national newspapers), and the political alignment between the state governments in different states with the central government (obtained from election data). We construct a time series of these three datasets from 2014 to 2021, and show (a) how various performance factors of the welfare scheme are treated differently by the media in different states based on whether they are aligned or non-aligned with the Central government, and (b) whether coverage in the media is able to influence the performance of the welfare scheme. To the best of our knowledge, this is the first study of its kind to examine the interplay between media bias, government performance, and government influence, and helps uncover the complexities and nuances of these relationships.

CCS CONCEPTS

- Applied computing → Document management and text processing; Law, social and behavioral sciences.

KEYWORDS

MGNREGA, Employment Guarantee scheme, Social Welfare scheme, Mass media, time-series, Center-State political alignment

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1 INTRODUCTION

Government supported welfare schemes play a crucial role in fulfilling basic needs and providing essential services for the poor to realize their capabilities and lead dignified lives [15]. The implementation of these schemes may encounter several issues though, such as to do with unfair exclusion arising from low budgets or inaccurate targeting, corrupt or inefficient administrative practices especially at the last mile, or underlying design issues with the programme itself, especially when programmes are designed to benefit specific social groups and can lead to clientelism [24]. Media can play a crucial role to improve the implementation of welfare schemes by prominently highlighting their gaps, and thereby impose checks and balances for democratically functioning societies to ensure that adequate attention is paid to welfare schemes towards building a more equal society [9]. However, media can also be selective in highlighting various issues, especially in countries such as India where mass media organizations rely heavily on revenue from government advertisements for their financial sustainability and hence form political affiliations that leads to media bias [36], often by avoiding or delaying the reporting of events critical of the government [16]. In this paper, we attempt

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to answer two research questions: first, does political alignment play a role in influencing which aspects of welfare schemes are covered more in the media than others, and second, based on issues that are covered in the media, do they actually influence the performance of welfare schemes. Being able to understand these factors can help the civil society or even government regulatory agencies to take possible mitigation steps, such as by deliberately bringing attention to under-reported aspects of welfare schemes, or by keeping track of aspects where despite media attention there has been a lack of action by implementing agencies to resolve the problems.

We choose the MGNREGA (Mahatama Gandhi National Rural Employment Guarantee Act) welfare scheme for our analysis. This is the largest employment guarantee programme in the world, and provides for each rural household to demand up to 100 days of employment in a year, mostly on unskilled labour work [34]. Since its inception in 2006, it has generated approximately 37.47 billion person days of work with a total expenditure of INR 7.86 trillion of which INR 5.39 trillion is on wages. It employs 152.2 million active workers at present, and has created 60.9 million assets so far [1, 27], such as water ponds for rainwater harvesting, land-leveling for agriculture, tree plantations, etc. These assets not only provide employment during their construction phase, they also lead to sustained economic and social benefits for the communities [35]. The implementation of MGNREGA however faces many issues. Given the federal governance structure of India, the scheme is financed jointly by the Central and State governments, and is often saddled with low budgets or a delayed release of funding from either of the governments. This is known to lead to delayed wage payments for people who work under MGNREGA, or non-allocation of work even when there is need, and consequently leads to lower demand from the people since the scheme may not be able to fulfil its promises [19, 31, 32]. Corruption is also rife. Ghost workers are registered for work and draw a payment, even though fewer workers may have actually worked on the sites [5]. Other techniques such as the use of machines instead of manual labour, and compromising on the quality of construction material used in the work, have also been widely reported. For these reasons, MGNREGA is not able to meet its full potential, even though it proved to be very relevant during the pandemic as an alternate source of employment for people [19], it has the potential to reduce internal migration and the associated precarity of work [27], and it can also be a vehicle to support climate change adaptation by commissioning carbon sequestering works [40].

To answer research questions related to the interplay between welfare scheme performance, media coverage, and political influence, we create three sets of time-series data in the context of MGNREGA, for the period April 2014 to March 2021. First, we use a large corpus of daily published news articles from six leading English language newspapers in India to build a dataset of mass media content related to MGNREGA. Second, we obtain official data related to MGNREGA from the publicly accessible and extensive MIS (Management Information System) website maintained by the government, carrying data for all states, districts, and villages, over the years. This data reports details such as the number of workers under the scheme, wage payments made, the type of works undertaken, status of the works, grievances, etc. Third, we

construct a state-level series for political alignment between the Center and State governments. For each state, we identify the periods for which the government in power at the State was aligned with the government in power at the Center. After initial work to collect these datasets through web scraping, followed by data cleaning and the use of NLP (Natural Language Processing) techniques to analyze mass media data, we predominantly use OLS (Ordinary Least Square) regression methods to understand the nuances of the interplay between these three factors, and answer the following research questions:

- RQ-1: How does Center-State alignment and the performance of social welfare schemes influence the media coverage of the schemes?
- RQ-2: How does mass media coverage and Center-State alignment influence the performance of social welfare schemes?

For RQ-1, using data related to MGNREGA, we find that media tends to treat aligned states more favourably, through different pathways, such as giving more coverage to positive news about scheme performance improvements in aligned states, or more coverage in non-aligned states to negative news about scheme performance. Different factors of the scheme performance are treated differently. For RQ-2, we struggle to find strong evidence of the impact of media coverage on performance improvement. This puts into question the critical role of media to put checks and balances on governments institutions and hold them accountable.

The rest of the paper is organized as follows. In Section 2 we present related work; in Section 3 we describe the dataset; Section 4 provides a qualitative analysis to show that mass media data does reflect MGNREGA scheme performance; Section 5 presents quantitative analysis to answer the two research questions; and in Section 6 we present a brief discussion and conclusion of this work along with limitations of this study.

2 RELATED WORK

2.1 Impact of media on public policy decisions and public opinion

Stapenhurst shows that media, when operating independently from the government, improves the accountability of political leaders and bureaucrats through investigative reporting and ground reports which are informed by citizens' experiences with the state [46]. It also improves the awareness of civil society about wider issues with governance, and facilitates a pluralistic and mutually supportive social environment by evoking a sense of responsibility among these various stakeholders towards governance. Gottlieb similarly finds through experiments in Mali that the acceptance of delinquent performance of political leaders by the civil society leads to even poorer performance, and highlights that an active civil society is essential to ensure better outcomes [18]. In contrast, Anderson *et al.* find in China that non-governmental agencies are able to exercise limited influence on the functioning of authoritarian governments [3]. Any impact, however, also depends significantly on the freedom of the press. Nordenstreng classified four roles that media can play based on the underlying autonomy and power granted to it [37]. Autonomous media can empower people and

serve as a watch-dog, while on the other hand, media that is financially dependent on the government or corporates is influenced by their agenda and becomes a means of propaganda. On these lines, in India where media sustainability is heavily dependent upon government funds and hence may experience a lower freedom of press, our study helps outline to what extent does the coverage of MGNREGA in English national newspapers influence the quality of implementation of MGNREGA. It builds upon work of a range of similar research in other countries. Soroka and Wlezien found positive correlation between policy change and media coverage through an analysis of defense spending by the US government and media articles related to defense policy [45]. Tan and Weaver analyzed the relationship between education, defense, and gun control policies, against media coverage given to legislators from across the political spectrum [47]. They found that media coverage does influence policy, but with a lag, and termed it as an *inertia* in influencing policy. Albanese et al. performed a time series analysis of media coverage and sentiment in the context of the 2016 US presidential elections to analyze the impact of media coverage and sentiment on policy changes proposed by the contestants, and found that that the coverage sentiment by itself is not predictive of the differences between policy proposals, but a combination of topic coverage and sentiment is able to provide useful insights [2]. Such studies use NLP techniques to analyze media data, and show that media coverage influences policy. We use similar methods in the context of India, with a specific focus on MGNREGA. Media is also known to shape public opinion, which in democratic countries is a strong pathway towards policy change [11, 21]. In this context, Barabos and Jerit show that the volume, breadth, and prominence of media coverage influences people's knowledge about policy decisions [6]. Sponsored advertisements and paid news leveraged by political parties and business houses also influence public opinion and policy decisions, and can undermine democracy [39, 48]. Active and investigative reporting by the media can also have a greater impact on influencing public opinion and policy than mere passive reporting of events [41]. We similarly analyze the volume and sentiment of coverage of different aspects of MGNREGA in the mass media, and further evaluate whether variations across different states can be explained by political affiliations and MGNREGA performance of the states. Biased coverage can impact the framing of welfare schemes in people's minds, and thereby influence policy changes.

2.2 Monitoring the performance of social welfare schemes

Social welfare schemes, and development interventions more generally, are typically monitored at three levels: Inputs, Outputs, and Outcomes [53]. Inputs constitute financial and human resources that are committed to support various activities to implement the intervention. Outputs include measures like the number of beneficiaries participating in the intervention, recipients of any cash or in-kind transfers, funds disbursed, etc., which denote the breadth and depth of coverage of the intervention. Final outcomes are a stronger measure to assess whether the intervention is having the intended impact on the lives of the beneficiaries or not, such as whether nutrition programmes for children lead to a drop in

malnourished children, or in the case of MGNREGA whether the constructed assets in rural areas are of good quality and persist for a long-enough lifetime to provide recurring social and economic benefits to the community, or even wider outcomes such as self-efficacy and strengthening of community institutions that may emerge from a good implementation of the schemes.

MIS systems often make only the inputs and outputs available in a transparent manner to withstand scrutiny, and form the main basis for our analysis. Our analysis extends other work in this direction. Chopra, et al. use MIS data to highlight the issue of MGNREGA delayed wage payments in the state of Andhra Pradesh [13]. Narayanan, et al. draw attention to the unmet demand for MGNREGA work in districts with high multidimensional poverty and high rates of out-migration [34]. We similarly use MGNREGA MIS data to build a range of performance indicators, and then study the interplay between these indicators and media coverage related to MGNREGA.

Outcome measurement is often done at smaller scales in specific geographies, through methods like baseline/endline surveys, some times with a control group for comparison, or through RCTs (Randomized Control Trials) done at larger scales [25]. Ethnographic studies and reports by social sector organizations, often covered in the mass media, also contribute extensively to understanding the impact of welfare schemes and their shortcomings. Drèze and Sen, for example, show that although MGNREGA implementation falls short of following the processes as laid down in the specifications, it is a powerful instrument for social justice to ensure dignified lives for the poor, empower women, and improve health and education outcomes for children [15]. Veeraraghavan uses interviews and ethnographic immersion to find that local politics along with workers' attitude and motivation play a role in influencing MGNREGA outcomes [54]. Better outcomes in tribal dominated villages that were studied, emerged from community involvement in commissioning MGNREGA works and then managing them well. Lower outcomes were however noticed in dalit (lower caste) dominated villages, where urban aspirations caused the communities to undervalue the assets built, and political alignment with the party in power made it easier for local middlemen to collude with MGNREGA field assistants to manipulate records. MGNREGA however improved the bargaining power for rural workers, to increase the wages they got otherwise for agricultural labour and other work. Misra reports that outcomes are also influenced by historically persistent inequalities in land ownership and political power, where the upper classes are able to manipulate local governance institutions (Gram Panchayats) in the commissioning of new MGNREGA works especially on private land [28]. Many such reports are actively covered in the mass media as well. Since our analysis uses mass media data, in our study we specifically compare the input and output oriented MGNREGA indicators obtained from MIS data, with a qualitative analysis of news reports covered by the mass media which includes outcome oriented reports as well. This helps us to uncover relationships between output and outcome to understand possible underlying reasons behind the output-based performance and the consequences of these performance patterns.

3 DATASET

We next describe our dataset consisting of three parts, for the years 2014 to 2021: MGNREGA MIS data about various input and output factors, news articles related to MGNREGA, and Center-State alignment during these years.

3.1 MGNREGA MIS data

The government of India maintains an extensive publicly accessible MIS website for MGNREGA, which can be queried at the state, district, and village levels, for different years. We wrote web crawlers to automatically download and parse this data. We obtained the data at the district level since it provided more detailed parameters than the state-level queried data, and then aggregated it to the state level for analysis. We noticed that data specifically for the year 2013 had many missing values, and therefore restricted our analysis to 2014 onward. This was incidentally also the election year when a new government came to power at the Center, and therefore it served as a good starting point to analyze the impact of Center-State political alignment.

Table 2 lists the parameters we use for our analysis. All these parameters are calculated for each year, at the state level. We group the parameters into three categories, indicating different aspects of the scheme performance: *Support*, *Utilization*, and *Management*. *Support* parameters include the average number of days for which households were provided employment, and the ratio of workers who were enrolled and given a job-card to the total number of workers who registered for the scheme. These parameters indicate the extent to which supply-side constraints such as budget availability may have bottle-necked MGNREGA outreach. *Utilization* denotes the extent to which the scheme is utilized, and includes a mix of demand-side and supply-side parameters such as the ratio of workers who demanded work to the total number of active workers, and the ratio of work provided by the government to the total amount of work demanded. *Management* indicates how well is the scheme managed, and includes parameters related to delays in wage payments. Our choice of these parameters across the *support*, *utilization*, and *management* related aspects of MGNREGA, was also guided by selecting those parameters that exhibited the greatest variance across the years and across states. We next explain these parameters and MGNREGA operations in more detail.

According to the MGNREGA act, each rural household is eligible for up to 100 days of employment per year. However when households do register for work, not all of them are granted job-cards in a timely manner, and the eventual average number of days for which employment is provided is also much lesser than the upper-bound of 100 days per year. These gaps, as we understand from our reading of reports and news articles, are often due to budget constraints faced by the states, typically arising from less budget sanctioned by the Center to the states. We therefore use the parameters of “job cards issued per registered household” (J_{Issued}) and the “average employment days provided per registered household” ($empDays$) as indicators of MGNREGA *support* provided by the government.

A job-card is considered active if the beneficiary has been employed under the scheme for at least one day in the last three years. The ratio of “active job cards to issued job cards” ($J_{Cactive}$) therefore represents the extent to which MGNREGA is utilized,

and is affected by both demand-side constraints where not everybody who has a job-card may use it, as well as supply-side constraints where people may want to use their job-card to get work but the work may not be sanctioned. The ratio of “employment demanded to the number of issued job cards” ($empDemand$) represents this demand-side gap: job-card holders have to fill out a form to put in a formal application for work at their local Panchayat office, and the government is then obligated to meet this demand. Similarly, the ratio of “employment provided to employment demanded” ($empProvided$) represents the supply-side extent to which the government is able to meet the demand for work. Note that second order effects can result in supply and demand influencing one another, for example low $empProvided$ in a year may dishearten workers to demand employment in later years and thus lead to low $empDemand$, and hence attributing some of these factors exclusively to either the supply or the demand side may not be appropriate. We therefore club all of them together as *utilization* variables. We also include an additional parameter *wage* as the average wage paid to an unskilled MGNREGA worker for a day’s work.

MGNREGA also has provisions to ensure that wages are paid in a timely manner - within 14 days of the work having been completed. Delayed wage payments make the government liable to pay a delayed compensation amount. The ratio of “delay compensation payable amount to total wages” represents the extent to which wage payments are delayed. We subtract this ratio from one to build a parameter for *timelyPayment*, denoting the timeliness of wage payments. An additional parameter we model is the ratio of “delay compensation approved amount to the payable amount” ($DCapproved$), representing the fraction of the payment amount that is approved by the government for payment. We consider these parameters as indicative of the quality of scheme management, since wage delays can arise from delayed submission of completion reports by the local authorities, or delayed payments from the Center to the states.

The range of the $empDays$ variable is 12-95 days, the *wage* variable varies from INR 99 to INR 308, and other variables which are ratios fall between 0-1. To bring all the parameters to the same scale and capture their internal variance, we use max-min normalization. We then compute a simple score for each category as the sum of the normalized values of their constituent parameters. *Support* and *Management* scores thus range from 0-2, and the *Utilization* score ranges between 0-4. These scores are computed annually for each participating state, from 2014 to 2021.

MGNREGA has extensive guidelines and many more parameters are also reported on the MIS, such as the ratio of labour to material cost for different categories of work, and an unemployment allowance that is meant to be paid in case the government is unable to meet the demand for work. We did not use many of these parameters because they were either constant and showed little variation over the years, or provisions such as unemployment allowance are not implemented actively in most states.

Category	Variable Name	Description
Media	<i>coverage</i> : Mass media coverage	Average daily number of news articles in a given state, over the year
	<i>posSentiment</i> : Positive sentiment	Average positive article sentiment in a given state, over the year
	<i>negSentiment</i> : Negative sentiment	Average negative article sentiment in a given state, over the year
Political	<i>alignment</i> : Center-State alignment	Binary variable equal to 1 when the state and Center have the same ruling political alliance, otherwise 0
Demographic	<i>log population</i>	Logarithmic value of the population of the state
Management	<i>timelyPayment</i> : 1 - Delay compensation payable amount relative to total wages	The government is liable to pay a delay compensation in case of wage payment delays. Delay compensation payable amount relative to total wages therefore shows the extent to which wages are delayed, and therefore this metric indicates the extent to which timely wage payments are being made.
	<i>DCapproved</i> : Delay compensation payment amount approved relative to the delay compensation payable	The delay compensation to be paid by the government needs to be approved for the payments to be made. Authorities may not deem all delays as worthy of compensation, and this variable indicates the fraction of compensation payable which was approved by the government.
Support	<i>JCissued</i> : Job cards issued per registration	Each rural household is eligible to register under MGNREGA. This variable represents the fraction of households that registered for MGNREGA, and were allocated job-cards.
	<i>empDays</i> : Average employment days provided per household	The scheme guarantees up to 100 days of employment per household per year. This variable measures the average number of employment days provided per household, over the year.
Utilization	<i>JCactive</i> : Active job-cards per issued job-card	Active job-cards are those for which work was allocated at least once in the last 3 years.
	<i>empDemand</i> : Employment demanded per issued job-card	People are expected to demand work via their Panchayats, based on which new work is sanctioned. This variable measures the fraction of job-card holders who demanded work.
	<i>empProvided</i> : Employment provided per employment demand	Even if work is demanded, it may not be sanctioned. This variable indicates the fraction of demand that was met.
	<i>wage</i> : Average wage per person day	The Central and state governments revise the wage rate annually.

Table 1: Variables used for analysis

3.2 Mass-media data

We use an infrastructure described in prior work to crawl and process newspaper articles from six prominent English national daily newspapers in India, spread across a wide spectrum of political affiliations and economic and social ideologies: *Hindustan Times*, *The Hindu*, *The Telegraph*, *The Indian Express*, *The New Indian Express*, and *The Times of India* [42]. We use this to build a corpus of news articles specific to MGNREGA, from April 2013 onward, i.e. from one year before the analysis period from 2014 to 2021. To identify news articles relevant to MGNREGA, we use a set of seed keywords that we identified through manual inspection: *MGNREGA*, *NREGA*, *MNREGS*, “*Mahatma Gandhi National Rural Employment Guarantee*”, and “*National Rural Employment Guarantee*”. We included articles only if these keywords appeared either in the top half of the article, or any of the keywords appeared at least twice in the article.

We built this corpus for 2922 days, from April 1st 2013 to March 31, 2021. Data was missing for 19.54% days due to sporadic problems such as web scraping failures or changes in the newspaper website structure that required changes to be made in the crawlers. The mean duration of failure was however only 2.25 days with a standard deviation of 5.81 days, and the mean duration between consecutive failures was 10 days with a standard deviation of 12.69 days. Figure 2 shows the distributions from which we conclude that the extent of missing data is not significant and is fairly randomly distributed.

A free-to-use web service called *OpenCalais* is then used to extract location entities from the news articles. We ignore locations that are mentioned as the first word in the article, since these tend to be the bureau locations that produced the news rather than the location of the news itself. We then run through an elaborate entity resolution procedure to resolve these locations to specific states, or to districts which are then mapped to their corresponding states. For entity resolution, we first build a master list of all Indian states and districts as per the 2011 census. We then successively use, first, the Jaro distance to match the locations mentioned in the articles to the master list, second, for those with low Jaro scores we match using the Levenshtein distance, and third, we use the NYSIIS phonetic matching algorithm [7]. We carefully tune the thresholds for different string sizes and obtain precision and recall values of 93.18% and 95.35% respectively against a manually constructed groundtruth of 100 randomly selected locations [20]. We also manually examine all unmatched locations and refine the master list to include alternate district names, such as Poorvi Champaran for East Champaran, Paschim Champaran for West Champaran, Prayagraj for Allahabad, etc.

An article may cover news about multiple locations and such articles are included for all these locations. We thus obtain a time-series of the average daily number of news articles in a given state, over the years. We call this the *coverage* variable.

We also obtain sentiment scores for the news articles using the commonly used Sentistrength tool [51]. Sentistrength uses a dictionary of sentiment words with associated strength measures and produces 2 scores: a positive score, which takes integer values from 1 to 5; and a negative score, which takes integer values from -1 to -5. We use these scores to develop time-series for *posSentiment* as the

average positive score across all the articles for a state over a given duration, and *negSentiment* as the average negative score across all articles. Sentistrength also produces a neutral score, derived from the positive and negative scores, but we do not use it in our analysis.

We also evaluated the accuracy of Sentistrength by constructing a ground truth from 50 randomly selected news articles. Four coders from among the authors of this paper independently assigned positive and negative ratings to these articles. The Fleiss' Kappa for these ratings was 0.84 and 0.80 for positive and negative ratings respectively. The modal value of these ratings, or the mean in case of a tie, was used as the ground truth. Evaluated against this ground truth, the Sentistrength reported positive and negative sentiment scores were accurate to 78% and 84% within a +/- one margin. The RMSE between the ground truth scores and Sentistrength scores was 1.22 and 1.17 for positive and negative sentiments respectively.

3.3 Center-State alignment data

We use the www.elections.in website to obtain information about the political parties in power at the Center and various states, since 2014. Through careful manual inspection, we then produce an alignment score of 1 or 0 for each Center-State pair for each year, based on whether or not aligned political parties were in power in that year. An alignment is declared if the same political party is in power at the Center and a state in that year, or the parties belong to the same national alliance at the Center - there are three prominent national alliances in India, of the UPA (United Progressive Alliance) parties including the Indian National Congress, the NDA (National Democratic Alliance) parties including the Bhartiya Janta Party, and the Third front. Since elections can happen at any time during a year, we take care to split the mass media variables in the election years into values for the periods before and after an election. Since our underlying corpus of news articles is organized by day, we separately calculate average daily coverage, and positive and negative sentiment scores separately, for the part of the year before the elections and the part after the elections. The MIS data can however not be split similarly into before and after election periods, and is a limitation of our dataset. The MIS data is available on an annual basis, and since all MIS indicators that we develop are either ratios or carry a fixed value throughout the entire year, we use the same value in both the election periods in an election year.

4 RELEVANCE OF MASS-MEDIA DATA

Before we proceed to an OLS-based analysis to answer our research questions of interest, we first show that news articles indeed are able to reflect many aspects of MGNREGA scheme performance that are noticeable in the MIS data. We do this by deriving clusters of states that seem to behave similarly based on their MIS data, and then examine the news articles about MGNREGA in these states.

4.1 Clustering of states

As mentioned earlier, for each state we compute a time-series over the years of *support*, *utilization*, and *management* scores, where the scores are a simple sum of the constituent normalized parameter

values for each of these categories. We then compute the mean scores over the years for each state, and the growth trend in the state approximated through a linear regression trendline computed over the annual scores. We thus obtain a six-tuple feature vector for each state (*avg_support*, *avg_utilization*, *avg_management*, *trend_support*, *trend_utilization*, *trend_management*). We then do a k-means clustering over these state vectors to obtain clusters of states that seem to behave similarly. We found that k=4 produced reasonable clusters. The scores and trend values for various states along with their corresponding clusters are given in Table 3.

The utilization scores seem to produce the most variation across the clusters, followed by the support scores. The clusters are arranged roughly in order of performance, with Cluster-1 having the lowest performance and also showing poor improvement, and Cluster-4 having the best performance as well as showing fast improvement on lagging indicators.

This initial clustering analysis helps us assess broad differences in MGNREGA performance across the states, and which we use to do a qualitative assessment of whether these differences are also reflected in the news articles about MGNREGA from these states.

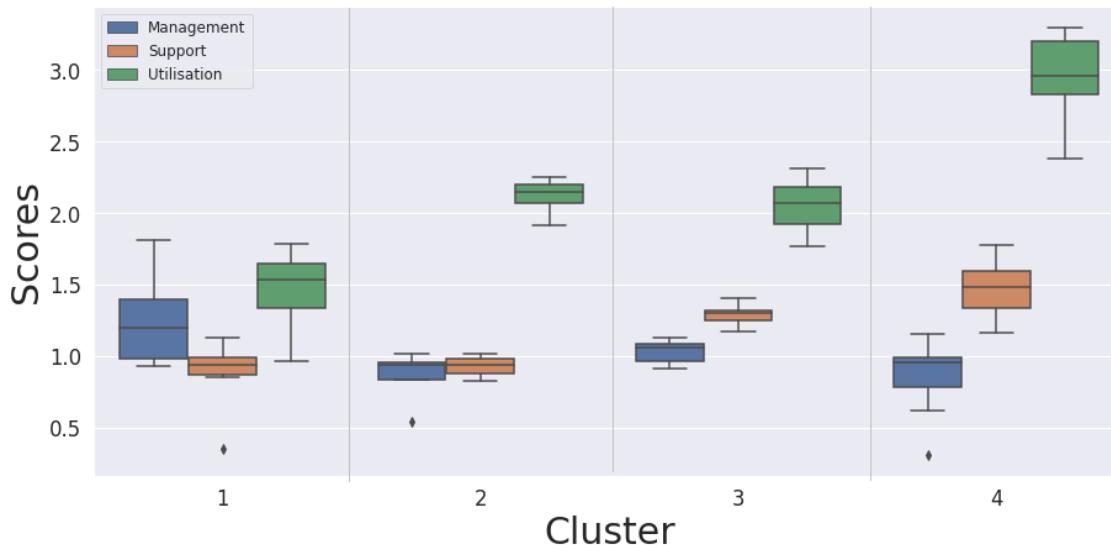
4.2 Selection of news articles for qualitative assessment

Table 5 shows the count of MGNREGA related news articles identified in each cluster. Since these run into hundreds of articles, we need a method to sample articles that are likely to give some unique insights for each cluster. We do this by using a document ranking method to identify articles that are most similar to other articles in their cluster, and most different from articles in other clusters [20]. We use a method based on the DocTag2Vec encoder-decoder architecture. This starts with pre-trained word embeddings for English words, then fine-tunes them while additionally learning document embeddings that can influence the content, and finally adds another output for tags which is dependent upon the document embeddings [10]. In our case, we use the cluster mapping of article locations as the tags attached to each article. Running these documents through the DocTag2Vec architecture produces document embeddings for each article. We then compute the document embedding centroids for each cluster, and compute a ranking score for the documents in each cluster as the product of the cosine similarity between the document embedding and the cluster centroid, and 1 minus the average cosine similarity between the document embedding and centroids of other clusters. This method was shown to successfully rank documents that are simultaneously indicative of the characteristics of their class as well as are able to differentiate from the characteristics of other classes [20]. The method also recommends blinding entities such as the names of people and political parties, so that the documents reflect inherent characteristics of the classes rather than being biased by the presence of specific entities in the document text. We manually examine the top-100 articles ranked through this method in each cluster to assess whether they reflect unique characteristics that are explanatory of the clustering of states that was produced using the MIS data. The annual media coverage for each cluster is given in Table 4 and sample headlines of a few high ranked articles in each cluster are given in Table 5.

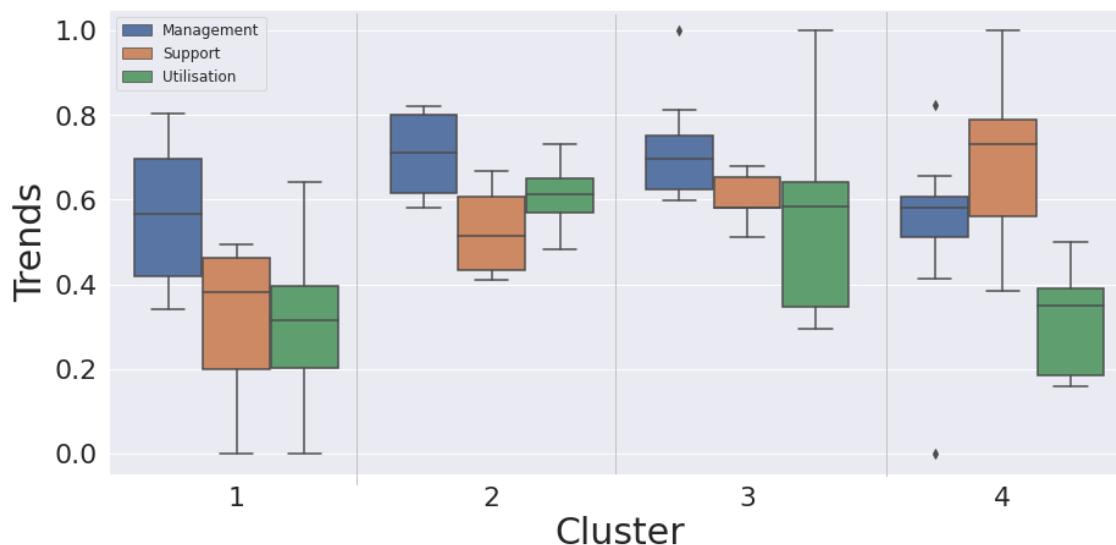
4.3 Cluster explanations using mass-media data

Cluster-1: This includes the consistently poor performing states of Bihar, Goa, Gujarat, Jharkhand, Maharashtra and Uttar Pradesh. These states have the lowest *support* and *utilization* scores along with low *management* scores, and poor *support* and *utilization* trends as well, as can be seen in Table 3. News articles reveal that the benefits of the MGNREGA are constrained due to corruption, fund embezzlement, and poor implementation. For example, a news from Jharkhand mentioned: *"The Enforcement Directorate will begin questioning of a former Jharkhand junior engineer arrested in a money laundering case linked to alleged embezzlement of Rs 18 crore MGNREGA funds in the Khunti district of the state"* - Hindustan Times, 29-06-2020. Similarly, in Uttar Pradesh, *"The Centre had sent crores of rupees in funds for the central scheme, but it was all embezzled and could not reach the common man. The money was meant for MNREGA and for literacy programmes but it never reached you,"* Referring to the Bundelkhand region, Rahul said - Indian Express, 19-02-2012. News articles also highlighted protests in Jharkhand arising from the poor performance of the scheme: *"As a mark of protest, MGNREGA workers in the Manika block of Latehar have in separate envelopes returned their Rupees 5 meagre wage hike to Prime Minister Narendra Modi on May Day. Enclosing the money with a letter, the workers affiliated to the Gram Swaraj Mazdoor Sangh expressed concern at the meagre hike as they felt that the central government was facing paucity of funds, otherwise the wages would have definitely increased in tune with Jharkhand's minimum daily wage which is Rs 212. The minimum wage under centrally-sponsored MGNREGA in Jharkhand is Rs 162 and after the hike it stands at Rs 167"* - The Hindu, 02-05-2016.

News articles from Bihar and Gujarat also pointed to an interesting interplay between MGNREGA performance and internal migration. Good MGNREGA performance in a state can increase the bargaining power of local labour and drive up wages for agricultural, construction, and other work [23, 29]. This, in turn, draws workers from other states to come and work at low wages. Bihar, being a low MGNREGA performing state and also being poorly industrialized, has become a primary source for internal migration with workers from Bihar moving to other states to take up low-wage labour: *"Even as the labour shortage started crippling both agricultural and construction activities in the State with the advent of Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), it has paved way for the influx of the labour from north, especially Bihar"* - The Hindu, 13-07-2012. Gujarat on the other hand, being more industrialized, faces pressure from industries to keep wage rates low. A well performing MGNREGA would mean less labour supply for the vast textile and spinning mills industry in Gujarat: *"The textile industry is facing an acute shortage of workers. Now, the Federation of Gujarat Weavers Association (FOGWA) has written to Congress general secretary Rahul Gandhi to make some changes in NREGS and disallow skilled workers from the textile units to join work as NREGS labourers back in their home states"* - Indian Express, 02-05-2011.



(a)



(b)

Clusters	Poor performance, negative growth trends	Average performance, fast growth trends	Good performance, good growth trends	Best performance, average growth trends
States	Bihar, Goa, Gujarat, Jharkhand, Maharashtra, Uttar Pradesh	Assam, Jammu and Kashmir, Punjab, Puducherry	Andhra Pradesh, Chhattisgarh, Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Odisha, Rajasthan, Uttarakhand, West Bengal	Arunachal Pradesh, Kerala, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tamil Nadu, Tripura
Topics	out-migration from Bihar, influence of textile industry in Gujarat, corruption, crime, fund mismanagement, poor implementation	delayed payments, dissatisfied workers, excluded areas, top-down planning, convergence of MGNREGA with other government schemes	increased demand for work, action on corruption charges, better control, efficient management, community involvement	work well-aligned with state's plans, proper utilization of Funds, use of technology, empowered civil society

(c)

Figure 1: MGNREGA clusters based on MIS Data

We can thus see that the news articles can provide insights about plausible causes for poor MGNREGA performance (corruption, embezzlement of funds, pressure by industries), as well as outcomes arising from poor performance (greater outbound migration). These articles also highlight the role that MGNREGA has played in increasing the bargaining power of workers.

Cluster-2: This includes somewhat better performing states of Assam, Jammu and Kashmir, Punjab, and Puducherry, but which have improved their performance over the years. Older news articles spoke about entire villages being excluded from the scheme in Punjab: "*Muktsar localities like Chack Bir Sarkar village, some part of Udaikaran village and Muktsar dehati (rural) area ... have also lost the right to utilise the MGNREGA scheme*" - Hindustan Times, 11-01-2014. Low wages have also been an issue in prosperous states such as Punjab: "*Badal last week wrote to rural development minister Birender Singh, saying the existing rate in Punjab - Rs 210 - was not being able to draw workers under the scheme... Social activist and former National Advisory Council member Aruna Roy said the low rate of wages under the MGNREGA was a problem*" - The Telegraph, 08-09-2015. The states in this cluster also include border states that are affected by interference from neighboring countries: "*Sources said China has also asked India to destroy the canals which are being constructed from NREGA funds in the Demchok sector of Ladakh*" - Indian express, 25-09-2014. News from these states thus highlights issues such as exclusion errors, delayed wage payments, and poor wage rates, especially during earlier years which reflects the average performance of states in this cluster. The poor performance of the cluster is reflected in poor *support* and *management* scores of its states, shown in Table 3.

Lately, however, improvements through better convergence of MGNREGA with other government schemes seems to have placed the states on a trajectory of better performance, as is visible with the high *utilisation* scores and good *support*, *utilization*, and *management* trends shown in Table 3. In Punjab: "*Residents of Chanan Wala, a remote border village of this district, were on cloud nine on Saturday as the once filthy government primary school there was inaugurated as the states maiden air-conditioned smart school... The total cost of the renovation was around Rs 18 lakh, out of which 72% work was accomplished through MNREGA*" - Hindustan Times, 07-04-2019. Similarly, in Assam, the ODF (Open Defecation Free) programme was designed to converge with MGNREGA: "*Open Defecation Free Plus (ODF Plus), which includes ODF sustainability and solid and liquid waste management (SLWM), will converge with MGNREGA, especially for grey water management, and will complement the newly launched Jal Jeevan Mission. The programme will also work towards ensuring that no one is left behind and everyone uses a toilet, it said. The 15th Finance Commission has proposed earmarking Rs 30,375 crores for rural water supply and sanitation to be implemented by rural local bodies for the upcoming financial year.*" - Times of India, 19-02-2020. Such measures may be responsible for the improved performance trends of the states in this cluster.

Cluster-3: This includes the states of Andhra Pradesh, Chhattisgarh, Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Odisha, Rajasthan, Uttarakhand, and West Bengal, where MGNREGA performance is not only somewhat better but has also improved significantly over the years. This cluster has better *support*

and *management* scores and high *utilisation* scores, and average *support*, *utilization*, and *management* trends, as given in Table 3. News articles from these states seem to indicate that a tighter bureaucracy led to better management of the scheme. During the COVID-19 pandemic, "*The Odisha Panchayati Raj department advised all district administrations to generate employment through the MGNREGA to help the poor and returned migrant laborers. MGNREGA changes lives of nomadic families. Enhancement of demand among the needy people for the MGNREGA work was possible through the involvement of NGOs, timely payment of wages, transparency through daily documentation*" - Times of India, 13-06-2020. In Karnataka, the state Rural Development and Panchayat Raj Minister at that time, confirmed that action was taken against irregularities by government employees: "*Mr. Shettar said the Government was taking action against those involved in irregularities in implementation of MNREGA schemes. As many as 1,432 complaints, of the 1,720 received in this regard, had been disposed of. Disciplinary action has been initiated against 256 government employees and 157 employees have been suspended*" - The Hindu, 27-08-2011. Similarly, Andhra Pradesh is known to have strong social audit institutions to curb corruption.

News articles also highlight the importance of involving local communities in commissioning MGNREGA work. *the villagers belonging to Manila in Karnataka and Puttige in Kerala joined hands to build this barrage to face the summer. The water stored in the barrage helps irrigate about 300 acres of land comprising areca nut gardens and paddy fields. Usually, work starts in the first week of February. But this year, it was nearing completion because MNREGA grants were made available early in January, Ms. Hemavathi said*" - The Hindu, 31-01-2017.

The news articles therefore point towards an alert civil society, responsive bureaucracy, and community involvement, as leading to better scheme performance.

Cluster-4: This includes some of the best performing states, many of which are in the North East of India (Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura), along with Tamil Nadu and Kerala which due to their strong social mobilization and socialist roots respectively, are often credited with having the best performing public systems in health, education, and infrastructure, among others. News articles seem to point towards ideal MGNREGA operations with communities being able to demand work based on their local needs. As a result, the cluster displays better *support* and *management* scores and very high *utilisation* scores, with improving *support* trends as given in Table 3. In Kerala: "*Agriculture Minister V.S. Sunilkumar inaugurated a Mazhathaavalam rainwater harvesting project as part of the MGNREGA scheme*" - The Hindu, 22-06-2016. Similarly, in Tamil Nadu: "*Thanks to the farm ponds scheme initiated last year by the State Government of Tamil Nadu, dovetailing the Centres Mahatma Gandhi National Rural Employment Guarantee Scheme, a total of 1,000 agricultural fields owned by small and medium-scale cultivators in Erode district are now endowed with water bodies*" - The Hindu, 23-01-2015. When assets are created based on real needs, their impact tends to be strong: "*Sikkim is the only state which has bagged three national awards for its exemplary work under MGNREGA. It is adopting a mechanism to sustain assets that it has created under the MGNREGA scheme. A research team from country's premier rural management institute - the Institute of Rural Management, Anand*

(IRMA) - which evaluated MGNREGA's implementation in the North Eastern state has suggested this to the Sikkim government" - Times of India, 07-02-2011.

The scheme in these states also seems to be managed well which is reflected in higher *management scores* for the cluster, given in Table 3. News from Tripura mentions an increased wage rate and fund allocation during the pandemic: "He further informed that his government is expecting Rs. 4,802.88 crore under five major heads out of the total Rs. 20 lakh crore package announced by the Centre earlier in May. These include different components like direct support to farmers and rural economy, support to urban poor, support to agriculture, industries, entrepreneurs, hike in MGNREGA allocation and borrowing limit" – Hindustan Times, 22-05-2020. Similarly, in other North Eastern states: "Complaints regarding irregularities in the implementation of MGNREGA have been received by the ministry till March 31, 2010. In the region, 30 such complaints were received from Assam, seven from Manipur, one from Mizoram, five from Nagaland, one from Sikkim and two from Tripura. All complaints have been forwarded to the states concerned for taking appropriate action in accordance with the law, an official statement said" - Times of India, 05-03-2011.

News articles also indicated bottom-up planning with community involvement, which led to sustainable assets in the states in this cluster. Overall, the news articles thus highlighted several ideal characteristics of MGNREGA operations.

4.4 Summary

This qualitative analysis shows that news articles do seem to capture interesting characteristics of the scheme that are roughly in line with the observed input and output MIS indicators. They may discuss the outcomes emerging from different levels of MGNREGA performance, such as its effect on wage rates and internal migration, or explain possible causes behind improvements in MIS-observed performance such as the role played by a tight bureaucracy or an civil society using collective action, or highlight ideal implementation scenarios when the work is demand driven and contextually sensitive to local needs, or converged with other government schemes. We next study this quantitatively, to see if such patterns of media coverage, measured through the volume and sentiment of media coverage, are statistically associated with the scheme performance as well. Further, we examine the role that Center-State alignment can play in the media coverage, and whether media coverage influences the scheme performance as well.

5 RESULTS

Encouraged by the qualitative analysis in the previous section of the interrelationship between news articles and MIS data, and the likely influence of political and bureaucratic attention on MGNREGA performance, in this section we attempt to answer two research questions:

- RQ-1: How does Center-State alignment and the performance of social welfare schemes influence the media coverage of the schemes?
- RQ-2: How does mass media coverage and Center-State alignment influence the performance of social welfare schemes?

We use OLS regression methods for this purpose and construct two sets of models. For the first research question, we build models for the dependent variables of the amount of mass media coverage and the sentiment of news articles. Explanatory variables include: Center-State alignment, the state population, and MIS reported parameters of support, utilization, and management. For the second research question, we build models for the dependent variables being the MIS parameters this time. Explanatory variables include one year lag values of the media coverage and sentiment, to assess potential causal relationships of media influence on MGNREGA performance. The entire set of variables are listed in Table 1.

5.1 Research question 1

How does Center-State alignment and the performance of social welfare schemes influence the media coverage of the schemes?

We start with a simple model of explanatory variables including only Center-State alignment and the state population (Model-1). We then add variables corresponding to the support, utilization, and management scores (Model-2). Next, we construct three models by expanding each score into its constituent parameters, to understand which parameters have a statistically significant relationship with media coverage (Model-3, 4, 5). A new model is constructed using only these parameters (Model-6). We then further study their interaction with Center-State alignment, to understand under what alignment configuration do they have the most influence on media coverage (Model-7). This method is followed for three dependent variables: the average daily number of news articles (*coverage*), average positive article sentiment (*posSentiment*), and average negative article sentiment (*negSentiment*). The full OLS equations for Model-7 are given in the three equations in Table ??, with values for state *i* and year *t*. All results are presented in Tables 6, 7, and 8, respectively. Since we are dealing with time-series data, we also performed a co-integration test on all the models to ensure that the results are not arising from spurious regression. The tests confirmed that the explanatory variables are co-integrated with dependent variables at a 5% significance level. We present a brief analysis of the next; a more detailed discussion is given in the Appendix E.1.

$$\begin{aligned}
 coverage_{it} = & \beta_0 + \beta_1 alignment_{it} + \beta_2 \log(population_i) \\
 & + \beta_3(ManagementScore_{it}) + \beta_4(SupportScore_{it}) \\
 & + \beta_5(UtilizationScore_{it}) + \beta_6 timelyPayment_{it} \\
 & + \beta_7 DCapproved_{it} + \beta_8 JCissued_{it} + \beta_9 empDays_{it} \\
 & + \beta_{10} Jactive_{it} + \beta_{11} empDemand_{it} + \beta_{12} empProvided_{it} \\
 & + \beta_{13} wage_{it} + \beta_{14} (alignment_{it} * DCapproved_{it}) \\
 & + \beta_{15} (alignment_{it} * JCissued_{it}) + \beta_{16} (alignment_{it} \\
 & * empDays_{it}) + \beta_{17} (alignment_{it} * Jactive_{it}) \\
 & + \beta_{18} (alignment_{it} * empDemand_{it}) + \beta_{19} (alignment_{it} \\
 & * wage_{it}) + u_{it}
 \end{aligned} \tag{1}$$

$$\begin{aligned}
posSentiment_{it} = & \beta_0 + \beta_1 alignment_{it} \\
& + \beta_2(ManagementScore_{it}) + \beta_3(SupportScore_{it}) \\
& + \beta_4(UtilizationScore_{it}) + \beta_5 timelyPayment_{it} \\
& + \beta_6 DCapproved_{it} + \beta_7 JCissued_{it} + \beta_8 empDays_{it} \\
& + \beta_9 JCactive_{it} + \beta_{10} empDemand_{it} + \beta_{11} empProvided_{it} \\
& + \beta_{12} wage_{it} + \beta_{13}(alignment_{it} * JCissued_{it}) \\
& + \beta_{14}(alignment_{it} * empProvided_{it}) + \beta_{15}(alignment_{it} * wage_{it}) + u_{it}
\end{aligned} \tag{2}$$

$$\begin{aligned}
negSentiment_{it} = & \beta_0 + \beta_1 alignment_{it} \\
& + \beta_2(ManagementScore_{it}) + \beta_3(SupportScore_{it}) \\
& + \beta_4(UtilizationScore_{it}) + \beta_5 timelyPayment_{it} \\
& + \beta_6 DCapproved_{it} + \beta_7 JCissued_{it} + \beta_8 empDays_{it} \\
& + \beta_9 JCactive_{it} + \beta_{10} empDemand_{it} + \beta_{11} empProvided_{it} \\
& + \beta_{12} wage_{it} + \beta_{13}(alignment_{it} * timelyPayment_{it}) \\
& + \beta_{14}(alignment_{it} * JCissued_{it}) + \beta_{15}(alignment_{it} * empProvided_{it}) + u_{it}
\end{aligned} \tag{3}$$

5.1.1 Population. We find a statistically significant and positively correlated relationship between the log of the population of a state and the mass media coverage from that state. It is expected that larger states will get more coverage.

5.1.2 Management related parameters. MGNREGA has several useful provisions to handle delays in wage payments to the workers. Workers facing the problem of delayed wages are to be given a delay compensation, and the amount of this compensation is approved by the state government. We find that the media provides a statistically significant higher coverage to states that approve higher delay compensation amounts, provided the state is aligned with the Center. Further, negative sentiment in this media coverage reduces with timely payments. This shows that the media tends to give higher coverage to less critical news in Center-aligned states when management performance improves, indicating a propaganda element in the media to favour Center aligned states. Since our period of analysis aligns with the reign of NDA government at Center, it may be perceived as favorable treatment by the media of the NDA government itself.

We further tested the influence of Center-State alignment on scheme performance. The results are shown in Table 9. We find that payment delays are lower and are compensated more favorably in aligned states. This is not surprising - greater support from the Center to aligned states has indeed been noticed in many social welfare schemes [24], and can be the case for timely wage payment related management indicators too.

5.1.3 Utilization related parameters. Similar to the above, we typically find that improvement in supply-side parameters leads to

greater media coverage in aligned states, and the sentiment becomes less negative with improved performance. This is true for the utilization parameters of active job cards and wage rates.

The demand-side parameter of the fraction of employment demanded to the total number of issued job cards (*empDemand*) indicates a different pattern, but again favouring Center-aligned states. *empDemand* is indicative of distress in the population and we find a positive and statistically significant relationship with media coverage exists only in non-aligned states. This indicates that the media prefers to leave aligned states alone but its coverage in non-aligned states is critical of the government in these states. This justification becomes stronger upon examining Table 9, which shows the relationship between MIS parameters and alignment. Most utilization parameters are negatively and statistically significantly related to Center-State alignment, indicating that the scheme performance tends to be lower in aligned states. Despite this, the media covers less the improvements in active job cards and wage, and covers more the problems of *empDemand*, in non-aligned states, while aligned states seem to get a free pass despite their poor performance. Despite serving a propaganda function favouring the Center in aligned states, if the media wants it can be effective in improving performance though. We find that in terms of the employment provided, greater negative coverage seems to be related to improved performance, but only in non-aligned states. Sporadic negative coverage by the media might be leading to an improved performance.

5.1.4 Support related parameters. Support parameters such as the fraction of job cards issued to job cards demanded, are largely related to supply-side budget availability. MGNREGA budgets have been reported as almost always being less than what is required [38], and Table 9 interestingly shows that aligned states have a greater problem with performing well on support parameters. Despite this, we find that the media coverage is negative and larger in volume in non-aligned states. The same pattern of the media favouring Center-aligned states therefore seems to persist with support parameters too.

It is quite interesting however that aligned states face more trouble with budget constraints than non-aligned states. We provide a possible explanation in the next section.

5.1.5 Summary. Our analysis revealed several interesting patterns. We found that all categories of scheme performance - support, utilization, and management - are reflected in the media coverage, although in different ways in aligned and non-aligned states, but arising from a common principle of the media giving a more favourable treatment to Center-aligned states. Scheme management related to timely wage payments and approvals is better in aligned states, and the media echoes it by amplifying positive stories and possibly government propaganda selectively in aligned states rather than in non-aligned states. Scheme utilization is worse in aligned states. The media however either covers improvements in aligned states more than non-aligned states for some parameters, or tends to highlight negative news in non-aligned states more than that in aligned states for other parameters. Scheme support is also worse in aligned states, but the media suppresses negative stories in aligned states while amplifying them in non-aligned states.

Since our period of analysis is when the NDA government has been in power in the Center, our analysis not only shows that the media tends to favour the Center, but also that aligned states generally exhibit poorer performance and seem to rely on the friendliness of the media for this poor performance to not be prominently highlighted in the public sphere. Several criticisms of the NDA government have highlighted similar aspects. For example, the state of Gujarat which has been an NDA stronghold exhibits among the poorest social development indicators, even though it is often projected as a poster child for industrialization led development [15]. Similarly, the government of Uttar Pradesh which saw the NDA government move into power in 2017, has been widely criticized for its mismanagement during the COVID-19 pandemic including for MGNREGA, but saw an active muzzling of the media with arrests of several journalists who were critical of the establishment especially on their handling of law and order in the state [50]. Many other eminent journalists have spoken actively about the silencing of media during the NDA regime [17, 49].

5.2 Research Question 2

How does mass media coverage and Center-State alignment influence the performance of social welfare schemes?

To answer this research question, we construct models shown in Tables 10 (for the management and support parameters) and 11 (for the utilization parameters), with the various MIS parameters as dependent variables, and Center-State alignment along with media related variables used for explanation. The media variables are considered at a one-year lag to assess a causal relationship of whether the media coverage influences scheme performance or not. The equation below describes the model for various dependent parameters. Political alignment is not considered with a lag because it is expected to instantaneously influence the scheme performance. As before, we also performed a co-integration test to ensure that the results are not arising from spurious regression. The tests confirmed that the explanatory variables are co-integrated with dependent variables at a 5% significance level. We also attempted to conduct Granger causality tests on the time series instead of OLS tests on one-year lag values, but with non-stationary time series the Granger tests were not feasible because of the short duration of the time series. We next discuss the results briefly; a more detailed discussion is presented in Appendix E.2.

$$\begin{aligned} Y_{it} = & \beta_0 + \beta_1 posSentiment_{it} + \beta_2 negSentiment_{it} + \beta_3 coverage_{it} \\ & + \beta_4 alignment_{it} + \beta_5 (alignment_{it} * coverage_{it}) + u_{it} \end{aligned} \quad (4)$$

5.2.1 Media impact on management performance. We find that mass media coverage seems to improve delay compensation amounts in Center-aligned states, and similarly positive sentiment leads to an improved performance on timely payments as well.

This seems counter-intuitive to what an ideal media environment would suggest, that media coverage should have an impact in both aligned and non-aligned states, and a negative sentiment in the media should result in a positive change if media is able to demand accountability. Relating to our observations in Section 5.1.2 where we found that the media echoes news about improved

performance in aligned states, the surprising pattern seen in this section can be explained to arise when such propaganda behavior occurs year on year. Since governments are elected for five years, this recurring pattern will result in an auto-correlation and lead to what we observe in the lag models. Media therefore may not have an influence on improving MGNREGA management scores after all, it may rather only be amplifying performance improvements in aligned states in its coverage.

5.2.2 Media impact on support performance. We did not find any statistically significant influence of media related variables on the support parameters.

5.2.3 Media impact on utilization performance. We find that mass media coverage has a negative and statistically significant relationship with all four utilization parameters - active job cards, demand for employment, employment provided, and average wages - and is more negative in aligned states as compared to non-aligned states. This appears strange and a possible hypothesis introduced earlier in Section 5.1.3 may explain it: The media considers negative stories or less positive stories about utilization to be more newsworthy; negative stories do have an impact on improving MGNREGA utilization, but as the utilization improves the coverage is reduced due to the media's preference for non-neutral stories, and hence the relationship between coverage leading to impact comes out negative in aggregate. Thus, only with the utilization parameters do we find a possible influence of the media on MGNREGA performance, although subject to assumptions that sporadic coverage of negative news leads to a positive reaction by the government to improve performance, and as the performance improves the coverage quickly reduces. This relationship between media coverage and utilization performance is less negative in non-aligned states than in aligned states, which indicates that non-aligned states are more likely to improve their performance as a result of media pressure than aligned states. MGNREGA utilization in aligned states continues to be poorer than in non-aligned states.

5.2.4 Summary. We failed to find strong evidence of the impact of media in influencing MGNREGA performance.

Aligned states perform better on management parameters and the media seems to serve a propaganda role of amplifying positive news related to management performance in aligned states. It does not improve management performance in aligned or non-aligned states.

Aligned states do worse on support performance, and again media does not seem able to influence the performance in aligned or non-aligned states. Since support performance is heavily controlled by the funding provided by the Central government, this can also be interpreted as an inability of both aligned and non-aligned states to leverage the media to put pressure on the Central government to increase MGNREGA fund allocation. Such an erosion of federalism seems to be at an increasing trend in India [44]. When schemes such as MGNREGA for which the responsibility is spread between the Center and the various states, are stifled, the blame tends to fall more on the states due to their closer proximity to the citizens. Further, welfare allocation by the Center is being increasingly moved to transfer-based schemes entirely supported by the Center, which portrays the Central government in a brighter

light. Thus state governments begin to lose their credibility in being able to successfully provide social support to their respective constituencies. With the Prime Minister as the face of the Central government, this strengthens the credibility of the Prime Minister at the cost of Chief Ministers in both aligned as well as non-aligned states [44].

Only on utilization parameters in non-aligned states does there seem to be a possibility that negative coverage in the media puts pressure on the government to improve performance. This perhaps is justified because of a long-standing campaign by civil society activists to nudge MGNREGA implementation towards its envisioned demand-driven operation: awareness walks organized by social workers through rural villages to encourage people to demand work [52], protests to release the unemployment allowance for unmet demand [30], and research and news articles highlighting the benefits of MGNREGA assets when they are constructed in a context-sensitive manner through bottom-up involvement [33], are some activities related specifically to MGNREGA utilization that the civil society has pursued consistently for many years. This provides some reassurance that concerted protests by the civil society on other MGNREGA performance aspects can have a similar effect if the media carries such news prominently. Indeed, networks like Libtech have lately conducted detailed surveys to highlight management aspects such as the payment delays in MGNREGA [31, 32], and PAEG (People's Action for Employment Guarantee) has set up a MGNREGA tracker to draw attention to support issues of the lack of sufficient fund allocation to MGNREGA [38]. Such initiatives may succeed in nudging performance improvements, although the pathway also highlights that the civil society is essential to generate negative news which the media can then amplify.

6 DISCUSSION AND CONCLUSION

We make several contributions in this paper. From a methodological perspective, we find that media data can serve as a rich source of insights to explain patterns noticed in other data sources with which it can be linked. This can be useful especially in the social development context to understand outcomes, impact pathways, and reasons for failure of development interventions when their outcomes may not be measured. This is often the case, since inputs and outputs of large government schemes are typically tracked well but outcome measures are not collected. Document ranking methods such as the one used by us can help identify qualitative data that is likely to best explain the observations. Our work therefore augments calls for the use of "thick data" to supplement and explain "big data" [4, 26], or digital ethnography more generally [8, 14].

From a media bias perspective, we find that media coverage and sentiment about MGNREGA tends to favour aligned states. Since the NDA government has been in power at the Center throughout the period of our study, this can alternatively also be interpreted as the media favouring the Central government. With all the newspapers considered in this study being national level English newspapers, this shows that the national public sphere is deeply under the influence of the NDA government. We are not alone in making this observation, numerous commentators have also made similar

claims [17, 49, 50]. We further show that maintaining such a stance requires careful treatment of news. Some factors of performance which are better in aligned states, are given a greater and positive coverage in aligned states. Other factors on which aligned states may be doing poorly are given less and negative coverage in aligned states, or more and negative coverage in non-aligned states. To the best of our knowledge, our study is the first to analyze such nuanced aspects of the relationship between media bias, political alignment, and government scheme performance.

From a media influence perspective, we do not find strong evidence that the media is able to influence scheme performance. Only on performance factors for which civil society activists launch protests, it seems the media covers such negative news briefly, and if the performance improves then the media quickly reverts to reduced coverage about these factors. The media does not independently raise these performance issues, indicating that it behaves passively in reporting news created by the civil society rather than actively through investigative reporting of ground issues on its own [41]. This highlights the relevance of civil society, and points towards a joint influence of civil society activism amplified by the media as possibly leading to change. To be effective, media therefore requires the civil society to impose checks and balances on other stakeholders. This outlook is different from how media effects have typically been studied, to observe the influence of media on public action [43], instead of vice versa.

As part of future work, we plan to strengthen our analysis by attaching more indicators to the media data, such as whether an article is about a news or is it an opinion piece, does it have a civil society element linked to it, and particular topical aspects that the article covers that can relate an article directly with specific MIS variables. We hope that our attempt in this paper to uncover the complex relationships between mass media, political alignment, and scheme performance, will inform more such studies.

LIMITATIONS: Our work has a few limitations which we acknowledge. First, we have only included prominent national English newspapers in our analysis. Regional newspapers in local languages may provide more coverage to welfare schemes, but these websites were hard to crawl. Second, we did our analysis on annual time-series because the MGNREGA MIS data was available at the state-level on an annual basis. This reduced the length of the time-series because of which causality analysis such as Granger tests were not feasible to conduct. Third, a richer analysis using state fixed effects may reveal other interesting patterns.

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A MIS DATA

Category	Category description	Parameters	Min Value	Max Value	Mean Value	Std Deviation
Management	Quality of implementation management	$\frac{1 - Delay_compensation_payable_amount}{Total_wages}$	0.9173	0.9985	0.9857	0.0184
		$\frac{Delay_compensation_approved_amount}{Delay_compensation_payable_amount}$	0.0000	0.9868	0.1321	0.2267
Support	Aspects likely to be affected by supply-side budget constraints	$\frac{Issued_job_cards}{registered_households}$	0.8768	1	0.9776	0.0270
		$\frac{Avg.emp.days.provided.per.household}{}$	12.47	94.63	45.08	15.92
Utilization	Extent to which the scheme is utilized	$\frac{Active_job_cards}{Issued_job_cards}$	0.2562	0.9868	0.6558	0.2038
		$\frac{Employment_demanded}{Issued_job_cards}$	0.0392	1	0.5506	0.2445
		$\frac{Employment_provided}{Employment_demanded}$	0.6344	0.9998	0.9067	0.0639
		$\frac{Average.wages.paid.per.person.day}{}$	99.17	308	186.66	35.40

Table 2: MIS Parameters for different scheme performance categories

State	Support Score	Utilisation Score	Management Score	Support Trend	Utilisation Trend	Management Trend	Cluster Clusters
ARUNACHAL PRADESH	1.24872561	2.834941238	0.61978272	0.053543574	0.07263036	0.032735128	4
MANIPUR	1.159854544	3.280750341	0.887157811	0.076374004	0.07414201	-0.145529365	4
MEGHALAYA	1.595291781	2.957055798	0.787641786	0.037795827	0.091835285	0.096491588	4
MIZORAM	1.779815891	3.29685715	0.988421444	0.11586258	0.099700667	-0.024230916	4
NAGALAND	1.376610579	3.206549212	0.308382462	0.001113847	0.021064788	0.030522237	4
SIKKIM	1.497925698	2.832803777	0.968205893	-0.030734413	0.074566569	0.031403343	4
TAMIL NADU	1.334209245	2.765702641	0.95624243	-0.032034426	0.071685106	0.025004727	4
TRIPURA	1.667480267	3.097313419	0.993426997	-0.069831969	-0.002016679	0.020911972	4
ANDHRA PRADESH	1.489896361	1.969260941	1.445256422	0.00759137	0.147546549	-0.054040658	3
CHHATTISGARH	1.265513615	2.314275758	0.916589385	0.014202678	0.119610896	0.038043516	3
HARYANA	1.240440641	2.075398532	1.010820205	0.021534449	0.051070803	0.059547826	3
HIMACHAL PRADESH	1.315536172	2.072333862	1.067639176	-0.001863502	0.063463434	0.074968832	3
KARNATAKA	1.40262726	1.877482704	0.957131149	0.013965964	0.218450335	0.042391973	3
KERALA	1.48062882	2.382976641	1.155009954	0.0371829	0.025478098	0.047029615	3
MADHYA PRADESH	1.253582268	1.925327131	1.127102977	-0.027680846	0.136902036	0.071655708	3
ODISHA	1.298002406	1.770182191	0.964119368	-0.007225262	0.126652518	0.02991072	3
RAJASTHAN	1.404714269	1.958674374	1.084005534	-0.057045901	0.120633359	0.087312011	3
UTTARAKHAND	1.175344376	2.183968613	1.123442794	-0.044003973	0.070312974	0.036233555	3
WEST BENGAL	1.322407346	2.252987536	1.05760355	0.005875736	0.075348595	0.093234769	3
ASSAM	0.828807029	1.918315904	0.932885374	-0.048602464	0.123636849	0.039098236	2
JAMMU AND KASHMIR	1.019225172	2.253768975	0.538059267	0.017886017	0.129434531	0.095941831	2
PUNJAB	0.969928133	2.119880645	1.016140776	0.002817023	0.092072664	0.024944029	2
PUDUCHERRY	0.900659115	2.181894365	0.940062976	-0.032347981	0.144705171	0.148260597	2
BIHAR	0.855041021	0.968648077	0.930895137	-0.073350721	0.133457304	0.090821549	1
GOA	0.35148045	1.786962137	1.439953019	-0.032954837	-0.018597126	-0.032282974	1
GUJARAT	1.133047829	1.300343283	1.13501306	-0.058217494	0.081659748	0.066604373	1
JHARKHAND	0.948825065	1.621834948	1.254489621	-0.134090963	0.020710788	0.006432004	1
MAHARASHTRA	1.008649016	1.441269692	1.814698192	-0.17786705	0.055956183	-0.04519512	1
UTTAR PRADESH	0.926053644	1.650460622	0.930984504	0.022330752	0.04902084	0.005035673	1

Table 3: MIS parameters in each cluster

B MEDIA DATA STATISTICS

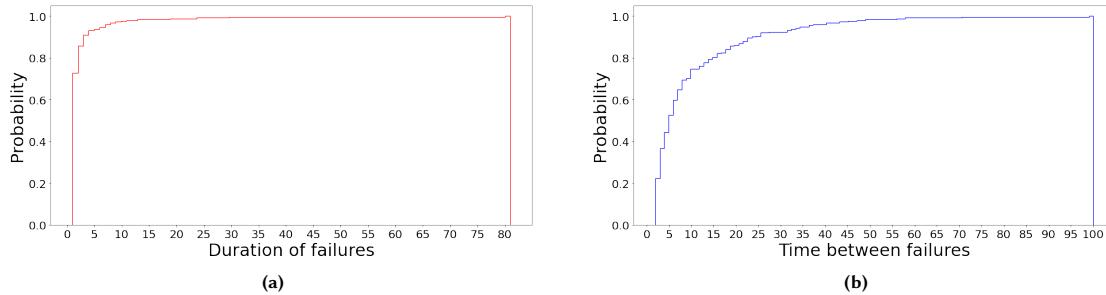


Figure 2: Missing media data analysis

Cluster No.	1	2	3	4
Year	Bihar, Gujarat, Goa, Jharkhand, Maharashtra, Uttar Pradesh	Assam, Jammu and Kashmir, Punjab, Puducherry	Andhra Pradesh, Chhattisgarh, Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Odisha, Rajasthan, Uttarakhand, West Bengal	Arunachal Pradesh, Kerala, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tamil Nadu, Tripura
2014-15	991	164	1573	330
2015-16	863	148	1271	294
2016-17	915	141	1471	350
2017-18	532	85	809	194
2018-19	257	36	558	111
2019-20	328	72	603	150
2020-21	1060	187	1537	343

Table 4: Article count of MGNREGA related news in the mass media

Cluster No.	1	2	3	4
Cluster	Poor performance, negative growth trends	Average performance, fast growth trends	Good performance, good growth trends	Best performance, average growth trends
States	Bihar, Goa, Gujarat, Jharkhand, Maharashtra, Uttar Pradesh	Assam, Jammu and Kashmir, Punjab, Puducherry	Andhra Pradesh, Chhattisgarh, Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Odisha, Rajasthan, Uttarakhand, West Bengal	Arunachal Pradesh, Kerala, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tamil Nadu, Tripura
Topics	out-migration from Bihar, corruption, crime, fund mismanagement, poor implementation	delayed payments, dissatisfied workers, top-down planning, convergence of MGNREGA with other government schemes	increased demand for work, action on corruption charges, better control, efficient management, community involvement	work well-aligned with state's plans, proper utilization of Funds, use of technology, empowered civil society
Sample news head-lines	In Bihar, DM Dipak Anand has ordered the dismissal of MGNREGA programme officer Mustafa Zamal Ansari for defalcation of government money; Gujarat government is spending the money ... for the NREGA schemes for the salary for the forest department staff, Joshi said; Protests to demand for expansion of MGNREGA in terms of number of days and minimum wages in Ranchi; Allahabad HC directed CBI to investigate the alleged abuse and misappropriation of funds ... under MNREGA scheme The Centre had sent crores of rupees ..., but it was all embezzled and could not reach the common man...Referring to Bundelkhand region, Rahul said.	Badal ..., saying the existing rate in Punjab - Rs 210 - was not being able to draw workers under the scheme... Social activist and former National Advisory Council member Aruna Roy said the low rate of wages under the MGNREGA was a problem; Residents of Chanan Wala,..., were on cloud nine on Saturday as the once filthy government primary school there was inaugurated as the states maiden air-conditioned smart school...72% work was accomplished through MNREGA; The ODF Plus programme will converge with MGNREGA,...The 15th Finance Commission has proposed earmarking Rs 30,375 crores for rural water supply and sanitation.	Environment management work carried out by MGNREGA workers in West Bengal and Uttarakhand; The villagers ... join hands to build a barrage to face the summer. The water ... irrigate about 300 acres of land comprising area nut gardens and paddy fields; The Odisha Panchayatiraj department had advised all district administrations to generate employment through the MGNREGA ... changing lives of nomadic families. It was possible through the involvement of NGOs, timely payment of wages, transparency through daily documentation; The smart card was introduced by the Andhra Pradesh government which would free NREGA job-card holders from the hassle ...for receiving payments;	Rainwater harvesting project as part of MGNREGA work in Kerala; Additional fund allocation for MGNREGA to Tripura; Sikkim ... has bagged three national awards for its exemplary work under MGNREGA... sustain assets that it has created under MGNREGA programme; Thanks to the farm ponds scheme initiated last year by the State Government of Tamil Nadu, dovetailing the Centres Mahatma Gandhi National Rural Employment Guarantee Scheme, ... agricultural fields owned by small and medium-scale cultivators in Erode district are now endowed with water bodies; Tripura has achieved the top spot in several sectors like MGNREGA implementation...;

Table 5: Description of MGNREGA performance clusters formed by different states

C IMPACT OF MIS PARAMETERS ON MEDIA COVERAGE AND SENTIMENT

Dependent Variable - coverage: Mass media coverage	Model1	Model2	Model3	Model4	Model5	Model6	Model7
Independent Variables							
<i>alignment</i> : Center-	-0.0566** (0.0232)	-0.0693*** (0.0234)	0.0722*** (0.0232)	0.0697*** (0.0235)	0.0681*** (0.0229)	0.0701*** (0.023)	
State alignment							
<i>log population</i>	0.0867*** (0.0068)	0.0532*** (0.0088)	0.0566*** (0.0088)	0.0526*** (0.009)	0.059*** (0.0088)	0.0601*** (0.008)	0.0638*** (0.009)
Management Score		0.0159 (0.0337)		0.012 (0.0356)	-0.0149 (0.0367)		
Support Score		0.1412*** (0.0404)	0.1425*** (0.0399)		0.1267*** (0.0403)		
Utilization Score		-0.1476*** (0.0264)	-0.1411*** (0.0262)	-0.1496*** (0.0271)			
<i>timelyPayment</i> : 1 - Delay compensation payable relative to total wages			-0.0818 (0.0522)				
<i>DCapproved</i> : Delay compensation approved amount relative to delay compensation payable			0.0987** (0.0476)			0.0341 (0.050)	-0.1356 (0.091)
<i>JCissued</i> : Job cards issued per registration				0.1266** (0.0591)		0.1482*** (0.057)	0.2583*** (0.080)
<i>empDays</i> : Average employment days provided per household				0.1593** (0.0668)		0.0968 (0.065)	0.0513 (0.078)
<i>JCactive</i> : Active job-cards per issued job-card					-0.6184*** (0.1285)	-0.6017*** (0.130)	-0.8243*** (0.178)
<i>empDemand</i> : Employment demanded per issued job-card					0.3259** (0.1461)	0.3355** (0.150)	0.5503*** (0.206)
<i>empProvided</i> : Employment provided per employment demand					0.0042 (0.0858)		
<i>wage</i> : Average wage per person					-0.1558** (0.0627)	-0.1548** (0.063)	-0.1148 (0.082)
<i>alignment</i> * <i>DCapproved</i>							0.2370** (0.111)
<i>alignment</i> * <i>JCissued</i>							-0.1653* (0.088)
<i>alignment</i> * <i>empDays</i>							0.0727 (0.133)
<i>alignment</i> * <i>JCactive</i>							0.4653* (0.269)
<i>alignment</i> * <i>empDemand</i>							-0.3942 (0.304)
<i>alignment</i> * <i>wage</i>							0.0744 (0.108)
Intercept	-1.2*** (0.1124)	-0.4985*** (0.1799)	-0.4954*** (0.1778)	-0.4743** (0.1938)	-0.6398*** (0.1834)	-0.6938*** (0.170)	0.8215*** (0.181)
R-squared	0.4345	0.5116	0.525	0.5118	0.5447	0.546	0.560

Table 6: Models to explain mass media coverage

Standard errors shown in parenthesis; Significance as * p<0.1, ** p<0.05, *** p<0.01

Dependent Variable - posSentiment: Positive sentiment							
Independent Variables	Model1	Model2	Model3	Model4	Model5	Model6	Model7
<i>alignment</i> : Center-State alignment	0.1154 (0.1152)	0.0544 (0.1195)	0.0565 (0.1199)	0.0589 (0.1197)	0.0382 (0.1174)	0.0503 0.115	
Management Score		-0.2662 (0.1699)		-0.2171 (0.1812)	0.007 (0.1843)		
Support Score		0.4981** (0.1983)	0.4942** (0.1991)		0.422** (0.1985)		
Utilization Score		- 0.5303*** (0.1021)	- 0.5302*** (0.1023)	- 0.5217*** (0.1028)			
<i>timelyPayment</i> : 1 - Delay compensation payable relative to total wages			-0.1991 (0.2634)				
<i>DCapproved</i> : Delay compensation approved amount relative to delay compensation payable			-0.3255 (0.2462)				
<i>JCissued</i> : Job cards issued per registration				0.6759** (0.301)		0.6135** (0.272)	0.4631 (0.467)
<i>empDays</i> : Average employment days provided per household				0.299 (0.3217)			
<i>JCactive</i> : Active job-cards per issued job-card					0.3192 (0.6603)		
<i>empDemand</i> : Employment demanded per issued job-card					-0.5194 (0.7397)		
<i>empProvided</i> : Employment provided per employment demand					- 1.8123*** (0.4049)	- 1.8571*** (0.312)	- 1.7687*** (0.459)
<i>wage</i> : Average wage per person					-0.7477** (0.3169)	-0.7015** (0.310)	-0.6465 (0.413)
<i>alignment</i> * <i>JCissued</i>							0.2198 (0.503)
<i>alignment</i> * <i>empProvided</i>							-0.0920 (0.567)
<i>alignment</i> * <i>wage</i>							-0.1037 (0.555)
Intercept	1.9683*** (0.0776)	2.8294*** (0.3584)	2.7822*** (0.386)	2.6885*** (0.401)	3.2309*** (0.3749)	3.1643*** (0.348)	3.1976*** (0.331)
R-squared	0.0047	0.1183	0.1188	0.1209	0.1669	0.168	0.169

Table 7: Models to explain positive sentiment in the media

Standard errors shown in parenthesis; Significance as * p<0.1, ** p<0.05, *** p<0.01

Dependent Variable - negSentiment: Negative sentiment							
Independent Variables	Model1	Model2	Model3	Model4	Model5	Model6	Model7
<i>alignment</i> : Center-State alignment	0.1434 (0.1522)	0.0873 (0.1568)	0.0812 (0.1572)	0.0987 (0.1565)	0.0683 (0.156)	0.0933 (0.151)	
Management Score		- 0.5955*** (0.223)		-0.4727** (0.2369)	-0.3251 (0.2447)		
Support Score		0.619** (0.2602)	0.6301** (0.261)		0.5364** (0.2637)		
Utilization Score		-0.718***	- 0.7183***	- 0.6963***			

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Table 8 – continued from previous page

Dependent Variable - negSentiment: Negative sentiment	Model1	Model2	Model3	Model4	Model5	Model6	Model7
Independent Variables	(0.134)	(0.1341)	(0.1343)				
<i>timelyPayment</i> : 1 - Delay compensation payable relative to total wages			-0.7862** (0.3454)			-0.4312 (0.340)	-0.7732** (0.371)
<i>DCapproved</i> : Delay compensation approved amount relative to delay compensation payable			-0.427 (0.3227)				
<i>JCissued</i> : Job cards issued per registration				1.064*** (0.3934)		0.9204** (0.366)	0.8912 (0.646)
<i>empDays</i> : Average employment days provided per household				0.1211 (0.4206)			
<i>JCactive</i> : Active job-cards per issued job-card					-0.2521 (0.877)		
<i>empDemand</i> : Employment demanded per issued job-card					-0.254 (0.9824)		
<i>empProvided</i> : Employment provided per employment demand					-2.02*** (0.5378)	-2.4440*** (0.413)	-1.9623** (0.611)
<i>wage</i> : Average wage per person					-0.9018** (0.4208)	-0.7934* (0.412)	-0.2324 (0.575)
<i>alignment</i> * <i>timelyPayment</i>							1.2167** (0.568)
<i>alignment</i> * <i>JCissued</i>							0.1187 (0.690)
<i>alignment</i> * <i>empProvided</i>							-0.8427 (0.784)
<i>alignment</i> * <i>wage</i>							-0.9945 (0.790)
Intercept	2.6128*** (0.1025)	4.0747*** (0.4704)	4.2088*** (0.5061)	3.7222*** (0.5243)	4.4683*** (0.4979)	4.4019*** (0.580)	4.0942*** (0.602)
R-squared	0.0041	0.1299	0.132	0.1392	0.1579	0.172	0.194

Table 8: Models to explain negative sentiment in the media

Standard errors shown in parenthesis; Significance as * p<0.1, ** p<0.05, ***p<0.01

Dependent Variables	<i>timelyPayment</i> : 1 - Delay compensation payable amount relative to total wages	<i>DCapproved</i> : Delay compensation payment amount approved relative to the delay compensation payable	<i>JIssued</i> : Job cards issued per registration	<i>empDays</i> : Average employment days provided per household	<i>JActive</i> : Active job-cards per issued job-card	<i>empDemand</i> : Employment demanded per issued job-card	<i>empProvided</i> : Employment provided per employment demand	wage: Average wage per person day
Independent Variables								
<i>alignment</i> :	0.0543*	0.1116***	-0.1433***	-0.0821***	-0.1863***	-0.1601***	-0.0938***	0.0303
Center-State alignment	(0.0292)	(0.0315)	(0.0275)	(0.0258)	(0.0364)	(0.0321)	(0.0239)	(0.0235)
	0.8567***	0.0904***	0.8962***	0.4308***	0.6247***	0.5757***	0.7858***	0.4084***
Intercept	(0.0196)	(0.0212)	(0.0186)	(0.0174)	(0.0245)	(0.0216)	(0.0161)	(0.0158)
R-squared	0.0159	0.0553	0.1123	0.0452	0.1089	0.1044	0.0672	0.0077

Table 9: Models on the relationship between Center-State alignment and scheme performance

D IMPACT OF MEDIA COVERAGE AND SENTIMENT ON MIS PARAMETERS

Dependent Variables	<i>timelyPayment</i> : 1 - delay compensation payable amount relative to total wages	<i>DCapproved</i> : Delay compensation payment amount approved relative to the delay compensation payable	<i>JIssued</i> : Job cards issued per registration	<i>empDays</i> : Average employment days provided per household
Independent Variables	Model1	Model1	Model2	Model1
<i>posSentiment</i> :	0.1087***	0.0241	0.0342	-0.0165
Positive sentiment	(0.038)	(0.0411)	(0.0404)	(0.0368)
<i>negSentiment</i> :	-0.1019***	-0.0219	-0.0292	0.0333
Negative sentiment	(0.0287)	(0.031)	(0.0306)	(0.0278)
<i>coverage</i> : Mass media coverage	0.1455**	0.28***	0.0954	0.0608
	(0.0678)	(0.0733)	(0.0855)	(0.0656)
<i>alignment</i> : Center-State alignment	0.043	0.1062***		-0.1424***
	(0.0284)	(0.0307)		(0.0275)
<i>alignment*coverage</i>			0.4029***	
			(0.0982)	
Intercept	0.8856***	0.041	0.0881**	0.827***
	(0.0404)	(0.0437)	(0.0418)	(0.0391)
R-squared	0.0834	0.1189	0.1374	0.131
				0.0477

Table 10: Models to show the impact of mass media coverage and sentiment on scheme management and support parameters

Dependent Variables	<i>J</i> Active job-cards per issued job-card		<i>empDemand:</i> Employment demanded per issued job-card		<i>empProvided:</i> Employment provided per employment demand		<i>wage:</i> Average wage per person day	
Independent Variables	Model1	Model2	Model1	Model2	Model1	Model2	Model1	Model2
<i>posSentiment:</i>	-0.0081 (0.0394)	-0.0299 (0.041)	-0.0166 (0.0357)	-0.0359 (0.0373)	-0.0417 (0.0292)	-0.0512* (0.0292)	-0.0089 (0.0312)	-0.0033 (0.0311)
Positive sentiment								
<i>negSentiment:</i>	0.0116 (0.0297)	0.0254 (0.031)	0.0211 (0.0269)	0.0331 (0.0282)	0.0076 (0.022)	0.014 (0.022)	-0.0027 (0.0235)	-0.0058 (0.0235)
Negative sentiment								
<i>coverage: Mass media coverage</i>	-0.747*** (0.0702)	-0.5717*** (0.0868)	-0.6261*** (0.0636)	-0.4932*** (0.0788)	-0.3168*** (0.0521)	-0.1906*** (0.0617)	-0.1624*** (0.0555)	-0.1592** (0.0659)
alignment: Center-State alignment	-0.1802*** (0.0294)		-0.1543*** (0.0266)		-0.0898*** (0.0218)		0.0359 (0.0232)	
<i>alignment* coverage</i>		-0.3845*** (0.0997)		-0.2919*** (0.0905)		-0.2757*** (0.0709)		-0.0061 (0.0757)
Intercept	0.768*** (0.0419)	0.6936*** (0.0424)	0.6845*** (0.0379)	0.6215*** (0.0385)	0.9149*** (0.0311)	0.8762*** (0.0301)	0.4651*** (0.0331)	0.4785*** (0.0322)
R-squared	0.4309	0.374	0.3939	0.3309	0.2587	0.2527	0.0594	0.0488

Table 11: Models to show the impact of mass media coverage and sentiment on scheme utilization parameters

E DETAILED DISCUSSION ON RESULTS

E.1 Research Question 1

How does Center-State alignment and the performance of social welfare schemes influence the media coverage of the schemes?

The results are given in Tables 6, 7, and 8.

E.1.1 Population. In all the models, media coverage is statistically significantly and positively related with the logarithm of the state population. This is expected since larger states are likely to get more coverage.

E.1.2 Center-State alignment. In Models-1 to 6, we find that the media coverage is lower for states aligned with the Center, and this relationship is statistically significant. Its relationships with positive and negative sentiment are not statistically significant though. The explanation of why aligned states are covered less and non-aligned states are covered more in the media becomes clearer when we study the interaction of alignment with the MIS variables, described next.

E.1.3 Management score. In Model-2, the management score does not have a statistically significant relationship with media coverage, but when it is deconstructed into its constituent parameters in Model-3, *DCapproved* is found to be positively and significantly related with media coverage. *DCapproved* is the fraction of delay compensation payable that is approved by the government, indicating that more favourable rulings to approve higher compensation amounts leads to increased media coverage. A deeper analysis in Model-7, where we consider the interaction of management parameters with Center-State alignment, reveals that this positive relationship persists only in aligned states, i.e. a better performance on *DCapproved* translates into greater media coverage in aligned states but not in non-aligned states. Since our period of analysis is when the NDA government has been in power at the Center, this can also be interpreted as indicating a favourable treatment by the media of the NDA government at the Center. Since *DCapproved* however does not exhibit any statistically significant relationships with the sentiment variables, we cannot strongly justify this claim. However, examining the second management parameter of *timelyPayment* shows that improved *timelyPayment* results in a less negative sentiment. *timelyPayment* is an indicator based on the delays in wage payments for MGNREGA work. *timelyPayment* does not show a statistically significant relationship with media coverage, but in conjunction with *DCapproved* it seems that improved MGNREGA performance results in a higher volume of less negative coverage in aligned states.

We also build a new set of models shown in Table 9 to study the relationship between the various MIS parameters as the dependent variables, and Center-State alignment as the explanatory variable. We find that both *DCapproved* and *timelyPayment* tend to be higher in aligned states, showing that payment delays are lower and are compensated more favorably in aligned states. This is not surprising - greater support from the Center to aligned states has indeed been noticed in many social welfare schemes [24], and can be the case for timely wage payment related management indicators too.

E.1.4 Utilization score. The Utilization score indicates the extent to which MGNREGA is utilized in terms of active job cards, work demanded, employment generated, and average wages paid. Model-2 shows that the utilization score is negatively and significantly related with media coverage, i.e. as utilization improves, the media coverage decreases. The sentiment models also show that improved utilization performance is statistically significantly related to less positive sentiment as well as less negative sentiment, indicating that better performance leads to more neutral coverage. One explanation may be that the media finds utilization related news to be worthy of reporting only when the performance is poor: an improved utilization indicates that both the demand-side and supply-side aspects of MGNREGA are working better, hence people would have fewer grievances, and this will lead to lower coverage in the media if the media considers negative stories as being more newsworthy.

We next analyze the relationship between utilization and media coverage through its constituent parameters and their interaction with Center-State alignment.

The constituent parameter of the fraction of active job cards to issued cards, (*JActive*), is found to have a similar relationship with media coverage as the aggregate utilization variable: improved *JActive* results in less media coverage. In Model-7, however, when an interaction term of *JActive* and Center-State alignment is introduced, *JActive* is found to have a negative and significant relationship with media coverage in non-aligned states, and a positive relationship in aligned states. This indicates that with improved *JActive* the media coverage decreases more in non-aligned states as compared to aligned states, highlighting possibly a preferred treatment of aligned states by the media. Indeed, *JActive* has a positive relationship with *posSentiment*, and although not statistically significant, it does offer a possible explanation that improvements in *JActive* are reflected positively in the media in aligned states. Less coverage is given to improvements in non-aligned states.

The *wage* parameter shows a similar relationship with coverage as *JActive*, with the coverage being lower when *wage* is higher. However, the relationship is not statistically significant when interaction terms with alignment are introduced.

We next examine the *empDemand* parameter. *empDemand* is the fraction of employment demanded to the total number of issued job cards. As a demand-side variable, a higher fraction indicates that more beneficiaries need work and are also able to register their demand for work. Despite people needing work though, studies have shown that people are often not aware that MGNREGA is meant to be demand driven, and is a right granted by the act; many people consider it as "government work", which, even if they apply for it may or may not get it [19]. Further, the procedure to demand work is complex - it involves filling out paper forms at the Panchayat office which many beneficiaries are unable to do without assistance, or they may not seek a counter-signed receipt as proof of their work application submission and the demand may thus not get officially registered. For these reasons, although MGNREGA was originally envisioned to be a demand-driven scheme, it has become supply initiated in practice where local governments often plan the MGNREGA works based on budget availability [12, 22]. We find in Model-5 that *empDemand* has a statistically significant and positive relationship with media coverage. Although not statistically

significant, it also has a negative relationship with *posSentiment*, which may imply that a high *empDemand* indicates distress among the population rather than a good performance of MGNREGA.

Model-7 further shows that high *empDemand* has a positive and statistically significant relationship with media coverage only in non-aligned states. This pattern indicates for *empDemand* related news that media prefers to leave aligned states alone but its coverage in non-aligned states is critical of the government in these states. This justification becomes stronger by examining Table 9, which shows the relationship between MIS parameters and alignment. All utilization parameters expect *wage* are negatively and statistically significantly related to Center-State alignment, indicating that the scheme performance tends to be lower in aligned states. This suggests that the media is unfriendly to non-aligned states: it covers less the improvements in *JActive* and *wage*, and covers more the problems of *empDemand*, despite MGNREGA performing better in non-aligned states. Aligned states seem to get a free pass despite their poor performance.

In contrast with *empDemand* which is a demand-side parameter, *empProvided* is a supply-side parameter. It is the fraction of employment provided to employment demanded. Civil society activists have often highlighted that a low *empProvided* performance disheartens people and reduces MGNREGA demand, thus hurting the ideal manner in which MGNREGA was envisioned to operate. In fact, the government is even liable to pay an unemployment allowance if it is unable to provide work within a time-bound manner of it being demanded, but unemployment allowances are hardly ever provided by any state and the demand-driven nature of MGNREGA is thus also compromised. We find in Model-5 that *empProvided* does not have a statistically significant relationship with media coverage. However, in non-aligned states, it does have a statistically significant and negative relationship with both positive and negative sentiments, i.e. a better performance leads to more neutral coverage, and which is more predominant in non-aligned states. This regression towards a neutral sentiment may indicate that sporadic negative coverage by the media leads to an improved performance on *empProvided*, following which the media quickly reduces coverage and moves to neutral news. This relationship holds in non-aligned states than in aligned states - we discuss this media influence later as a part of RQ-2 and suggest that such a pattern may indicate that media does exercise an influence in improving scheme performance in non-aligned states but not in aligned states.

E.1.5 Support score. The support score is largely related with supply-side budget availability. Model-2 shows that the support score is positively and significantly related with media coverage. Opening up the support score into its constituent parameters in Model-4 shows that *JCissued* has a positive and significant relationship with media coverage. *JCissued* is the fraction of job cards issued to the total number of registered MGNREGA workers. When its interaction with Center-State alignment is examined in Model-7, we find that with improved *JCissued* media coverage increases more in non-aligned states than aligned states. If media indeed treats aligned states more favourably then it is surprising that news related to budget improvements is covered more in non-aligned states but covered less in aligned states. This can be explained

if the nature of the articles to make them newsworthy tend to be more about budget constraints (negative articles) than budget availability (positive articles), and this indeed seems to be the case. *JCissued* has a positive and statistically significant relationship with both positive as well as negative sentiments, i.e. despite an improvement in *JCissued*, since the demand is not fulfilled the media coverage continues to follow its characteristic pattern of carrying non-neutral news, and this is seen more in non-aligned states than the aligned states since media favours the Center-aligned states. Note that this pattern of favouritism is different from what was observed earlier with the *DCapproved* and *timelyPayment* management parameters where improved MGNREGA performance is related with increased positive coverage in aligned states; or the *JActive* and *empDemand* utilization parameters where improved performance is related with less positive coverage or more negative coverage respectively in non-aligned states.

When we further examine Table 9, we find that *JCissued* is negatively related with Center-State alignment - aligned states seem to face more supply-side constraints than non-aligned states. Given this, the media coverage pattern we notice seems to be justified - the media tends to suppress critical news about budget constraints in aligned states, but not in non-aligned states. It is quite interesting however that aligned states face more trouble with budget constraints than non-aligned states. We provide a possible explanation in the next section.

Similar to *JCissued*, the *empDays* parameter has a positive and significant relationship with media coverage. *empDays* indicates the average number of employment days provided per household. However, the relationship loses statistical significance when interaction terms for alignment are added. It also does not have a statistically significant relationship with the sentiment variables. Like *JCissued* though, aligned states provide lower *empDays* than non-aligned states, and therefore the media treatment is likely to follow the same pattern of favouring aligned states.

E.2 Research Question 2

How does mass media coverage and Center-State alignment influence the performance of social welfare schemes?

The results are shown in Tables 10 (for the management and support parameters) and 11 (for the utilization parameters).

E.2.1 Media impact on management performance. The average daily number of news articles (*coverage*) results in a positive and statistically significant relationship with the management parameter of *DCapproved*. The positive and significant relationship of Center-State alignment on *DCapproved* seen earlier in Table 9 is also retained. We further look at the interaction of media coverage with alignment, and find that coverage has a positive impact on *DCapproved* in aligned states but not a statistically significant impact in non-aligned states. Positive and negative sentiment in the media do not conclusively impact *DCapproved* either. However, *posSentiment* is found to impact *timelyPayment* positively in a statistically significant relationship, and *negSentiment* impacts it negatively. These results seem counter-intuitive to what an ideal media environment would suggest: media coverage should have an impact in both aligned and non-aligned states, and a negative sentiment in the media should result in a positive change if media is able to demand accountability. Relating to our observations in Section 5.1.2 where we found that an improved MGNREGA management performance is related to a higher volume of less negative coverage only in aligned states, the surprising relationships uncovered in this section can be explained to arise from such a pattern recurring year on year. Since governments are elected for five years, this recurring pattern will result in an auto-correlation and lead to what we observe in the lag models. Media therefore may not have an influence on improving MGNREGA management scores after all, it may rather only be amplifying performance improvements in aligned states in its coverage, thereby acting as a propaganda vehicle for aligned states.

E.2.2 Media impact on support performance. The support parameters of *JCissued* and *empDays* are not influenced in a statistically significant manner by any of the media variables. The negative and significant relationship of Center-State alignment on these variables seen earlier in Table 9 is retained, and we can therefore conclude that media is not able to influence MGNREGA support scores.

E.2.3 Media impact on utilization performance. We next study the influence of media coverage on MGNREGA utilization parameters. Although less positive and more negative media sentiment is related with an improvement in the utilization parameters, indicative of media influence on MGNREGA performance, the relationships are not statistically significant other than for *posSentiment* and *empProvided*. We further find that *coverage* has a negative and statistically significant relationship with all four utilization parameters: *Jactive*, *empDemand*, *empProvided*, and *wage*. These coefficients are more negative for aligned states than non-aligned states. Reduced coverage in the media therefore seems to lead to improved performance, which appears strange. A possible hypothesis introduced earlier in Section 5.1.3 may explain this: The media considers negative stories or less positive stories about utilization

to be more newsworthy; negative stories do have an impact on improving MGNREGA utilization, but as the utilization improves the coverage is reduced due to the media's preference for non-neutral stories, and hence the relationship between coverage leading to impact comes out negative in aggregate. Thus, only with the utilization parameters do we find a possible influence of the media on MGNREGA performance, although subject to assumptions that sporadic coverage of negative news leads to a positive reaction by the government to improve performance, and as the performance improves the coverage quickly reduces. This relationship between media coverage and utilization performance is less negative in non-aligned states than in aligned states, which indicates that non-aligned states are more likely to improve their performance as a result of media pressure than aligned states. MGNREGA utilization in aligned states continues to be poorer than in non-aligned states.