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Brief

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Jobs in the Era of Artificial Intelligence: A Comparative Policy Analysis and the Road Ahead

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Abstract: *This paper attempts to create an understanding of the impact of artificial intelligence on the job markets in India (especially Telangana and Tamil Nadu). It analyses the rapid integration of AI into the ubiquitous affairs of mundane life from the Schumpeterian model of Creative Destruction and John Maynard Keynes' prediction of widespread technological unemployment. The paper is a quantitative study and conducts an in-depth analysis of the Telangana government's AI framework and the Tamil Nadu government's AI policy to create a nuanced understanding of the technology's implications for the future of work. It also charts the policy/framework according to its receptivity to AI-induced job displacement and its willingness to reskill the current workforce as per industry standards.*

Keywords: Artificial Intelligence, Future of Work, Labour Force, Tamil Nadu, Telangana, India
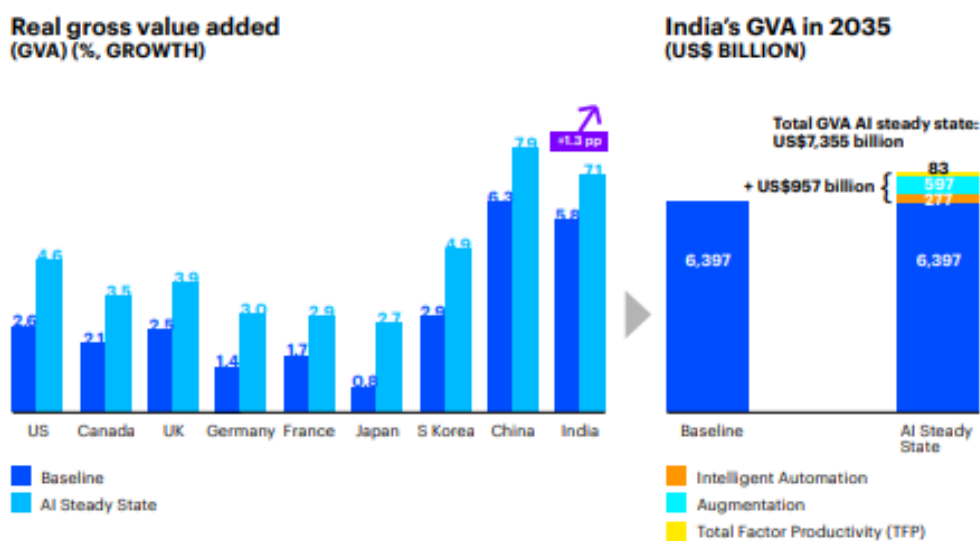
Introduction

The International Monetary Fund (IMF) in a recent report on Artificial Intelligence and the Future of Work has pointed out that "almost 40 per cent of global employment is exposed to AI" (Cazzaniga et al. 2024). The report adds "In advanced economies, about 60 per cent of jobs are exposed to AI, due to the prevalence of cognitive-task-oriented jobs" indicating seismic macroeconomic implications. (Cazzaniga et al. 2024). It states that 26 per cent of India's workers are employed in high-exposure employment. In the seminal article "AI's Future Doesn't Have to Be Dystopian", Daron Acemoglu provides a stark warning, stating that current research's ambit on the topic is excessively narrow. According to him, the prevalent AI discourse constricts development to particular domains and downplays its radical effects on society. He identifies why the current trajectory of technological development risks fuelling a social upheaval (Acemoglu, 2021).

Such doomsday narratives have been countered by optimistic reports of AI fuelling equitable economic growth and prosperity. The World Bank has acknowledged that "AI can potentially contribute $13 trillion to the global economy by 2030" adding that "at least 50 governments have developed or are in the process of developing an AI strategy" (World Bank, 2020). Governments worldwide have recognised the benefits of AI in boosting productivity and improving the quality of provisioning for goods and services. Often dubbed a silver bullet, the technology is anticipated to improve governance, public services, and mobility for senior citizens and individuals with disabilities (Taeihagh, 2021). NITI Aayog, India's national think-tank, has a carefully calibrated AI strategy to make the country a "solution provider of choice for the emerging and developing economies (ex-China) across the globe." It aims to harness the power

of AI through intervention in healthcare, agriculture, education, infrastructure and transportation (Kumar et al, 2018). An Accenture report states that AI can add "US $ 957 billion, or 15 per cent of current gross value added, to India's economy in 2035" (Menon et al. 2018).


Note: Image 1: The Economic impact of AI on select G20 countries. (Source: Accenture and Frontier Economics)

Relevance and Theoretical Framework: This paper draws inspiration from John Maynard Keynes's oft-cited prediction of widespread technological unemployment. Keynes wrote about widespread technological unemployment in his pioneering essay Economic Possibilities for Our Grandchildren. This, according to him emerged "due to our discovery of means of economising the use of labour outrunning the pace at which we can find new uses for labour" (Keynes, 1933, p.3). Ruminations about the possibility of secular job stagnation have often been coupled with moral anxiety about the technological process of human welfare. **In his**

theory of Creative Destruction, Joseph Schumpeter (1942) talked about the "essential fact of capitalism" where an incessant product and process innovation mechanism replaces outdated production units with new ones (Caballero, 2008). This along with his seminal work on business cycles highlights the history of capitalist processes (Langroodi, 2021).

Now, for a country like India, where the challenges posed by AI are double-edged, it can lead to rapid economic growth, but can also hinder employment opportunities by automating clerical tasks, reducing the need for specific expert roles and having a disproportionate impact on creative employment (Mannuru et al. 2023). The "deleterious impact" of AI across sectors in India and the "pall of uncertainty" that hangs on the country's future workers is best highlighted in the latest Economic Survey report. It acknowledges that AI poses a significant challenge to long-term sustainability, job creation and the growth of business services (Department of Economic Affairs, 2024). The report identifies particularly vulnerable sectors like "the BPO sector," commenting that routine jobs like customer services will become highly automated. (Department of Economic Affairs, 2024). According to the report, another sector that risks being displaced by the integration of AI is the "creative sector" which "will see extensive usage of AI tools for image and video creation" (Department of Economic Affairs, 2024). Given that 11.61% of India's estimated workers are employed in the IT and BPO sector (Ministry of Labour and Employment Labour Bureau, 2022), and 8.30% in the creative economy (Kukreja et. al, 2022), any form of disruption in the job markets can foment trouble.
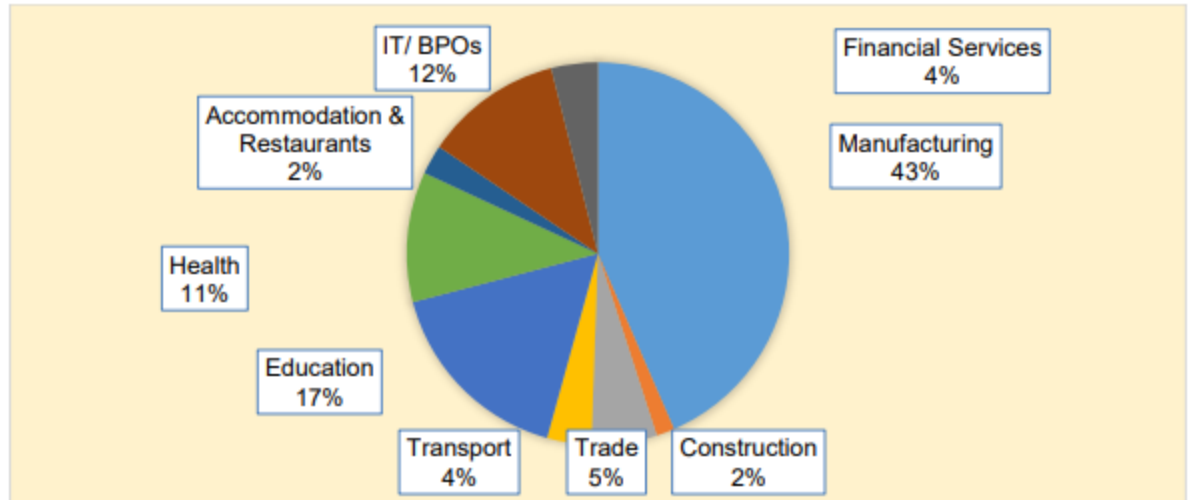
Note: Image 2: Sector-wise distribution of the estimated number of workers (Source: Ministry of Labour and Employment Labour Bureau, 2022)

Problem Statement: In light of the above information, it becomes imperative to assess the economic potential of Artificial Intelligence, its propensity to displace workers, and whether existing policies or frameworks account for AI-induced job displacement. This research is an attempt in that direction. This paper will navigate these extreme positions through a quantitative study of policy documents and will look to analyse what technological advancement means for the future of labour.

Methodological Framework and Rationale: The paper employs a Quantitative approach to understand the information and technology policies or Artificial Intelligence frameworks of Telangana, and Tamil Nadu. Using the text-as-data method comparative policy approach, the article will try to perceive how the respective states have addressed the challenges of job displacement posed by AI through respective policies or frameworks. Texts or policy documents are the quintessential data source for social scientists. A "text is arguably the most pervasive and certainly the most persistent-artefact of political behaviour" (Monroe & Schrodt,

2008). Thus the policy document will be thoroughly scrutinised through the text-as-data approach making it "possible to discover new phenomena, concepts, and relationships from latent dimensions of texts" (Gilardi & Wuest, 2017).

Firstly, a lexicon of labour and worker rights-related terminologies will be created. It will then be mapped against keywords in AI policies or frameworks of Tamil Nadu and Telangana. A lexicon makes knowing emotions easier (Yadollahi, A, et al. 2017). A lexicon usually addresses "a specific domain. This is because words play various roles in different ways, and it is difficult for a lexicon to possess all domains equally" (Kulkarni & Rodd, 2021). Following this, a keyword analysis will be conducted, to understand the frequency of the most important nodes. It will be juxtaposed to the frequency of the relevant lexicon. Keyword analysis is a type of quantitative content analysis, and "it identifies relevant topics in different research fields as well as to predict trends" (Kevork and Vrechopoulos 2008). This direct keyword extraction technique uniquely identifies the document and detects its latent dimensions.

The paper uses the lexicon-based approach for sentiment analysis. "Sentiment analysis often called opinion mining can be performed at either document level, sentence level or aspect level" (Pang & Lee, 2008). It "is a method of analysing a predefined feeling concerning a given subject from online texts written in a natural language" (Liu, 2010). In this paper, sentiment analysis will study the negative or positive expressions in policy documents, particularly of the words in the lexicon created. The results of the sentimental analysis will be evaluated through discourse analysis and will help determine the association between the lexicon and nodes.

Discourse analysis finds its footing in scrutinising "the details of speech (and gaze and gesture and action) or writing that are arguably deemed relevant in the context and that are relevant to the arguments the analysis is attempting to make" (Gee, 2011). This level of analysis

involves asking pertinent questions about language and its plurality in place and time. It asks about "seven building tasks and six tools of inquiry" (Gee, 2011).

Analysis

This research attempts to understand how respective state policies and frameworks account for provisions related to AI-induced job displacement. It also analyses if states have adequate measures to uphold worker/labour rights amidst this wave of technological adoption. It attempts to study the provisions related to worker/labour rights in the policy documents of Telangana, and Tamil Nadu through a lexicon of labour. A lexicon of labour was created after analysing and understanding the provisions under India's four new labour codes. The lexicon includes words like employment, labour, work, worker, social security, minimum wages, workforce, skill, skilling and reskilling.

Telangana

The Telangana government published its AI framework in 2020, intending to make the state "a global hub for Artificial Intelligence and foster social innovation" (Outshade Digital Media, 2020). It aimed "to increase the AI workforce by at least 30,000 by the end of 2022," primarily highlighting the technology's potential for job creation rather than having a comprehensive understanding of its myriad prospects and possible unintended consequences.
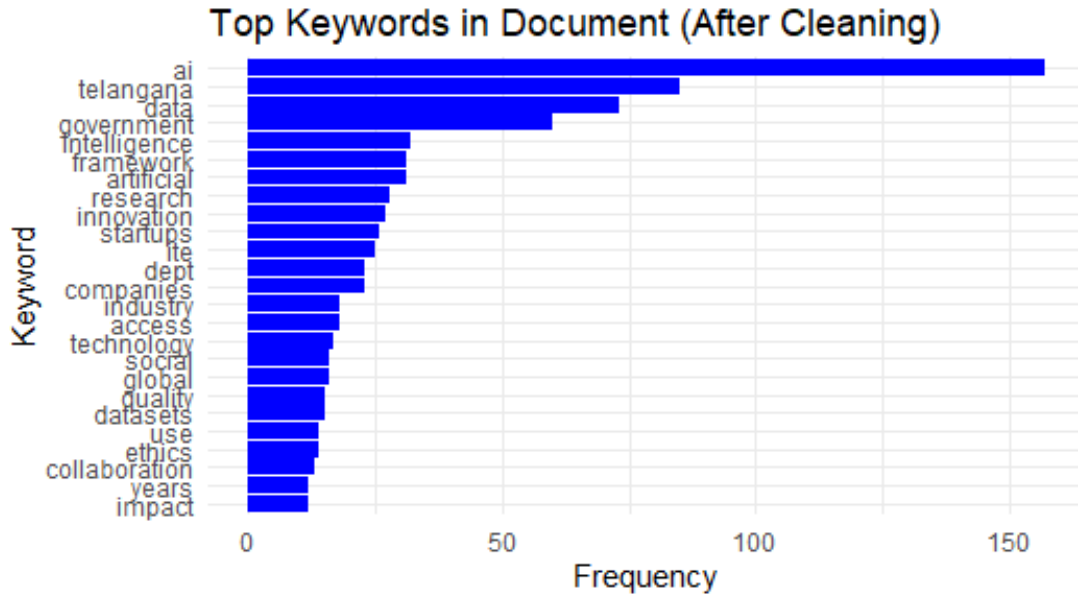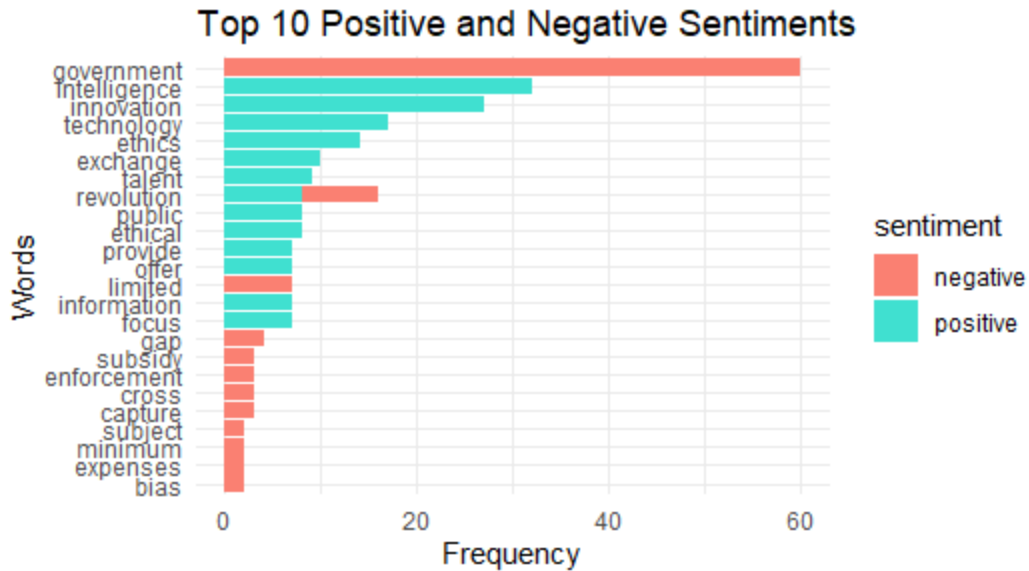
Note: Image 3: The top keywords in the Telangana AI framework (Source: User-generated through R)

A keyword analysis of the document helps determine the strategic dimensions of the framework as words like AI and Telangana are mentioned repeatedly. Similarly, words like government, research, innovation, and collaboration highlight the state's prudent and ambitious goals.
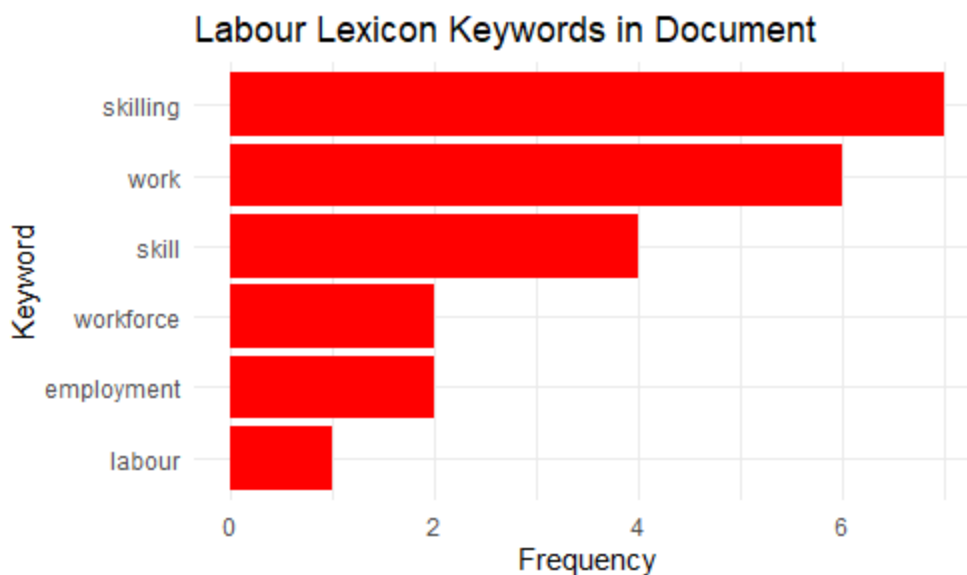
Note: Image 4: Keyword mapping of the labour/worker lexicon in the Telangana AI framework (Source: User-generated through R)

A keyword analysis of the labour/worker lexicon reveals that skilling is the most frequently mentioned word. It is followed by words such as work, skill, workforce, employment, and labour/worker. The missing keywords include worker, social security, and minimum wages. This hints at the absence of social protections and traditional guarantees associated with labour/jobs. While the policy aims to accrue benefits from AI integration and attempts to create new jobs, it does not account for AI-induced job displacement. Neither does the framework aim to reskill the existing workforce, nor provide adequate measures to mitigate harmful workforce disruptions.

Note: Image 5: Sentiment mapping of the top ten positive and negative sentiments in the Telangana AI framework (Source: User-generated through R)

The sentimental analysis reveals a positive correlation between words like innovation, technology, and information. This highlights the framework's overarching emphasis on stratagems that further AI usage to propel growth and development. The negative emotions associated with "government", "enforcement", "bias" and "expenses" highlight the challenges posed in adopting the technology. Words like "subsidy", "expenses" and "gap" highlight the enforcement costs and administrative challenges associated with its adoption. It raises questions about incentives such as government subsidies for enterprises and startups to propel innovation. Inherently, the government is subsidising companies that replace workers with AI. This raises the

question: Will   the   state   support   workers   who   lose   their   jobs?

Sentiment Analysis of Labour Lexicon in Policy Document

Frequency

Sentiment

Note: Image 6: Sentiment analysis mapping of the labour/worker lexicon in the Telangana AI framework (Source: User-generated through R)

Since sentiment analysis of the labour/worker lexicon couldn't be mapped in the Telangana AI framework, a discourse analysis was conducted. A missing relation with the labour/worker lexicon indicates that the framework doesn't adequately address issues related to job generation. It also signals that the act does not highlight the technology's propensity to displace jobs. Discourse analysis tries "to give some consideration, if only as background, to the whole picture" (Paul Gee, 2011) behind this policy. It tries to understand the "significance", "practices", "identities", "relationships", "politics", "connections" and "sign systems and knowledge" in what has been said or written.

SME platform

There are around 23 lakh MSMEs in Telangana, who have played a significant role in terms of creating employment opportunities along with innovation. Being more flexible they can cater to very specific needs and adapt to the technological changes faster. Proven AI products developed by a startup that are applicable to a wider pool of SMEs will be made available in common market space. SMEs can take advantage of this to improve and accelerate their businesses.

- Land will be allotted at subsidized rates to AI companies by Telangana State Industrial Infrastructure Corporation Limited, the guidelines specified for regular ICT companies in terms of annual revenue, investment promises, employment creation promises will be partially relaxed for AI firms.

Note: Image 7 (a) and (b): Discourse analysis of the labour/worker lexicon in the Telangana AI framework (Source: User-generated through R)

Image 6 (a) highlights Article 5 of the framework where the government acknowledges the employment generation capability of Small and Medium Enterprises. It believes AI will help SMEs unleash their potential by accelerating their businesses. The language in the document hints at leveraging this emergent technology to propel SMEs to greater productivity. While a direct positive relationship between AI generating "employment" cannot be established, a connection can be made per discourse analysis. Thus, it can be assumed that integrating AI in SMEs will create more job roles and opportunities.

Similarly, for Image 6(b), part of the Incentives section, a direct relationship between AI and job creation cannot be established. A series of connections imply the government's willingness to generate employment. The state incentivises AI companies by allocating land however, it adds that "employment creation promises will be partially relaxed for AI firms" (Outshade Digital Media, 2020). While it is difficult to establish the effect such a statement will

have on prospects related to employment, questions can be raised on the **deadweight cost of such an incentive.** The framework can lead to the loss of desirable employment opportunities given how vague the framework imperatives are, thus causing a loss of desirable economic activity.

Tamil Nadu

The Tamil Nadu government created its "Safe and Ethical Artificial Intelligence Policy" in 2020, to adopt and deliver "ICT-based solutions for good governance" (Government of Tamil Nadu, 2020). It aims to improve "its citizen engagement, service delivery and problem redressal processes so that no citizen is left behind" (Government of Tamil Nadu, 2020).
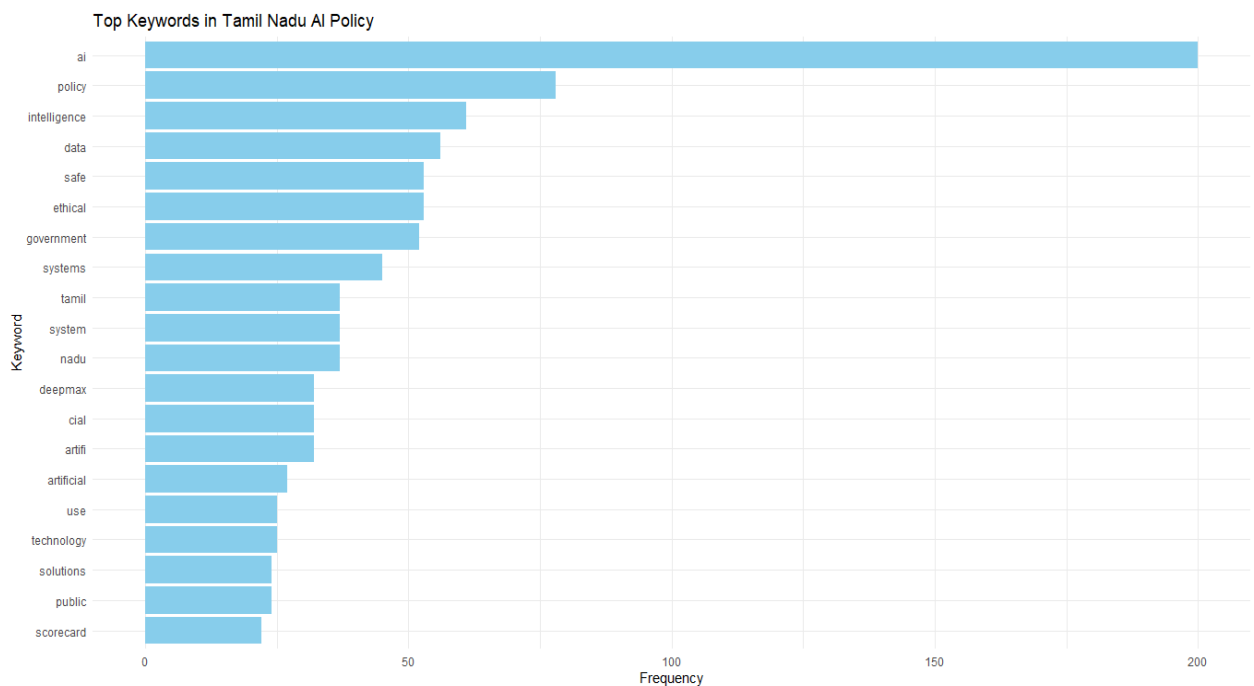
Note: Image 8: The Top keywords in the Tamil Nadu AI policy (Source: User-generated through R)

The presence of the TAM-DEF Framework and DEEP-MAX Scorecard (Scorecard has 22 iterations) within the top keywords highlights the states' focus on enabling a calibrated approach of "transparency and audit", "accountability and legal issues", "misuse protection" (Government of Tamil Nadu, 2020). These frameworks and scorecards create a **complex compliance mechanism** with a cobweb of rules. All state procurement agencies must follow guidelines to procure AI solutions and maintain ethics scores for AI systems. The **enforcement and administrative costs** will rise as government departments must "consult the Center of Excellence in Emerging Technologies (CEET) functioning under TNeGA (Tamil Nadu e-Governance Agency) before making any AI procurement" (Government of Tamil Nadu, 2020). **Additional compliance requirements snowball the enforcement and administrative costs.** Similarly, all purchases are further "monitored by Safe and Ethical AI Monitoring committee headed by chief secretary…" These enforcement nightmares might lead to a **deadweight loss in economic activity**.

Labour Lexicon Mapping in Tamil Nadu AI Policy
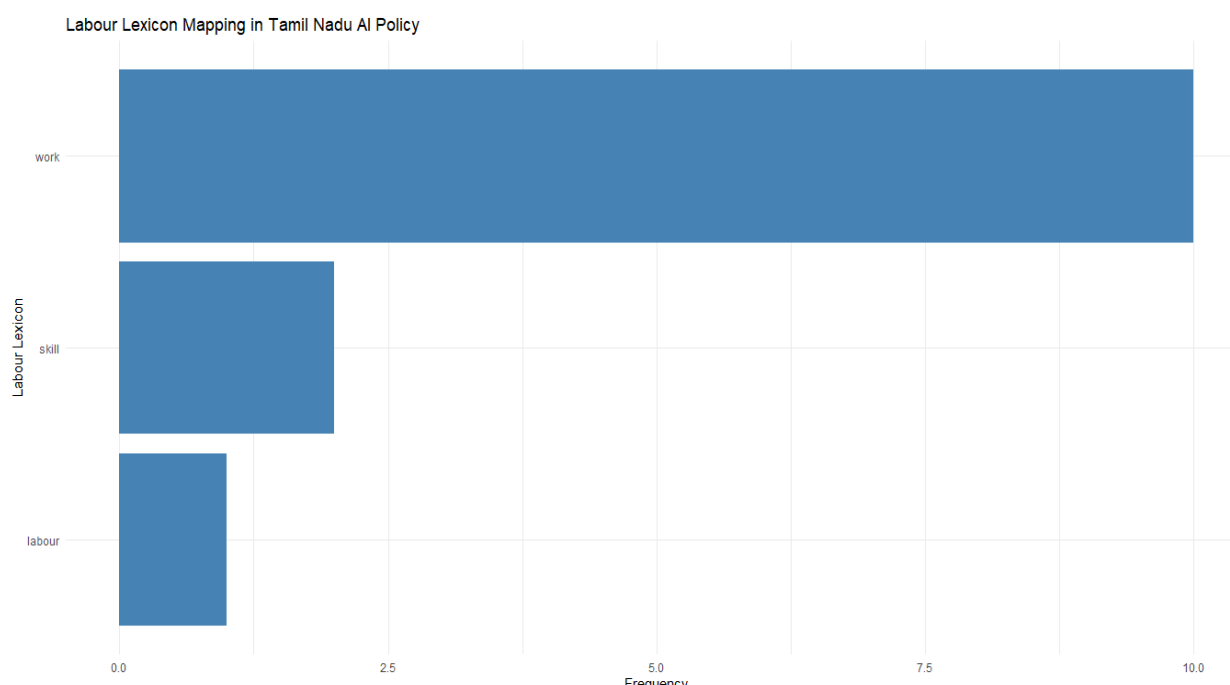
Note: Image 9: Keyword mapping of the labour/worker lexicon in the Tamil Nadu AI policy (Source: User-generated through R)
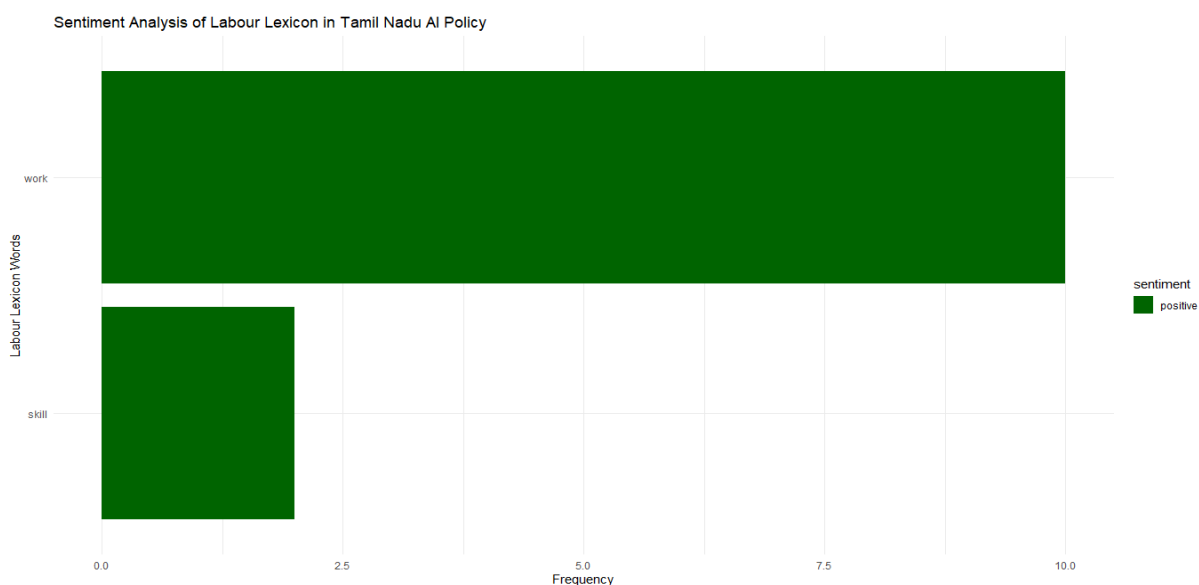
The keyword analysis of the labour/worker lexicon reveals that particular amendments incentivise the creation of new job roles and responsibilities. It is important to note that Section 1 of Article 10 makes provisions for creating jobs and focuses on "skill building for youth." While it doesn't directly address the problem of AI-induced job losses that the paper seeks to address, the tone on job creation is akin to that taken by the Telangana AI framework.

Top 10 Positive and Negative Sentiments in Tamil Nadu AI Policy
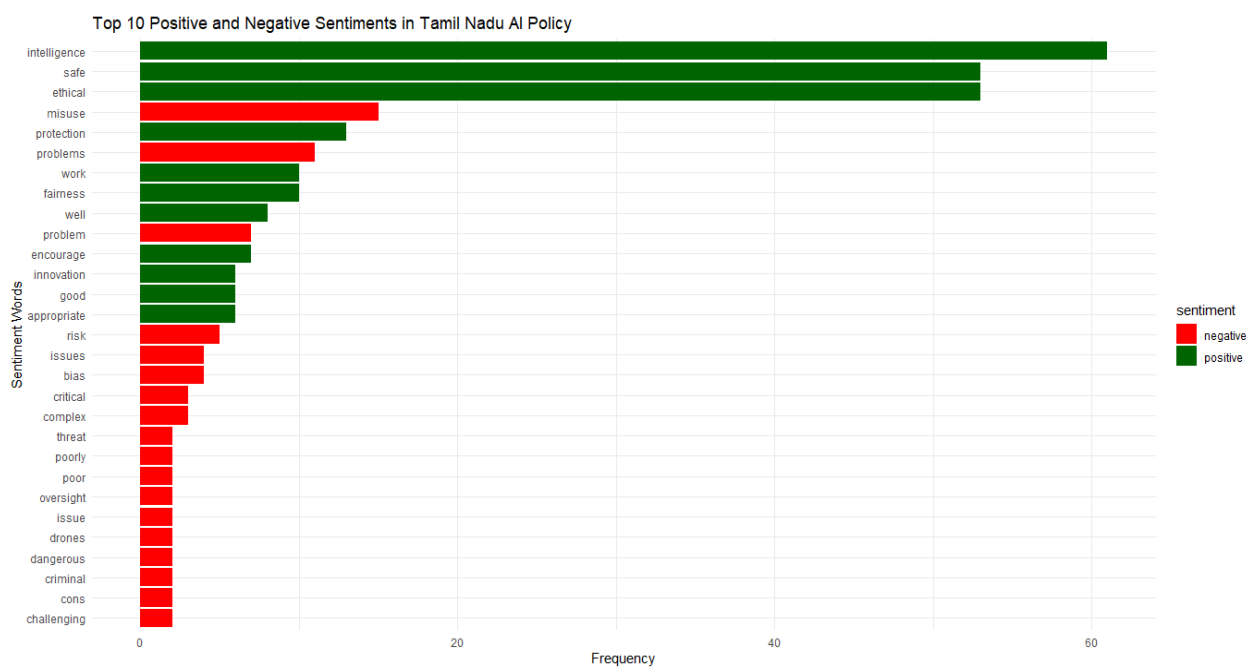
Note: Image 10: Sentiment mapping of the top ten positive and negative sentiments in the Tamil Nadu AI framework (Source: User-generated through R)

The words that generate positive sentiment are safe, ethical, work, and fairness. These bring to light the strategic intention of the government. It has curated an effective policy committed to mitigating the risks posed by emerging technology. An analysis of words such as

misuse, bias, criminal, cons and challenging generating negative sentiments showcases a cognisance on the part of the government about the risks and threats associated with the technology.

Note: Image 11: Sentiment analysis mapping of the labour/worker lexicon in the Tamil Nadu AI policy (Source: User-generated through R)

A positive relationship between two keywords in the labour/worker lexicon and the policy document reiterates the Act's optimistic tone on job creation. However, a missing sentiment with keywords in the labour/worker lexicon reveals that the act doesn't adequately address concerns of job displacement. Deeper scrutiny through discourse analysis revealed an interesting insight. Section 6 of Article 6 deals with fairness and equity and mentions the keyword "labour". It advises caution to mitigate problems such as rapid and unabated integration of AI may generate. While it doesn't address the topic of AI-induced job losses, it comes closest to acknowledging the destabilising effect of the technology, or harmful labour/workforce

disruption. Words like "real threat of exploitation", "unfair treatment", and "commoditisation of human labour", hint at an awareness in the policy document of the harmful labour/workforce disruption that AI is capable of causing.
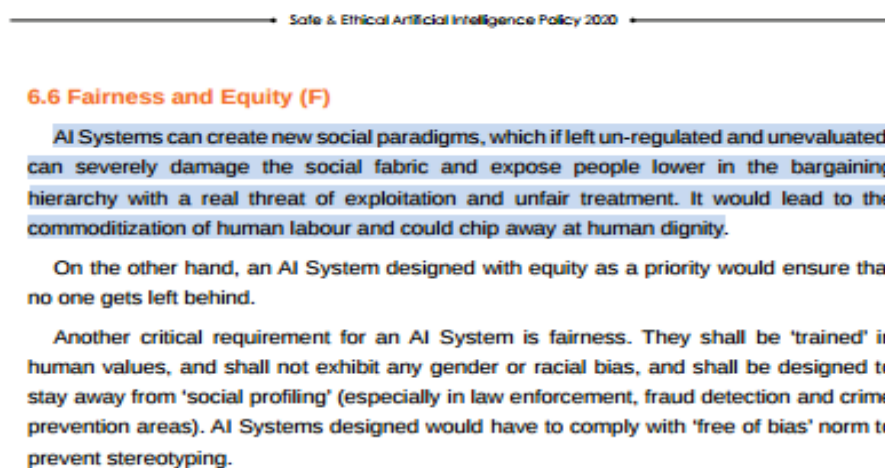
Note: Image 12: Discourse analysis of the labour/worker lexicon in the Tamil Nadu AI Policy (Source: User-generated through R)

Thus it becomes important to analyse this provision through the 6 key questions of discourse analysis. The language signifies how certain sections of society might get disenfranchised through the large-scale integration of AI. It highlights how practices by "AI systems can create new social paradigms" that "can severely damage the social fabric and expose people…" (Government of Tamil Nadu, 2020). The language in the policy creates a relationship that highlights the equity and social justice aspects by striking an ethical note. **This cautionary note makes the policy an industry benchmark for propagating safety and equity, differentiating Tamil Nadu's AI policy from Telangana.** It is also akin to the

multi-stakeholder approach that the International Labour Organization (ILO) advocates for designing and implementing regulations on job transitions. (Gmyrek, Berg & Bescond 2023)

Discussion

Telangana AI Framework

The analysis depicts a narrative of an overwhelming push towards AI adoption to propel economic growth and development, often at the cost of labourers/workers. A thorough scrutiny of the document also tells us that there is no significant effort towards generating a steady stream of jobs. The government doesn't address the issue of reskilling the existing workforce to meet the shifting demands of the industry. This leads to the unintended policy consequences of jobless growth. The state economy continues to thrive and prosper, and while the output generated by the industry increases, new jobs are not generated. This might pose a significant problem for the state as its population increases. Industries become capital-intensive and rely on steady technology adoption to boost production, thereby replacing the labour/workforce. This aligns with the theoretical frameworks of Schumpeter's creative destruction and Keynes' idea of widespread technological unemployment espoused in the paper. The framework misses a golden opportunity to create provisions for upholding labour/worker rights and addressing the topic of AI-induced job displacement. It addresses issues of job creation and dedicates an entire section to worker skilling and education. It doesn't address the rights and interests of workers on harmful labour/work disruptions. The framework is optimistic about the economic benefits it can reap from the advent of AI and its potential to generate jobs. However, it is limited in its purview on addressing challenges emerging from the large-scale adoption of the technology into the

workforce. By not accommodating the strategic challenges that large-scale adoption of AI can pose to the future of work and labour, the policy adds to its deadweight cost.

However, the policy tries to minimise the cost of enforcement and administrative challenges by using existing institutions to implement and monitor the adoption of AI. It has six pillars "Data Exchange Platforms", "Skilling and Education", "Governance, Ethics, Privacy", "Research and Innovation", "Enabling Adoption and Community Collaboration" and "AI-Innovestment Fund" for integrating AI. To enforce them, the Open Data Portal is used for data exchange, TASK (Telangana Academy of Skills) for skilling and RICH (Research and Innovation Circle) for research, thus driving down the cost of enforcement and administration.

The Tamil Nadu AI policy

The strategic imperatives of this policy are distinct. Tamil Nadu's policy focuses on the safe and ethical integration of AI. Its emphasis on creating equitable growth distinguishes it from the Schumpeterian model of creative destruction or Keynes' thesis on technological displacement. It is akin to the Harrod Neutrality theorem. Sir Henry R.F. Harrod stated, "Technical progress is neutral if, at the same rate of profit, the capital/output ratio remains unaltered" (Batra, 1970). Unlike Telangana, Tamil Nadu's emphasis on fairness and equity showcases its continued commitment to labour/workforce-augmenting growth. The state's approach to maintaining a balanced growth path by creating a nuanced understanding of the capability of AI shows a policy push towards complementing labour/workers. This difference in approach makes its policy a benchmark for the country and aligns it with the principle of Harrod Neutrality.

The policy is citizen-centric. It looks to address the concerns of the general populace rather than just being industry-centric. It highlights the virtues of the multistakeholder approach to policymaking. Unlike the Telangana government's framework that seeks to rapidly integrate AI to create jobs without accounting for its unintended consequences, the Tamil Nadu AI policy ensures that "no citizen is left behind" (Government of Tamil Nadu, 2020). However, this overwhelming concern for ethics and safety **leads to a regime of compliance measures, adding to the enforcement and administrative costs.** The policy creates an intricate regulatory regime where all Tamil Nadu government procuring agencies must follow guidelines to procure AI solutions and systems. Besides these guidelines, the agencies must also comply with the DEEP-MAX framework, which is revised periodically. This can lead to the need for hiring experts to manage compliances **thus adding to compliance costs.** The Centre for Excellence in Emerging Technologies is the nodal unit overseeing government purchases.

While the policy focuses on equity and ethics, its biggest omission is its missing provision on workforce realignment to meet the demands of AI-specific jobs. **This might be considered an error cost** (Rajagopalan, & Tabarrok, 2021)**.**

Limitations and Conclusion

A comparative analysis of the AI framework and policy of Telangana and Tamil Nadu provides a distinct pattern in which the technology is being integrated in these respective states. The technology adoption curve and Evertt Roger's diffusion of innovation theory tell us that some states react and adapt to innovative products quickly thus leading the innovation cycle. However, others take a calibrated stance in adopting the same, missing out on the early opportunity but are early adopters. This research highlights the challenges posed by the rapid

integration of AI technology worldwide through the lens of two Indian states, Tamil Nadu and Telangana. It further analyses if the South Indian states are well equipped to mitigate the challenges posed by the steady adaptation of AI technology. Our analysis shows Telangana's approach is that of a risk-taker and an innovator. The state tries to accrue the maximum economic benefits by adopting the technology quickly. However, this can lead to certain unintended consequences in policy-making.

While the state is eager to adopt the technology, it fails to see how such a strategy can lead to jobless growth. Tamil Nadu, on the other hand, takes a calibrated approach and differentiates itself from its southern counterpart. It tries to integrate the technology equitably and fairly, without damaging the state's social fabric. It tries to stay true to its Dravidian ideology of not leaving any citizen behind. However, this interpretation is primarily based on quantitative secondary research called "text-as-data", and uses careful thought, reasoning and decision-making of a researcher. Also, a researcher's psychological, social, emotional and cultural factors determine their decision-making. Thus one limitation of this study is that it is a subjective analysis of the available data, and originates from the conscious choice of the researcher. The lack of reliable data is another key factor limiting the scope of this analysis. A mere textual analysis of the policy document reveals very little original information on how the policy or framework has been implemented. Similarly, this research is more amenable to a longitudinal analysis conducted over the years as the implications of policy documents and frameworks generally take a long time to manifest.

While AI adoption poses significant challenges to labour/worker forces, a mass displacement can be ruled out as such a reaction can lead to global consternation. Since policymaking is an iterative process, and democratic governments exist to serve the people's

mandate, no government framework or policy is cast in stone. Government policies are amenable to change. Policies evolve as the public articulates their agendas to their governments. Thus any drastic impact of AI integration such as mass displacement of the labour/workforce will be met with strong opposition and campaigns mobilised by trading unions and grassroots organisations. Political parties will thus be forced to adapt and respond to the legitimate demands made by civil society actors. Nick Bostrom's book, Superintelligence refers to such an eventuality as the "moderate take-off scenario" (Bostrom, 2017). Here, mass protests by workers and labour organisations force governments to mitigate the emergent challenges to ensure political continuity and stability. However, given the significant financial capabilities of the big tech lobby to make this emerging technology ubiquitous, and the government's inability to regulate AI due to the pacing problem, a question arises on whether the policy process is amenable to capture or a systems hijack. Only time shall tell.

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