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## AI algorithm bias and regulatory path in the field of bidding and procurement

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### Abstract

Now, many places in China are using artificial intelligence for bidding and procurement to address the problems of low efficiency, excessive manual work and delayed supervision in the old ways. Due to problems in the integrity of the data, the structure of the algorithm and its operating environment, there may be hidden and systematic algorithmic bias that could harm the fairness of essential procurement. In terms of the governance of modern public procurement, this paper will divide the five typical manifestations of AI algorithmic bias and examine how they develop at the levels of data, algorithms and practice to explain the transmission path of "source deviation - endogenous solidification - scenario alienation". The three parts of the closed-loop regulation are technical correction, institutional guarantees and practical empowerment, and their purpose is to promote the standardised and fair development of intelligent procurement.

**Keywords:** Bidding and Procurement; Artificial Intelligence; Algorithm Bias; Public Governance; Regulatory Path

### 1. Introduction

With the advent of the digital economy era, many new digital tools, such as artificial intelligence and big data, have been applied to various parts of public administration to drive the modernisation of public resource trading governance. The Implementation Opinions on Accelerating the Application of Artificial Intelligence in Bidding and Tendering Industries, released by the eight governmental departments of the National Development and Reform Commission, have outlined a direction for the intelligent and standardised development of this sector and marked the beginning of an era of intelligent improvement and digital risk control in bidding and procurement.

Tendering and procurement are one of the main channels for distributing public assets, covering construction, goods and services, etc., and are characterised by a large amount of capital, many parties involved, numerous steps, and higher ethical risks. The equity of the deals and the clarity of the operating process directly affect how well the financial resources are used and the uniformity of the development of the commercial environment.

Artificial intelligence has been applied at all links of the bidding and procurement process, such as tender review, automated comparison, bid-rigging detection, bidding support, risk prediction, etc. It solves the problems of low efficiency, poor data analysis and lack of post-event responsibility in the old manual procurement system to improve quality and efficiency, standardise procedures, reduce the risk of fraud, and promote the direction of digitalisation of industry. Technology is not always a neutral force. AI judgement is based on past data and recursive rules; therefore, it has been maintaining the current market imbalance and has an algorithmic bias. Algorithm bias is not random; rather, human prejudice varies and differs all the time, and as a result, there are problems such as identity discrimination, excessively high standards, and uneven supervision.

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Previous studies have explored the benefits of artificial intelligence and begun to tackle the problems of legal risk and moral hazard in intelligent procurement, but they still have deficiencies. Most of the discussions are too general and do not address the specific problems of algorithmic bias in tendering and acquisition, or the conceptual structures of various industries. The occurrence of bias is sporadic, and there is no all-encompassing integrated view in the analysis. Most of the current supervisory tactics are general and have low applicability; they do not meet the public utility requirements of government contracts. In light of the research deficiencies mentioned above, this paper will organise a classification of expressions and origins of algorithmic bias and put forward an all-round regulatory system to provide inspiration and practical guidance for the intelligent and legal development of this field.

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## **2. Practical Manifestations of AI Algorithm Bias in Bidding and Procurement**

Algorithmic bias is a kind of systematic decision-making error in an artificial intelligence system that arises from biased data, a flawed algorithm, etc. It is a structural, widespread form of bias and not an isolated or random one. All the problems of algorithmic bias in the entire cycle of bidding and procurement can be categorized as follows: vendor exclusion screening, rigid bid assessment criteria, path-dependent reliance on historical data, differential regulatory bias and value misalignment in human-machine judgment; all of them harm the fairness of public procurement.

### **2.1. Discriminatory Screening Bias of Suppliers**

Supplier qualification assessment is at the start of the bidding and procurement process, and it is also a place where algorithms can be biased. Many intelligent procurement frameworks have begun to use big data technology for qualification verification, credit risk rating and admission decisions; they can improve the efficiency and consistency of the workflow, but there may still be some hidden subjectivity. As it no longer has a direct object, the platform has increased the entry barrier and indirectly reduced the weight of the index to limit the participation of micro, small and medium-sized enterprises (MSMEs), creative enterprises and peripheral enterprises.

The current algorithm is based on a few indicators, including the amount of capital, years in business, historical bid data and other operational factors. Organizations with a large number of transaction records and that are regional or national leaders will be ranked highly in the score. On the other hand, new small and medium-sized enterprises and creative companies with excellent operating conditions and proprietary innovations often cannot obtain good credit terms or face disadvantages due to the lack of extensive data. A system with regional data patterns will increase the demands on foreign companies and make it more difficult for them to enter; thus, new problems will arise in the overseas market. In addition, the old assessment system for new business models does not consider their technological and service advantages; therefore, the industrial creativity space has shrunk and industrial dominance may have increased at the expense of market competitiveness.

### **2.2. Solidification Bias of Bid Evaluation Standards**

Smart Bid Assessment is the first use case of artificial intelligence in procurement. With the help of natural language processing and text-comparison technology, the problems of excessive subjectivity, irregular norms and low efficiency in the previous manual bid assessment process can be resolved by automating the examination of tendering documents and rating criteria. The above method will also be influenced by the bias of fixed-bid evaluation.

At present, the criterion for determining the necessity of artificial intelligence acquisition is based on the accumulation of previous cases and fixed scoring rules; thus, it cannot meet the different demands of various scales and attributes of AI acquisition projects. The calculation model has been hesitant to utilise creative and customised tendering strategies, and cost-effective, project-specific proposals that do not conform to the traditional benchmark dataset may be ranked low; thus, market-based innovation will be restricted. Generally speaking, the bias in the system's analysis is that it focuses too much on the quantity rather than the quality, so it gives excessive weight to obvious indicators such as certification status, price, bid volume, etc., but neglects other non-material factors such as service quality, professional knowledge of staff, innovation, and so on. As a result, there has been a long-term misconception that the focus of research is on stocks, and the essence is information; this has enhanced the market power of older enterprises and inhibited the development of new high-tech enterprises.

### **2.3. Path Dependence Bias of Historical Data**

The Functional Structure of AI Models is to Replicate the Internal Data Pattern. The acquisition sector still has the old problems of regional isolationism, industrial concentration and discrimination against micro, small and medium-sized enterprises (SMEs), as shown by the trade data. These systems have inherited the old bias in the learning process

passively, and through their own judgements, have increased market asymmetry and formed a standard path dependency bias.

In the background of intelligent supervision, the identification framework for bid-rigging in traditional irregular cases has paid more attention to the frequent misconduct characteristics of micro and small enterprises but has reduced the filtering standard for large enterprises; new and subtle infringements have gone undetected, and the regulatory system is thus "punitive towards small firms but neglectful of large ones and favours established offences over novel ones". The credit rating model of an institution has not been revised according to current changes in business conditions. Even if there have been some improvements after correction, minor violations by the company will continue to adversely affect its business operations and ratings, thus not achieving the goal of comprehensive supervision. Even worse, unvetted human scrutiny, mistakes and irrational decisions in the past are continuously replicated by software and have started a destructive cycle of discrimination.

#### **2.4. Differential Bias in Risk Supervision**

The new monitoring system for acquisitions will be more electronic; we can foresee the risks and deal with them in time, otherwise, it will have a relatively small scope and the response speed will be too slow. Due to the lack of data, there are problems in the individual attribute identification and unequal alert boundaries; thus, there will be considerable custom oversight bias.

At present, the focus of risk detection has been on obvious signs of violation, such as text copying and abnormal prices; however, there is no data on hidden bid manipulation and industrial network collusion, and it is not very effective. Only based on the surface trade data can it be calculated; thus, the deep risk factors of corporate financial links and severe cooperative activities cannot be revealed and the analysis is flawed. In terms of the purpose of supervision, small and medium-sized enterprises have scattered data and irregular behaviour; it is relatively easy to find abnormalities in them, but large enterprises involved in hidden schemes are difficult to detect early and can adjust standards flexibly. As a result, there is an unequal supervision system for "small enterprises and lax supervision for large enterprises", which is not in line with the spirit of fair competition.

#### **2.5. Value Dislocation Bias in Human-Machine Collaboration**

Although present-day digital acquisition is still in line with the doctrine of "technical aid, constant accountability", technically speaking, it is based on the principle of productivity and lacks the merit assessment required for open bidding; thus, there is a value mismatch in human-computer determination. Many professionals have begun to depend too much on the results of computation and have even developed a sense of "system dominance", reducing or eliminating human intervention at crucial times such as qualification screening, tender evaluation and hazard assessment; thus, the openness and social value of acquisitions have decreased.

Algorithms are only suitable for the automatic processing of quantitative information and cannot adapt to complex situations or empathy and moral judgment. Rigid adherence to the results of the algorithm is shallow and unfair. Currently, there is a systematic imbalance in the division between humans and computers; algorithms are responsible for most of the decisions on numbers, and although professional practitioners only conduct a superficial check of the results, they lack the advantage of experience and situations to correct errors in the algorithm. Given that generative AI is prone to hallucinations and has inconsistent output, if humans do not supervise it, more errors will occur in the decision-making process and the ethical distance between people and machines will widen.

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### **3. Formation Mechanism of AI Algorithm Bias in Bidding and Procurement.**

Algorithmic bias in the procurement system is not a sporadic technical failure; rather, it is a structural defect that has developed due to data, logic and practical application. The three levels of assessment in this paper are the origin of data, the inherent reasons for algorithms, and the situations of application; they will help us better understand how and why prejudice occurs, is strengthened, and spreads, thus laying the foundation for precise regulation.

#### **3.1. Data Layer: Source Inducement of Bias Generation**

Data will be used to learn and make decisions independently. The main reasons for algorithmic bias are biased data, inconsistent labelling and existing inequalities in society. There is a problem with the structure of the training data. The present intelligent framework is based on industrial equity trade logs, and there are errors in the entities, context and hazard indicators. Large and regional enterprises have accumulated rich data resources, but small and medium-sized

enterprises (SMEs), distant firms and independent businesses do not have such data and are thus out of the scope of algorithmic analysis; therefore, there are various evaluation results.

In terms of the application scenario, although there are many typical standard purchase cases, custom and pioneering projects have not been released in recent years, and thus the framework is not flexible enough for special circumstances. In terms of risk detection, there is a large amount of data from conventional illegal cases, but novel hidden transgression examples are scarce and thus fail to be detected. Human annotation is also prone to bias. Due to the momentum of the sectors, local views and personal biases have resulted in a relaxed standard for leading companies in some areas and stricter regulations for small and medium-sized enterprises. There are no unified industrial labelling rules, so the data in all parts and systems is not consistent. In addition, the traditional market imbalance is also in the database. Cannot find the problem of skewed data on its own, and algorithms will blindly inherit old unfair regulations to make manual bias systemic. There will be even more problems of biased data recursion due to the lack of standardised data cleaning procedures.

### **3.2. Algorithm Layer: Endogenous Root Cause of Bias Solidification**

The primary reason for the appearance of bias is data inconsistency; at the same time, even when employing relatively fair data, flaws in the design of the algorithms themselves, such as poor structure, irregular logic, limited optimisation objectives, etc., can also lead to and amplify the propagation of bias.

Most of the AI frameworks that have been used in public procurement have focused on efficiency and data alignment, but they do not meet the industrial requirements of fairness, social welfare and creativity. As a result, the motive of efficiency has deviated from the purpose of the industry. Some models are too prone to overfitting, have learned the patterns of historical data too closely, and cannot adjust to changes in the market. There is still a considerable difference in the process of feature selection and weight assignment. At present, most algorithms are based on relatively static quantitative indicators such as the size of the company, past performance and registered capital, but they do not consider other necessary qualitative factors, such as innovation capability, quality of service, operating environment, etc., which reduces the competitive strength of leading enterprises and restricts the development of new-generation small and medium-sized enterprises.

The Goals of Individual Algorithmic Iterations Increase Inequality. Only for the purpose of improving the speed of assessment algorithms and the accuracy of rule detection are Optimisations carried out; there is no assurance of fair markets or protection for people's rights and interests and creativity. At present, there is a focus on productivity all the time, and therefore, it may no longer align with the need for fairness and the economy. The Algorithm's Opacity is also discriminatory. It is difficult to observe the hidden reasoning mechanism and large language model framework; therefore, latent biases cannot be traced or corrected, and as a result, there are widespread regional differences in the market. Opacity makes it difficult to know the actual scope of liability, and therefore regulation and supervision are weak.

### **3.3. Application Layer: Extrinsic Catalyst of Bias Amplification**

The basic causes of prejudice are defects in the data and algorithms, and at the same time, due to systemic deficiencies and weak regulations in practice, bias has been applied, disseminated and normalised.

The main problem is the lack of cooperation between people and machines. Manual inspection and qualitative assessment are the final line of defence against algorithmic bias, but they have been weakened by the large number of operators who depend on computational results and do not receive human supervision. The division of labour among people and machines is not reasonable; professional scenarios and quality control cannot be optimised, and due to insufficient AI operating skills and weak bias detection capabilities, there is a high risk of bias in the decision-making process. The other reason is the absence of continuous flow and iteration. If there were a normal way to deal with the bias, decision mistakes and unfairness that occur, they would be immediately corrected; otherwise, only a fixed algorithm would be available and it would not be able to adapt to changes in the behaviour pattern and demands of market participants.

There are many problems with the entire monitoring system. Currently, the only supervision of online recruitment systems takes place after the fact; thus, they are not in place before or during the operation of the system. The administrative department lacks specialist knowledge of algorithms and technical means; therefore, it is impossible to detect all kinds of discrimination by design. The institutional authority is divided, and the cooperation among departments is poor; there is also a lack of a clear liability system. Industrial conformity and moral order have lagged behind the development of artificial intelligence technology. No particular algorithmic moral rules or fairness standards

have been put forward for mergers and acquisitions, and since there are no laws or regulations addressing bias detection, prohibition and liability, managing bias has been out of control.

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#### **4. Regulatory Paths for AI Algorithm Bias in Bidding and Procurement.**

The systemic risks of AI algorithmic bias in purchasing are due to all sorts of interconnected factors and cannot be solved by technology or policy alone. In accordance with the development mechanism of bias, this paper puts forward a three-part regulatory system combining technical correction, institutional guarantees and practical support to achieve all-round closed-loop management of algorithmic bias risk at the stages of source prevention, process supervision and terminal correction.

##### **4.1. Technical Correction: Source Governance and the Construction of a Fair Technical Foundation**

Technical rectification is the foundation of bias control; thus, to address the source of bias, data regulation, algorithm improvement, promotion of transparency, standardisation of fairness assessment, etc., need to be taken.

In terms of data management, a cycle of information collection, cleaning, labelling and gradual refinement needs to be formed to address the problems of locality, theme and situation in data; it will help to fill missing data for disadvantaged market entities and creative contexts and improve the balance of sample composition. A good foundation will be laid to prepare for the cleaning of data and eliminate old records. To reduce errors in manual labeling, the industrial labelling protocol will be standardised; thus, a double-check system with two people will be implemented to prevent such mistakes, and to ensure that the information is always up-to-date and accurate, continuous data updating and deletion plans will be introduced.

In light of the problem of the rigidity in the general model for public procurement, special fairness-oriented frameworks will be introduced for various industries. The structure of the assessment should be changed to reduce the weight of stock quantitative indicators and increase the weight of innovation, service and performance qualitative indicators. The general goal should be to optimise "efficiency + fairness + innovation", and subject equalisation and innovation incentives will be added. At the same time, there should be no bias in the early detection and rectification of this component, and the updated violation sample database has been expanded to reduce differentiated supervision bias.

To promote the principle of transparency, fundamental business algorithms should be made more visual and understandable to enable full traceability of the decision-making process. The logic of the non-proprietary algorithm should be disclosed to some extent and added to the deviation tracking system to identify the cause of the bias accurately and improve technical monitoring. A standardised fair assessment system should be built, special audits should be regularly carried out in line with subject equality, equal opportunity and outcome justice, many appraisal groups need to be involved, and public score submission and rectification deadlines should be set to maintain the technical foundation of AI deployment.

##### **4.2. Institutional Guarantees: Systematisation of Construction for the Multi-Party Co-governance Model**

Construction of Structure can regulate the use of artificial intelligence and promote good governance. Strengthen the regulation system, strengthen the supervision work and clarify the boundaries of authority and responsibility.

First, revise the specific regulations. Based on the existing tendering and public procurement laws, specific governance rules for the use of artificial intelligence in acquisitions need to be issued to define the scope of fairness for procedures, how to detect bias, who is responsible, etc. Take the initiative to build a system to record the registration of algorithms and carry out moral and compliance audits to prevent the release of biased models. With the change in standards for generative artificial intelligence in recent years, they need to be updated in line with the direction of policy.

Change the supervision model of the government and start building a multi-party governance system. A four-way connection supervisory system should be built to involve the government, enterprises, external organizations and industry participants, and it needs to be implemented and supervised. More cooperation among departments is needed to strengthen full-stage supervision of the link connecting data, algorithms and applications in all aspects of life. Strengthen the independence of the internal audit board and the audit board of R&D institutions; strengthen the involvement of external audit institutions, such as stock exchanges, in monitoring for impartiality, set up an official whistleblowing channel, etc., to build a strong and stable governance system.

Strengthen the system of hierarchical authority and responsibility. At different stages of research, application and supervision, set the scope of responsibility and separately specify the reasons for algorithmic errors, data errors, human

error and lack of supervision. Regulations and the private sector should be strengthened to reduce the market asymmetry and financial losses due to algorithmic discrimination, and the person responsible will be added to a serious credit blacklist.

#### **4.3. Practice and Reinforcement: Strengthen the foundation of good governance through practice.**

In light of the current administrative limitations, measures need to be taken to train staff, supervise algorithms, establish a legal recourse mechanism, etc., so that the rules can be implemented.

First, develop people and the rest will follow. A standardised and organised educational system should be established to provide special training for acquisition executives, bidding assessors, monitors, portal administrators, etc., on the basic knowledge of artificial intelligence, prejudice prevention, moral hazard prevention and lawful use. Multi-disciplinary integrated professionals with the skills of "purchasing + AI + jurisprudence ethics" need to be trained, and independent regulatory squads should be set up to carry out algorithm assessments, bias investigations, compliance monitoring, etc., and optimise the platforms.

Standardisation and Strengthening of Algorithm Supervision. In addition to the periodic comprehensive assessment and particular evaluation, any problems will also be addressed promptly in the normal operating period. Periodically carry out a comprehensive audit of all data sets, frameworks and decisions, then publish an audit report and a rectification plan. Special audits will be carried out on the high-objection and high-risk initiatives, and then algorithmic tuning and data adjustment will be made according to the investigation of problems and iteration to ensure continuous improvement in fairness.

Improve the System of Legal Guarantees. A uniform algorithm for the review will be employed to safeguard the right to appeal of commercial enterprises, and in case of a decision being overturned on appeal or reconsidered, reasonable reasons and the corrected results will be promptly communicated. A loss indemnification system needs to be established to clarify the basis of compensation, how to apply for it, and who will bear the responsibility for the harm caused by algorithmic discrimination. A typical litigation database in the relevant industry will be created to obtain transferable experience in hazard reduction and management.

Improve the Model of human-computer cooperation. Continue to follow the basic idea of "human supervision, technology assistance and accountability". Algorithms will be employed for some reasons, such as to handle the large amount of data and carry out basic sorting; however, people still need to make important judgments, such as determining eligibility and taking responsibility. Strictly hierarchically distribute the work of manual audit to focus on examining the procurement results of vulnerable entities, creative proposals and non-standard initiatives, etc., and maintain a good balance between the speed of purchase and fairness through manual merit adjustment.

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## **5. Conclusion and Outlook**

Now, with the continuous progress of digitalisation, it has also been incorporated into the construction of public resource transaction systems. Although it has greatly sped up the process of transactions and improved the reliability and distribution of resources, artificial intelligence also has its own hidden and systemic algorithmic biases that harm fair market order and the protection of public interests. The five general types of combined and overlapping expressions of algorithmic bias in procurement that disrupt the fair competition in the market are introduced in this paper. The formation and spread of such biases are the result of the combined effects of data, algorithms and applications at all stages, and thus an entire transmission path of "origin production - internal stabilisation - scenario magnification" has been established. Due to the problem of algorithmic bias, the distributed governance strategy has not achieved good results; thus, an all-weather three-dimensional governance needs to be built to combine technical correction, institutional guarantee and practical power, and promote the dynamic balance of technological development and fair values through origin debiasing, process regulation and terminal improvement.

With the continuous development of generative AI and industrial large models, the scope of application for intelligent procurement will also be expanded continuously, and new, hidden and subtle algorithmic bias risks will also appear. Algorithmic fairness oversight will continue to be a problem that needs to be addressed in the long run. In the future, research will focus on the following three areas: First, with the development of technology, we need to pay attention to new biases at the beginning of their emergence and development to build an adaptable and detailed risk prevention system. Second, to solve the problem of scenario alignment deficiency in general models and reduce the risk of source bias, industrial-specific fair algorithms based on procurement knowledge graphs should be constructed. Third, the practical benchmarks and evaluation procedures for the oversight system need to be optimised; through strengthening

the governance architecture with multi-scenario empirical tests, a normalisation and stable management system can be formed to promote the secure, organised and high-quality development of AI technology in procurement and support the modernisation of the governance structure for public resource transactions.

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

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## References

- [1] Song Q, Du Z K, Yue L. Risk Identification and Early Warning of Bidding and Procurement Empowered by Artificial Intelligence[J]. China Tendering, 2026(05): 210-214.
- [2] Kong G H. Discussion on Compliance and Ethical Risks of AI-Assisted Bid Evaluation[J]. Bidding & Procurement Management, 2026(03): 43-45.
- [3] Ma S S. Application of Intelligent Supervision Technology in Identifying Bid-Rigging Behaviors in Government Procurement Bidding[J]. China Logistics & Purchasing, 2026(01): 143-144.
- [4] Wu S P, Chen Y H. Limitations and Legal Risks of AI Technology Application in Bidding and Procurement[J]. Bidding & Procurement Management, 2025(08): 34-36.
- [5] Zhao H S, Xu S J. Governance of Prominent Problems in Bidding and Tendering Empowered by Artificial Intelligence[J]. China Market, 2025(18): 199-200.
- [6] Zhu M. Research on Knowledge-Driven Human-Machine Collaborative Intelligent Bid Evaluation[D]. Beijing Jiaotong University, 2025.
- [7] Sun J T, Li M, Tian Z H, et al. Exploration and Practice of AI Empowered University Government Procurement[J]. China Government Procurement, 2025(05): 70-76.
- [8] Zhang N, Gao P C. Ethical Risks and Governance Paths of Generative Artificial Intelligence Emotional Simulation: An Analysis Based on Technology-Society Mutual Construction Theory[J]. Scientific Decision Making, 2025(02): 123-134.
- [9] Luo F, Ma Y X. Artificial Intelligence Embedded in Bidding and Procurement: Logic, Path and Risk[J]. China Tendering, 2023(12): 21-23.
- [10] Feng Y G, Xi Y Q. Ethical Risks and Governance of Artificial Intelligence[J]. Hebei Academic Journal, 2023(03): 60-68.
- [11] Pan Z Y. Ethical Risks and Legal Responses of Artificial Intelligence Application[J]. Study & Exploration, 2022(07): 61-67.