

Research on the Innovation and Improvement Pathways of Smart Case Management Mechanisms in Prosecutorial Organs in the New Era

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Abstract: With the continuous growth in the number of social cases and the advancement of judicial intelligence reforms, traditional case management models have become increasingly inadequate to meet the demands of high-quality case handling by prosecutorial organs in the new era. This study systematically examines the practical significance of smart case management within prosecutorial institutions and provides an in-depth analysis of key challenges in current mechanisms, including inefficient data sharing, an underdeveloped case allocation system, and insufficient levels of intelligent supervision. By promoting the deep integration of information technology and intelligent systems, strengthening full-process supervision, and cultivating a professionalized case management workforce, prosecutorial organs can effectively enhance the scientific rigor, standardization, and overall efficiency of case management. These efforts hold significant theoretical and practical implications for accelerating the development of smart prosecution and advancing judicial modernization.

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1.Introduction

Case management not only ensures the timely receipt, transfer, and allocation of cases, thereby facilitating prosecutors' case handling and alleviating their workload, but also plays a critical role in safeguarding the right to information, the right to supervision, and the right to participation of defense counsel and involved parties. In this regard, effective case management contributes to enhancing the credibility of prosecutorial organs, fostering a positive judicial image, and significantly improving both the quality and efficiency of case handling. However, with the rapid increase in the number of cases in the new era and the continuous emergence of complex social conflicts and disputes, traditional case management models have become increasingly incapable of meeting contemporary practical demands ^[1]. Consequently, the deep integration of modern technologies such as big data and artificial intelligence into case management has become an urgent necessity. The reform of case management mechanisms within prosecutorial organs constitutes a crucial component of the broader process of judicial intelligence reform ^[2]. The development of smart case management is not only an essential measure for advancing smart prosecution, but also a practical response to the evolving expectations placed on prosecutorial institutions in the new era.

Therefore, in-depth research on smart case management mechanisms in prosecutorial organs is of considerable significance. At present, systematic academic research on this topic remains relatively limited. Existing studies predominantly focus on practical case management operations at the local level, while insufficient attention has been paid to the conceptual framework and developmental pathways of intelligent case management. As a result, smart case management mechanisms have emerged as a pressing and underexplored research area warranting further scholarly attention ^[3].

Although prosecutorial case management has entered the stage of smart case management in practice, notable shortcomings persist at the legislative level. Relevant laws and regulations remain underdeveloped, and legislative gaps exist in certain areas, creating practical obstacles for both case management personnel and prosecutors. Research on smart case management mechanisms can therefore contribute to improving the legislative framework governing case management, guiding standardized practices, and correcting irregularities in case handling. Moreover, the advancement of smart case management enables the provision of more efficient and higher-quality judicial services, enhances comprehensive supervision throughout the case-handling process, and improves the efficiency of case information disclosure. By strengthening information exchange and data sharing among judicial institutions and establishing integrated database platforms, prosecutorial organs can further enhance overall case-handling effectiveness. A multidimensional analysis of smart case management mechanisms from legislative and judicial perspectives is thus of substantial importance for promoting the modernization of prosecutorial organs and strengthening their case-handling capacity ^[4].

2. An Examination of Problems in Smart Case Management Mechanisms of Prosecutorial Organs

2.1 Inefficient Data-Sharing Mechanisms

Against the backdrop of the continuous deepening of case informatization, inefficiencies in data-sharing mechanisms have become a major constraint on the improvement of case management effectiveness in prosecutorial organs. On the one hand, some prosecutors exhibit insufficient awareness of the importance of case data entry, limited professional understanding, or inadequate proficiency in system operations during the completion of case cards, resulting in frequent instances of incorrect, missing, or delayed data entry. Due to constraints in staffing and technological resources, case management departments often fail to detect and correct these errors in a timely manner, thereby undermining the completeness and accuracy of case data. On the other hand, when lower-level procuratorates upload data with unresolved quality issues to higher-level institutions, data inaccuracies are further amplified through vertical transmission, significantly increasing the overall difficulty of data governance. From a deeper perspective, these problems stem not only from insufficient professional competence and weak accountability among some prosecutors, but also from inadequacies in internal responsibility implementation and supervisory mechanisms, as well as the absence of unified and detailed data evaluation standards and operational norms. In terms of interdepartmental coordination, although prosecutorial organs have actively promoted data sharing and the construction of big data-driven collaborative platforms with administrative, investigative, and adjudicative bodies in recent years, the lack of a unified and efficient coordinating authority and well-established platform operation mechanisms has prevented effective synergy among departments in areas such as data standards, interface design, and access control. As a result, data silos persist. Moreover, influenced by departmental protectionism, some institutions adopt a cautious or even resistant attitude toward data openness due to concerns over information security and accountability, thereby artificially limiting the scope of data sharing. This ultimately places additional coordination and error-correction burdens on case management departments and undermines overall case-handling efficiency as well as the smooth operation of cross-departmental collaboration ^[5].

2.2 Insufficient Levels of Intelligent Supervision in Case Management

At present, case management departments continue to face shortcomings in the level of intelligent and refined supervision when performing their oversight functions. Regulatory efforts tend to focus primarily on substantive review and procedural compliance, while relatively limited attention is devoted to the supervision of procedural nodes, case-handling time-limit alerts, dynamic risk control, and preventive and corrective measures before and after case handling. In practice, case quality assessment still relies predominantly on manual cross-review, which is time-consuming and labor-intensive and heavily dependent on the professional competence of reviewers. The retrieval and comparison of relevant case materials are likewise

conducted mainly through traditional manual methods, making it difficult to fully leverage the advantages of information systems in data analysis, risk identification, and intelligent early warning, thereby constraining both supervisory efficiency and precision. Furthermore, some case management personnel lack a clear understanding of their job responsibilities and operational requirements, leading to frequent issues such as missing pages or the omission of key materials during the uploading of case files and legal documents. This reflects the need for further improvement in workflow standardization and accountability awareness. In addition, the informatization and standardization of seized property management remain insufficient, supervisory mechanisms addressing prosecutors' misconduct are not yet fully developed, and the people's supervisor system demonstrates limited participation and effectiveness in practice. A comprehensive supervisory framework characterized by multi-actor collaboration and technology-based support has yet to be fully established. Overall, intelligent supervision in case management remains in a critical transitional phase from an "experience-based manual model" to a "data-driven model," and its functional potential has not yet been fully realized ^[6].

3. Pathways for Improving Smart Case Management in Prosecutorial Organs

3.1 Actively Innovating Intelligent Case-Handling Support Tools

Against the backdrop of the continuous advancement of smart prosecution, the active innovation and improvement of intelligent case-handling support tools constitute a critical technological foundation for enhancing both prosecutorial efficiency and judicial quality. Such intelligent tools should comprehensively cover the entire case-handling process, ranging from case acceptance and document entry to evidence review and the preparation of legal documents, thereby enabling automated and standardized information processing. At present, although some procuratorates have introduced document entry and intelligent document-generation tools, their practical effectiveness remains constrained by the maturity of algorithms and the scale of training datasets. In particular, recognition accuracy remains inadequate in cases involving complex factual circumstances and specialized legal terminology, resulting in relatively high error rates that undermine usability. With respect to intelligent case file review, existing systems still exhibit deficiencies in mobile-device compatibility and in functions such as text copying, annotation, and key-point marking, making it difficult to accommodate prosecutors' fragmented and mobile work patterns. Coordinated upgrades of software and hardware are therefore urgently needed to enhance system practicality. In the evidence review stage, the analysis of non-written evidence—such as audio and video recordings—continues to rely predominantly on manual listening and viewing, which is time-consuming and prone to oversight. Accelerating the application of speech recognition, image recognition, and related technologies in the judicial field is thus essential to convert non-written evidence into searchable and comparable textual data and to integrate such data into unified case management systems. In addition, greater emphasis should be placed on the development of intelligent guidance and decision-support tools. By leveraging rule databases, case repositories, and risk-alert modules, these tools can provide prosecutors with procedural guidance, evidentiary review points, and legal application suggestions, thereby enhancing the standardization of case handling while fully preserving judicial independence ^[7].

3.2 Improving the Scientific Design and Operation of Case Allocation Mechanisms

A scientific and impartial case allocation system serves as a fundamental institutional guarantee for the standardized exercise of prosecutorial power and the enhancement of case-handling efficiency. The prevailing model—characterized by random allocation as the primary method and designated allocation as a supplementary mechanism—generally reflects principles of procedural fairness and power restraint. However, deficiencies persist in practice, including inconsistent rules and excessive discretionary flexibility in implementation. In the absence of unified national standards, disparities exist among regions and procuratorates with respect to allocation conditions, adjustment scenarios, and operational procedures, which may give rise to arbitrariness and non-standard practices. To address these issues, it is necessary for the Supreme People's Procuratorate to formulate unified and scientifically grounded case allocation rules. Such rules should clearly define allocation principles, applicable scopes, and exceptional circumstances, while incorporating factors such as case type, workload, and prosecutors' professional expertise into algorithmic models. This would ensure transparency, dynamic balance, and full traceability throughout the allocation process, thereby reducing opportunities for undue human intervention at the institutional level. In practical implementation, the random allocation mechanism should be strictly enforced, with designated allocation

limited to clearly defined conditions and subject to rigorous approval procedures. Information systems should automatically record allocation rationales and operational traces, enabling both internal and external oversight and enhancing trust among prosecutors and the public in the objectivity and fairness of case allocation.

3.3 Establishing an Intelligent Supervision and Constraint System for Case Management

The establishment of an intelligent supervision and constraint system for case management represents a crucial pathway for transforming oversight from post hoc correction to ex ante prevention and in-process control. Throughout case handling, information systems should be fully utilized to implement automated supervision over time limits, procedural nodes, and document formats. Risks such as delays, procedural anomalies, and formatting errors should trigger timely alerts and be incorporated into performance evaluation systems to form effective accountability mechanisms. At critical decision-making stages—such as case filing, prosecution decisions, and non-prosecution determinations—the system should embed standardized verification and reminder functions to promptly alert prosecutors to procedural noncompliance or potential risks, thereby preventing defective cases. At the same time, big data analytics and intelligent algorithms should be employed to conduct comprehensive assessments of case types, processing cycles, and risk distribution, enabling the early identification of integrity risks, quality risks, and management risks, and enhancing the foresight and precision of supervision. In terms of data governance, real-time monitoring and dynamic correction mechanisms should be established to promptly identify and rectify incorrect or missing data entries, thereby improving data authenticity and integrity and preventing distorted data from undermining management decisions. To ensure effective system operation, dedicated process supervisors should be appointed to conduct routine inspections, oversee rectification efforts, compile key statistics, and perform periodic audits. This “system-based supervision plus manual review” dual assurance mechanism can facilitate precise oversight across all procedural stages and ensure comprehensive coverage of critical case-handling processes.

3.4 Establishing an Intelligent Supervision and Constraint System for Case Management

Building a professional and multidisciplinary intelligent case management workforce is the fundamental guarantee for promoting the high-quality development of case management. In view of the comprehensive nature of case management in supervision, service provision, and data governance, personnel should be rationally allocated according to functional requirements. The workforce should be categorized into supervision and management personnel, case-handling support staff, comprehensive business personnel, and information technology specialists, with clearly defined responsibilities to form a coordinated and efficient working structure. To enhance overall professional competence, a normalized training mechanism should be established, providing tiered and specialized training focused on information system operation, case process management, data analysis, and risk prevention and control. Through the formulation of unified operational manuals and the implementation of practical assessments, it can be ensured that personnel are “certified for duty and perform their responsibilities in a standardized manner.” At the same time, incentive and support mechanisms should be improved by means of merit-based evaluations, professional competitions, and achievement showcases, so as to stimulate work motivation and innovative vitality and foster a positive atmosphere of mutual learning and healthy competition. At the level of professional development, case management personnel should be encouraged to participate in frontier research projects, conduct empirical analyses and theoretical syntheses based on case data, and feed research outcomes back into practice in the form of academic papers and research reports. Meanwhile, it is essential to establish strong brand awareness for intelligent case management, strengthen the independence and central coordinating role of case management departments within prosecutorial functions, and fully leverage big data and intelligent technologies to enhance precision monitoring, risk early warning, and case quality evaluation. In addition, exchanges and experience-sharing among procuratorial organs at different levels should be strengthened. By integrating regional characteristics, intelligent case management brands with distinctive local features can be developed, using demonstration and benchmarking effects to continuously improve the overall level of case management.

4. Conclusion

As a critical component of the procuratorial organs’ efforts to advance judicial intelligence and modernization, intelligent case management is not only a practical requirement for improving the efficiency and quality of case handling, but also an inevitable choice for enhancing public trust in procuratorial work and ensuring judicial fairness. At present, intelligent

case management still faces numerous challenges in areas such as data sharing, case assignment standards, and intelligent supervision. Addressing these issues requires adherence to top-level design, the formulation of unified case assignment rules, the improvement of intelligent auxiliary tools, the construction of full-process supervision and early-warning systems, and intensified efforts in cultivating professional teams and developing local brands. Through the continuous deepening of the application of emerging technologies such as big data and artificial intelligence in case management, and by further improving coordination mechanisms and professional support systems, it is possible to substantially enhance the standardization and intelligence level of case management, thereby promoting high-quality development and the modernization of judicial capacity of procuratorial organs in the new era.

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Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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