Construction and Analysis of the Theoretical Framework for Civil Aviation Regulatory Auditing

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Abstract: The paper discusses the responsibilities, objectives, and effectiveness requirements in civil aviation regulation, and forms an effective theoretical structure for regulatory auditing by building an organic link between responsibility auditing, performance evaluation and management cycle improvement. First, responsibility auditing ensures that all parties have clear responsibilities and improves transparency and accountability. Secondly, performance evaluation monitors and evaluates the effectiveness of civil aviation regulation by setting clear objectives and indicators to ensure that objectives are met and to promote continuous improvement. In addition, management cycle enhancement is a systematic process involving planning, implementation, inspection, and improvement. By introducing audit and evaluation mechanisms at each stage, problems can be effectively identified and adjusted, creating dynamic feedback to ensure the effectiveness and timeliness of regulatory measures. This theoretical framework provides new perspectives and methods for improving current civil aviation regulatory practices, and has important theoretical and practical significance.

Keywords: Regulatory Auditing; Civil Aviation; Performance Evaluation; Management Cycle; Responsibility Audit

1. Introduction

As an important basic industry for national economic and social development, civil aviation occupies an indispensable position in the modern transportation system. With the deepening development of global economic integration, the demand for civil aviation transportation continues to grow, the number of aircraft continues to increase, the route network is becoming more and more complex, and flight density has increased significantly. At the same time, various kinds of unstable factors affecting aviation safety are accumulating, and the safety situation facing civil aviation has become more serious. A series of global aviation security challenges have further emphasized the necessity and urgency of strengthening civil aviation supervision and ensuring the safe and smooth operation of civil aviation.

As an important means of effective supervision and management of civil aviation activities by the State, civil aviation supervision plays a key role in safeguarding aviation safety, protecting public interests and promoting the development of the industry. Scientific and effective regulation helps to restrain the behavior of aviation enterprises, regulate the operation order of the industry, improve service quality and control safety risks. At the same time, regulation is also an important tool to guide the innovative development of the industry. Reasonable regulatory policies can create a favorable development environment for the civil aviation industry, stimulate market vitality and social creativity, promote technological progress and management innovation, and improve the efficiency of resource allocation [1]. It can be said that the regulation of civil aviation has a bearing on the survival and development of the industry and is of great strategic significance in the overall situation of the country's economic and social development.

In recent years, scholars at home and abroad have paid increasing attention to the issue of civil aviation regulation, and carried out some useful theoretical explorations in the areas of regulatory model, regulatory performance evaluation, and innovation of regulatory means [2]. Some scholars have systematically sorted out the civil aviation regulatory regimes of different countries and analyzed the advantages and disadvantages of centralized and territorial regulatory models. Some other

studies focus on regulatory performance assessment, and have constructed an assessment framework including quantitative and qualitative indicators. In addition, the application of new technologies such as big data and artificial intelligence in the field of regulation (e.g., the construction of intelligent regulatory platform) has also become a hot spot in the academic community.

Although some progress has been made in existing research, there are still many shortcomings. First, there is a lack of systematic theoretical analysis framework. Most of the studies are limited to the discussion of a particular regulatory issue, and have not yet constructed a complete theoretical system of civil aviation regulation from the dimensions of responsibility, objectives, and effectiveness. Second, the practical relevance needs to be strengthened. There is still a gap between the existing research results and the actual needs of civil aviation supervision, and there is an urgent need to strengthen the in-depth integration of theory and practice. Third, the means of supervision needs to be further innovated. How to fully utilize the new technology and new methods to enhance the pertinence and effectiveness of supervision still needs further exploration.

Strengthening civil aviation regulation has become a common issue facing the development of civil aviation in all countries. It is of great significance to systematically construct the theoretical framework of civil aviation supervision, deeply analyze the needs of supervision practice, and innovate the mode and means of supervision to enhance the scientific level of civil aviation supervision and ensure the safe and high-quality development of civil aviation industry. Based on the existing studies at home and abroad, this paper explores the systematic theory of civil aviation supervision and audit by taking responsibility, target and efficiency as the entry point, so as to provide decision-making reference for improving the civil aviation supervision system in China.

2. Theoretical Foundations

2.1 Regulatory Responsibility Requirements

The first and foremost prerequisite for civil aviation regulation is the clarification of regulatory responsibilities. According to modern principal-agent theory, civil aviation regulation is a typical principal-agent relationship. The state and the public, as the principal, delegate the regulatory power to the civil aviation regulator as the agent, who implements the regulation on behalf of the principal. In this process, there may be information asymmetry and goal deviation between the principal and the agent, which may lead to the deviation of the agent's regulatory behavior from the interests of the principal, and give rise to the problem of "moral hazard". For this reason, it is necessary to regulate and constrain the agent's behavior through contractual institutional arrangements, and to clarify its supervisory responsibilities.

Regulatory responsibility includes different types of political responsibility, legal responsibility, professional responsibility, and social responsibility. Political responsibility required regulation to reflect public opinion and serve the public; legal responsibility emphasized regulation in accordance with the law; professional responsibility focused on enhancing the level of regulatory specialization; and social responsibility required a timely response to social concerns. In addition, accountability was seen as the key to realizing regulatory responsibility. The establishment of a comprehensive accountability system, including information disclosure, performance evaluation and reward and punishment mechanisms, is an important measure to promote the realization of civil aviation regulatory responsibility. These theories provide analytical perspectives for defining regulatory responsibility for civil aviation, as well as ideas for constructing a list of responsibilities and a sound accountability mechanism.

2.2 Regulatory Objectives and Effectiveness

Civil aviation regulatory performance is closely related to regulatory objectives. Song Hualin et al. pointed out that setting scientific and reasonable regulatory objectives is the basis for maximizing regulatory performance. The setting of regulatory objectives should not only focus on the control of civil aviation safety risks, but also consider the development of the industry, innovation incentives and other multiple demands. Drawing on the theory of goal setting, Wang Yongjie constructs a civil aviation regulatory goal system based on civil

aviation safety, service, and efficiency, which includes multi-dimensional indicators such as safety level, normal rate, capacity allocation and green development, providing a useful reference for the scientific formulation of regulatory goals.

Regulatory effectiveness reflects the effectiveness and efficiency of regulatory activities. The traditional regulatory performance assessment focuses on ex-post results, such as compliance rate, cost of violation, rectification of problems, etc. However, with the updating of regulatory concepts, it has become a consensus to focus more on ex-ante risk prevention and control. However, with the updating of regulatory concepts, it has become a consensus to pay more attention to risk prevention and control beforehand. Risk-oriented supervision requires the use of big data, artificial intelligence, and other new technologies to comprehensively assess all types of risks and dynamic early warning, accurate allocation of regulatory resources, thereby improving the foresight and effectiveness of supervision. Scientific assessment of regulatory effectiveness, the use of new technologies to empower regulation, is an important path to optimize the practice of civil aviation regulation.

2.3 Theoretical Foundations of Auditing

Internal control auditing theory is an important theoretical support for the use of auditing methods to strengthen the supervision of civil aviation, and the COSO Committee's updated Internal Control Integration Framework has further enriched the connotation of internal control theory, which regards internal control as a continuous optimization process involving the participation of all the stakeholders in the organization, aiming at providing reasonable assurance of the achievement of the operation and management objectives. The framework covers five major elements, namely, control environment, control activities, risk assessment, information and communication, and supervision, and emphasizes risk orientation and continuous improvement [3].

The COSO framework is of great significance to the construction of internal control system for civil aviation supervision. By systematically reviewing the control environment of civil aviation regulatory activities, evaluating various regulatory risks, designing matching control measures, and evaluating the control effects to form a closed-loop management, the regulatory process can be continuously optimized and the regulatory performance can be improved. In addition, on the basis of Simons' control leverage theory, it is pointed out that the use of belief system, boundary system, diagnostic control and interactive control and other control methods, balancing the rigidity and flexibility of control, has a positive effect on the enhancement of the adaptability and inclusiveness of the regulatory system. This is quite instructive for innovating regulatory concepts and methods and stimulating the vitality of market players.

The systematic sorting out and application of relevant theories can help clarify the boundaries of regulatory responsibilities, optimize, and improve regulatory objectives, scientifically assess regulatory performance, and innovate and improve regulatory means.

3. Theoretical Framework for Regulatory Auditing

3.1 Responsibility Audits

Responsibility audit refers to the use of audit concepts, methods and techniques, the organization, and its members to perform their duties and obligations to carry out supervision and evaluation activities. Its core is to urge the auditee to effectively take on the responsibility, to prevent the performance of responsibility is not in place, incomplete, non-transparent, etc. Responsibility audit concept was first put forward by Normanton, who emphasized that responsibility audit can help to realize the public fiduciary duty, improve organizational performance. Since then, with the emergence of the new public management movement, responsibility auditing has received increasing attention.

Responsibility audit has multiple significance: firstly, it promotes the implementation of responsibility and clarifies the boundaries of responsibility and power; secondly, it prevents and controls moral risks and regulates the operation of power; thirdly, it improves transparency and accepts social supervision; and fourthly, it promotes the performance improvement and realizes the organizational goals. It can be said that responsibility auditing plays an irreplaceable role in optimizing

governance, preventing risks, and improving performance by matching responsibility with power, obligation with benefit and building a scientific incentive and constraint mechanism. As a kind of institutional arrangement, responsibility audit is an important means to realize lawful, clean, and efficient governance.

The introduction of the concept and methodology of responsibility auditing can help to strengthen the responsibility of civil aviation supervision, standardize the operation of supervisory power, and improve supervisory performance. On the one hand, the responsibility audit can urge the supervisory organization to fully perform its supervisory duties such as safety supervision, service supervision, fair competition supervision and so on in accordance with the law, to prevent the problems of lack of supervision, misplaced, overstepping and so on. Through the assessment of responsibility performance, it can find the weak links of responsibility implementation and promote the formation of a civil aviation regulatory pattern of "unity of authority and responsibility, shared responsibility".

On the other hand, responsibility audit helps to standardize regulatory behavior and prevent moral risks such as rent-seeking and corruption. Through the construction of regulatory responsibility list and negative list, delimitation of regulatory power boundaries, and the use of big data and other technologies to implement dynamic monitoring of the whole process of supervision, can be timely found and investigated and dealt with violations of discipline. At the same time, responsibility audit also provides support for the operation of the accountability mechanism. The results of responsibility audit as an important basis for supervision and accountability, and the establishment of a linkage mechanism with assessment and evaluation, rewards, punishments, appointments, and removals, etc., can form a strong external supervision and institutional constraints.

In addition, responsibility auditing is also an effective means of improving the performance of civil aviation supervision. By systematically sorting out regulatory responsibilities and examining the compatibility of target setting and division of responsibilities, we can optimize the configuration of regulatory functions and clarify the performance orientation. Using responsibility auditing method to carry out supervision of the whole process of assessment, objectively reflecting the level of regulatory performance, not only can help identify management shortcomings, continuous improvement of supervision, but also can play a positive role in motivating and mobilizing the enthusiasm and creativity of supervisors. Introducing responsibility auditing into civil aviation supervision is of great significance to strengthening the construction of supervision capacity and enhancing the effectiveness of civil aviation governance. Responsibility audit should be used as an entry point to promote the construction of the whole process, all-round, full participation in the big regulatory pattern. By improving the responsibility system, innovating the audit method, improving the evaluation mechanism and other measures, the responsibility will be put into practice, forcing the responsibility to be taken by the audit supervision and providing a solid foundation for guaranteeing the high-quality development of civil aviation [4].

3.2 Performance Evaluation

3.2.1 Evaluation methodology

Scientific evaluation of civil aviation regulatory performance is the key to optimizing the allocation of regulatory resources and improving regulatory efficiency and effectiveness. This requires the construction of a scientific and reasonable evaluation index system and the adoption of appropriate evaluation methods. Regulatory performance evaluation indicators should be set up in a comprehensive and balanced manner, paying attention to result orientation, assessing the completion of regulatory work, as well as focusing on the process management, reviewing the standardization of regulatory behavior; examining the short-term effects, as well as evaluating the long-term impact. At the same time, the setting of indicators should also match the regulatory objectives, highlighting the different dimensions of safety, service and efficiency, and reflecting the characteristics of the industry and development demands.

In terms of evaluation methodology, traditional civil aviation regulatory performance evaluation mostly adopts a combination of

qualitative and quantitative methods, focusing on summarizing and descriptive analysis of regulatory work. In recent years, with the wide application of new technologies such as big data and artificial intelligence, data-driven quantitative evaluation has been increasingly emphasized. Using machine learning, natural language processing and other technologies, valuable information can be mined from the vast amount of industry operational data, and combined with statistical modeling to carry out in-depth analysis, thus improving the objectivity and precision of the evaluation.

At the same time, process-oriented evaluation methods are also being constantly innovated, such as the use of internal control audits, balanced scorecards, and other tools to systematically assess the organization and management of supervision, systems and processes, risk control and other aspects. Drawing on international practices, the establishment of a regularized regulatory peer review and assessment mechanism and the introduction of multiple evaluation subjects can help form a multi-dimensional cross-validation and improve the professionalism and credibility of evaluation. The construction of scientific evaluation indexes and the innovation of evaluation methods are the two keys to improving the quality and level of civil aviation regulatory performance evaluation.

3.2.2 Contribution to regulatory effectiveness

Regulatory performance evaluation through the diagnosis of regulatory work in the short board, optimize the regulatory model and means, in many ways to promote regulatory effectiveness. Firstly, it promotes goal orientation and guides supervision to focus on main responsibilities and main business. Performance evaluation is based on regulatory objectives, objectively reflecting the effectiveness and shortcomings of regulatory work, forcing regulatory agencies to clarify the boundaries of responsibilities, rational allocation of regulatory resources, focusing on the prevention and control of safety risks, operational efficiency enhancement and other key areas, thereby effectively transferring regulatory pressure to improve the relevance and effectiveness of supervision.

Secondly, it is to improve the system construction and strengthen the supervision according to the law. Regulatory performance evaluation focuses on assessing the normality of regulatory behavior and the soundness of the system, which helps to find the gaps and blind spots in the regulations and systems, accelerate the construction of regulatory system, promote the institutionalization, standardization and proletarianization of the regulatory work, and effectively achieve the "use of the system of authority, according to the system". At the same time, through the establishment of law enforcement inspections, case file evaluation and other mechanisms to strengthen the awareness of the rule of law, standardize law enforcement behavior, and resolutely put an end to arbitrary law enforcement, selective law enforcement and other issues.

Thirdly, it promotes process reengineering and improves regulatory efficiency. Regulatory performance evaluation for the optimization of regulatory business processes to provide an important hand. Through the systematic combing and evaluation of the organization and implementation of regulatory activities, we can find the irrationality of the process design in a timely manner, and accordingly carry out process re-engineering, eliminate duplication, redundancy, and other issues, maximize the compression of the time limit for approval and promote the intensive and efficient operation of the regulatory process, and effectively improve the efficiency of supervision.

Fourth, the scientific regulatory performance evaluation system should pay attention to the positive incentive role, the evaluation results and regulatory staff assessment promotion, salary, and other links, to mobilize their initiative and enthusiasm to perform their duties and responsibilities. At the same time, the evaluation should also focus on the grass-roots front-line, encourage exploration and innovation, by summarizing and promoting the excellent practical experience, to create a strong atmosphere of innovation, innovation, and constantly enhance the vitality of the regulatory work.

Strengthening the performance evaluation of civil aviation supervision is a practical need to change the concept of supervision and innovate the way of supervision, which is of positive significance for enhancing the effectiveness of supervision and guaranteeing the high-quality development of civil aviation.

By continuously improving evaluation indexes, innovating evaluation modes, promoting the application of evaluation results, and deeply integrating the concept of performance into all aspects of regulatory work, the "baton" of performance evaluation can be better utilized to provide strong support for the creation of an efficient and high-quality civil aviation regulatory system.

3.3 Management Cycle Enhancement

The management cycle, also known as the PDCA cycle, refers to the spiral process of management activities in the phases of planning (Plan), implementation (Do), inspection (Check), and disposal (Act). As a common management concept and method, the PDCA cycle emphasizes scientific decision-making, refined management, and continuous improvement, which is of great significance in promoting an organization's continuous optimization of management and performance enhancement. Applying the PDCA cycle to civil aviation supervision means adhering to goal-oriented and problem-oriented principles, following the laws of supervision, starting from the formulation of supervision plans, implementation, supervision and inspection, assessment and evaluation, rectification, and optimization, and continuously improving and perfecting the scientific, refined, and professional level of supervision work.

The starting point of the PDCA cycle is the scientific formulation of regulatory programs. This requires regulators to set scientific regulatory goals in stages based on in-depth research and extensive consultation, combined with the actual development of the industry. These goals should be broken down into specific regulatory tasks and measures, with a clear timetable and roadmap to provide basic guidelines for the implementation of regulation. In the implementation stage of the plan, regulators should coordinate and strictly control to ensure that the measures are effective. They should also strengthen the process of supervision, timely correction, and rectification to promote the complete implementation of the plan.

Supervision and inspection is a key part of the regulatory cycle. Supervisory bodies should formulate comprehensive inspection programs, employ methods such as the "four no two straight", cross-checking, and random sampling, conduct in-depth front-line investigations, and perform secret inspections to fully grasp the implementation of supervision. They should innovate the use of big data, remote monitoring, and other technical means to improve the level of technology and precision in supervision [5]. Supervisory bodies should strengthen problem-oriented, targeted supervision around weak links and risk points to effectively investigate issues. In the assessment and evaluation process, they should not only summarize achievements and commend the advanced but also identify gaps and analyze reasons. They should combine self-assessment with other assessments, expert evaluations, and big data analysis to improve the objectivity and authority of the evaluation.

Based on regulatory evaluation, regulators should attach great importance to the problems found, analyze the crux of the problem, formulate targeted rectification measures, specify the timeframe for rectification and the responsible person, and continue to follow up to ensure that the problems are rectified to the letter. They should not only treat the symptoms but also address the root causes. While solving specific problems, they should systematically analyze the common law and optimize the regulatory work from the improvement of the system and mechanism, as well as innovative ways and means, to promote the formation of a virtuous cycle. The PDCA cycle is a dynamic spiral upward process; only through unremitting and persistent efforts can results be achieved.

Applying the concept of PDCA to continuously improve and upgrade the work of civil aviation supervision, the following key points need to be grasped:

First, the PDCA cycle concept should be applied throughout the entire process of civil aviation supervision in all aspects to promote the transformation of supervision towards being scientific, refined, and professional, and to constantly improve the relevance and effectiveness of supervision. Through a sound regulatory system, optimized management processes, refined and quantified regulatory measures, and the expanded coverage of information technology, etc., every link and every detail can be effectively put in place, maximizing the compression of regulatory

blind spots and grasping the supervision work from the strict and practical aspects.

Second, adhering to the goal-oriented approach, focusing on regulatory responsibilities and missions, regulatory objectives that are in line with reality and reflect the characteristics of each stage should be scientifically formulated to provide basic guidelines for regulatory work. At the same time, based on the problem-oriented approach, focusing on outstanding contradictions and weaknesses, targeted supervision, continuous improvement, and enhancement should be carried out. Through the problem-solving process of "benchmarking, rectification, consolidation, and refinement", the regulatory work should be continuously optimized and improved, and regulatory achievements should be consolidated.

Third, new concepts and technologies should be actively utilized to innovate the regulatory model and enhance regulatory effectiveness. The promotion of "Internet + regulation" and the use of big data, artificial intelligence, blockchain, and other technologies should be vigorously promoted to innovate means of supervision and improve the accuracy and intelligence of supervision. New modes of credit supervision and "double random, one open" supervision should be actively explored to improve the efficiency of supervision and reduce the burden on enterprises. Grass-roots exploration and innovation should be encouraged, and advanced experiences and practices should be summarized and promoted in a timely manner to continuously enhance the vitality of supervision.

Fourth, the synergy between upper and lower levels, interdepartmental, and inter-regional should be strengthened to form a concerted effort and achieve the same frequency resonance of regulatory synergy. The role of industry organizations should be given full play, industry self-regulation should be strengthened, and the construction of a multi-dimensional common governance pattern should be explored. Administrative, legal, economic, credit, and other regulatory means should be utilized in a comprehensive manner, and concerted efforts should be made to enhance the effectiveness of regulation. At the same time, active participation in global civil aviation governance, strengthening international exchanges and cooperation, learning from advanced international experiences, expanding regulatory vision, and enhancing the internationalization of regulation should be pursued.

Fifth, a linkage mechanism between regulatory performance evaluation and decision-making implementation should be established, and the evaluation results should be used as an important basis for improving policies and optimizing resource allocation. The publicity and interpretation of the evaluation results should be strengthened, social supervision should be accepted, and evaluation should be used to force the implementation of responsibilities and stimulate commitment. At the same time, the evaluation results should be linked to the performance appraisal and grade promotion of supervisory personnel, and regulatory performance should be used as an important basis for selection and appointment to effectively play a positive incentive role in mobilizing the enthusiasm and creativity of supervisory personnel.

Constructing the theoretical framework of regulatory audit is a key part of strengthening the modernization of the civil aviation regulatory system and regulatory capacity. Utilizing the PDCA concept to promote responsibility auditing, performance evaluation, and management cycle enhancement will help clarify the boundaries of responsibility and authority, improve the system and mechanism, strengthen process control, and promote the high-quality development of regulatory work. It is necessary to strengthen top-level design, improve supporting reforms, organically combine responsibility implementation with performance orientation, and deeply integrate management optimization with innovation drive to continuously create a new situation in civil aviation supervision and provide a strong guarantee for the construction of a strong aviation country and a strong transportation country.

4. Organic Articulation Mechanism

The key to building a theoretical framework for civil aviation regulatory audit is to promote responsibility audit, performance evaluation and management cycle enhancement in a coordinated manner, and to form a synergistic system of mutual support and organic linkage. It is necessary to work on the top-level design,

clarify the internal logic and linkage path of each work, promote the formation of overall synergy, and continuously improve the systemic, holistic, and synergistic civil aviation supervision.

4.1 Interface between Responsible Auditing and Performance Evaluation

As the two pillars of civil aviation supervision and audit, responsibility audit and performance evaluation are intrinsically related in terms of goal orientation and function positioning. On the one hand, responsibility audit focuses on supervising the implementation of responsibilities, standardizing the operation of power and preventing moral risks, and its results can provide an important basis for performance evaluation. Only when the boundaries of rights and responsibilities are clear and the responsibilities are effectively carried out in place, will performance evaluation have a solid foundation. On the other hand, performance evaluation is aimed at assessing the effectiveness of supervision, diagnosing management shortcomings, and optimizing resource allocation, and the fulfillment of responsibilities is a key variable affecting supervisory performance. Taking the results of responsibility audits as evaluation indicators and reference bases can improve the pertinence and accuracy of performance evaluation [6].

Therefore, it is necessary to strengthen the organic connection between responsibility auditing and performance evaluation, and to build a "responsibility-oriented, performance-driven" linkage mechanism. In practice, we can consider the responsibility audit into the performance evaluation index system, the implementation of the responsibility as an important element in the evaluation of regulatory performance. At the same time, the performance evaluation as a hand, improve the accountability mechanism, the evaluation results as an important basis for accountability and performance management, and the implementation of the responsibility is not in place to carry out serious accountability, in order to evaluation to force the implementation of responsibility [7]. In addition, the responsibility audit can focus on the outstanding problems and weak links in the feedback of performance evaluation, carry out targeted audit investigations, find out the management loopholes and system deficiencies, and put forward practical and practical rectification proposals to promote the effective solution of regulatory issues, forming a virtuous cycle of responsibility transfer and performance improvement.

4.2 Feedback and Improvement in the Management Cycle

PDCA cycle as a dynamic management model, its vitality lies in continuous feedback and improvement. PDCA concept applied to civil aviation supervision and audit, we must establish a regular supervision and feedback and assessment and improvement mechanism, with the review and feedback to force the implementation of responsibility, rectification and improvement of the system, and constantly optimize and improve the supervision work. Regulatory performance evaluation, accountability audits, special inspections as an important hand, around the key links and risk points to carry out a "physical examination" diagnosis, timely detection of prominent contradictions and weaknesses, in-depth analysis of the crux of the problem, targeted improvement measures, the development of a timetable, roadmap, and continuous tracking and supervision to ensure that rectification and resolution of the problem in place.

Based on feedback and rectification, we should pay attention to the refinement of laws and mechanisms. For common problems and institutional obstacles, it is necessary to systematically sort out and reflect on them, adopt comprehensive measures to optimize authority and responsibility, improve the system and innovate methods and methods, promote the establishment of rules and regulations, promote institutional innovation, and improve the systemic, institutional, and long-term effectiveness of supervision [8]. We should summarize and consolidate the mature experience and practice, improve the regulatory guidelines and operating procedures, consolidate the reform achievements with the system, and continuously optimize the regulatory workflow. At the same time, make full use of big data technology, strengthen the collection, integration, and analysis of regulatory data, improve the timeliness and accuracy of assessment feedback, promote "data-driven, evidence-based

decision-making", and effectively enhance the foresight, scientific and effective regulation [9].

It should be emphasized that the PDCA management cycle is not a quick fix, but a process of continuous improvement. Only through long-term persistence and continuous improvement can we realize the self-renovation, self-improvement, and self-improvement of civil aviation supervision. This requires regulators and regulators to establish a "learning to catch up, innovation and competitiveness" consciousness, to maintain an open and inclusive, enterprising attitude, with "biting the green hills do not let up" tenacity and "not break the end of the Lan Lan" determination, in the exploration and innovation in the accumulation of experience in overcoming obstacles to sharpen the will to continue to promote conceptual innovation, system innovation and innovation, and constantly create a new situation of civil aviation regulatory work [10]. Only in this way can we truly realize the benign interaction between the theory and practice of civil aviation regulatory audit, and promote the modernization of regulatory governance system and governance capacity to a new level.

In conclusion, in the theoretical structure of civil aviation supervision and audit, the organic connection of responsibility audit, performance evaluation and management cycle enhancement play a key role in systematic optimization of supervision and continuous enhancement of supervisory efficiency. It is necessary to strengthen the top-level design, improve the supporting mechanism, realize the complementary advantages and mutual promotion in the responsibility-oriented and performance-driven, and realize the positive interaction and spiral upward in the feedback and rectification and system improvement, to effectively grasp all the work of civil aviation supervision and put it in place.

5. Conclusion

It is of great significance to build a theoretical structure of civil aviation regulatory audit with the three elements of "responsibility audit, performance evaluation and management cycle" to improve the regulatory system and enhance the effectiveness of regulation. In the context of the new era, to promote the innovation and development of civil aviation regulatory audit theory and practice, we should strengthen the top-level design and system construction, enhance the modernization of regulatory capacity, deepen the reform and innovation, and strengthen the international exchanges and cooperation, in order to provide a strong institutional guarantee for the high-quality development of civil aviation. At the same time, there is an urgent need to strengthen the basic theoretical research on civil aviation regulation, carry out international comparative analysis, deepen the exploration of application practice, expand interdisciplinary research, accelerate the construction of a theoretical system of civil aviation regulation, establish a platform for collaborative innovation between industry, academia, research and utilization, and promote benign interaction between theoretical research and practical application. Civil aviation supervision and audit work should be based on the new development stage, implement the new development concept, serve to build a new development pattern, and effectively enhance the systematic, scientific, effective and rule of law level of supervision, to provide better services to guarantee the high-quality development of civil aviation.

Acknowledgments

This work was supported by “the Fundamental Research Funds for the Central Universities”, Research on the Theory and Practice of Civil Aviation Supervision and Auditing (ZJ2022-008), Research on Key Technologies for Civil Aviation Regulatory Effectiveness Audit (ZHMH2022-003).

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