

Original Research Article

Research on high-quality development of customs informatization during the "Fifteenth Five-Year Plan" period

Yongqiu Yang, Zongping Zhang, Dairong Zhu, Bing Han

Guangzhou Customs Information Center, Guangzhou, Guangdong, 510000, China

Abstract: Based on the foundation of smart customs construction during the 14th Five-Year Plan period, this paper explores the path for high-quality development of customs informatization in response to new requirements and challenges during the 15th Five-Year Plan period. The study points out that in the future, we should adhere to the core concept of 'Smart Customs, Intelligent Borders, and Smart Connectivity', and systematically promote customs informatization through four key tasks: Building an intelligent digital foundation through technological empowerment, achieving full-process intelligent transformation through business restructuring, creating a port ecosystem community through collaborative sharing, and strengthening national border defenses through security support. Combining local practical cases, the paper proposes phased implementation paths and policy recommendations, aiming to provide reference for the compilation of the 15th Five-Year Plan and future work, and to help build an internationally advanced smart customs system by 2030.

Keywords: smart customs; 15th Five-Year Plan; high-quality development of informatization; digital foundation; system reconstruction

1. Introduction

The global trade landscape is undergoing profound transformations, while digital innovation accelerates, placing higher demands on customs supervision and service capabilities. During the 14th Five-Year Plan period, China's smart customs development has achieved remarkable progress, with a new regulatory service paradigm emerging characterized by networked connectivity, intelligent analysis, digital perception, and automated operations. Sun Meijun, Commissioner of the General Administration of Customs, emphasized that smart customs development has transitioned from full implementation to the final integration phase.

Against this backdrop, the 15th Five-Year Plan period will mark a pivotal phase for customs informatization to achieve high-quality development. Grounded in current policy frameworks and practical experience, this study systematically analyzes the current status and challenges of customs informatization. It proposes comprehensive development strategies, key tasks, and implementation pathways for the 15th Five-Year Plan period, providing theoretical references and practical guidance for building a modern customs supervision and service system that is secure, efficient, and user-friendly.

2. The present situation and challenge of customs informatization development

2.1. Existing foundation

During the 14th Five-Year Plan period, China's customs informatization achieved remarkable progress, laying a solid foundation for high-quality development in the 15th Five-Year Plan. Intelligent supervision saw widespread adoption: Customs extensively utilized technologies like AI-powered image analysis and the H986 container inspection system, with the AI system achieving over 94% accuracy in image recognition and completing container image assessments within 3-5 seconds. Clearance efficiency was significantly enhanced: The International Trade Single Window has become China's "digital gateway" for global trade connectivity, offering 964 services across 25 major categories through the "One-Net-Through" platform, covering nearly the entire cross-border trade chain. Emerging technologies were deeply

integrated: Customs authorities nationwide actively explored applications of AI, drones, and AR smart glasses. Innovations like Ningbo Customs' "Yongzhi" AI-assisted inspection system for recyclable metals and Nanjing Customs' AR smart glasses have substantially improved regulatory efficiency.

2.2. Problems and challenges

Despite remarkable achievements, customs informatization still faces multiple challenges. System integration requires further enhancement, with deeper collaboration between various operational systems needed. The Smart Customs initiative is progressing toward its "final assembly and basic completion" goal. Data sharing barriers persist, as insufficient information connectivity among port stakeholders continues to create data silos. Business-technology integration needs strengthening, with technological innovation often misaligned with operational demands. Frontline customs officers still struggle with the disconnect between technical applications and practical implementation in certain scenarios. The balancing act between security and efficiency remains critical, as maximizing clearance efficiency intensifies pressure on border security risk prevention.

3. The overall thinking of high-quality development of customs informatization in the 15th Five-Year Plan

3.1. Guiding ideology

During the 15th Five-Year Plan period, the high-quality development of customs informatization should adhere to the core guiding principles of "Smart Customs, Intelligent Border, and Seamless Connectivity". By prioritizing digital transformation and intelligent upgrading as primary pathways, it is essential to coordinate the development and security of ports, accelerate the digital transformation and intelligent upgrading of port operations, and strengthen services to support high-level opening-up and high-quality development.

3.2. Development goals

Based on the phased objectives set forth in the "Guidelines for the Construction of Smart Ports", the development of customs informatization during the 15th Five-Year Plan period can be divided into the following stages:

Short-term objectives (2026-2027): Key breakthroughs will be achieved in the integration of smart customs systems, with the framework of smart customs largely established through nine landmark projects.

Mid-term objective (2028-2029): Complete the restructuring of the customs business model system, and establish a smart, interconnected, and efficient ecosystem among all port stakeholders.

Long-term goal (2030): Some ports will achieve international advanced levels in smartization.

4. Key tasks of high-quality development of customs informatization in the 15th Five-Year Plan

4.1. Technology empowerment: Building intelligent and intensive digital base

Upgrading the "Single Window" platform: By leveraging cutting-edge technologies including big data, cloud computing, blockchain, and AI, we will enhance the underlying infrastructure to strengthen the integrated development and operations (D&O) system, achieving end-to-end digital management and service capabilities.

Advance the development of a cross-border trade big data platform by optimizing data exchange and sharing mechanisms, improving data governance, and legally and orderly promoting the open sharing and utilization of data resources.

Establish a unified database for all port-related data resources, integrating information on infrastructure, logistics operations, and customs supervision to enable real-time monitoring of key operational metrics.

4.2. Business restructuring: Promoting the whole process reform of smart customs

To achieve intelligent clearance with "minimal intervention, rapid clearance, and precise supervision": Extensively apply smart technologies in port clearance to explore and advance contactless clearance.

Promote intelligent operation modes: Promote intelligent operation modes such as intelligent loading

and unloading, sorting, cargo handling, stacking, transshipment and checking, and encourage qualified ports to build fully automated unmanned terminals.

Deepening the application of "intelligent supervision": Increasing the application of intelligent image review technology, realizing intelligent early warning, automatic control and accurate interception of risks such as security access and trade control of goods and items through intelligent large model.

The intelligent image analysis accuracy exceeds 96%, and the inspection efficiency improves by 80%, Passenger clearance time reduced by 35%, port efficiency increased by 50%, Intelligent recognition of 99 types of foreign official certificates.

4.3. Security support: Strengthening the national security defense

Enhance the network and data security management system by implementing national requirements and advancing privacy-preserving computing technologies in trusted environments.

Enhance intelligent analysis and risk prevention capabilities: Accelerate the development of a comprehensive port joint prevention and control platform that integrates basic data, risk characteristics, knowledge graphs, algorithm models, and information applications.

Building a Smart Security Barrier at National Borders: Accelerate the application of cutting-edge technologies for border security, and encourage sustained R&D and deployment of portable rapid screening devices to ensure accurate, swift, and effective border control.

5. Implementation pathways and key initiatives

5.1. Key technological breakthroughs

Digital twin technology for ports: Through digital mapping, it enables the visualization, predictability, and optimization of the entire port operation process.

AI Image Review and Intelligent Recognition Technology: Continuously optimizing algorithm models, expanding the range of intelligently recognized products, and improving recognition accuracy.

Cross-border data security exchange technology: Leveraging cutting-edge technologies like blockchain and privacy-preserving computation, it ensures secure and orderly data flow across borders.

5.2. Institutional safeguards for innovation

To improve the standard system of smart ports, we should establish a standard system including general basic standards, facilities and equipment standards, data exchange and technical support, management and service standards.

Establish a regular evaluation mechanism: Establish a comprehensive evaluation index system and evaluation model for ports based on hardware facilities, passage capacity, input-output, operation safety and other aspects.

Innovation of Construction-Operation-Maintenance Mechanism: Forming a Sustainable Development Model of Government Guidance, Market Participation and Multi-party Win-Win.

6. Case study: Local practice and enlightenment

6.1. Application of "Yongzhi" AI agent in Ningbo Zhoushan port

Ningbo Customs has pioneered the "Yongzhi" AI-powered inspection system for recyclable metals, implementing an integrated approach combining equipment coordination, image recognition, and AI analysis. The system captures cargo images via drones and transmits them in real-time. Using advanced visual recognition models, the AI performs intelligent comparisons and analyses, enabling identification of goods within one minute while providing comprehensive assessments of on-site inspection items like impurities. This innovation offers valuable insights into transitioning customs supervision from human-centric to technology-driven approaches.

6.2. Smart practice of Shenzhen customs' exit tax refund

Shenzhen Customs has integrated multimodal AI large model technology into its "Non-Trade Intelligent Control Platform", innovatively developing an exit tax refund module. By employing image information lossless processing technology and proprietary intelligent algorithms, the system achieves

parallel recognition and seamless stitching of multiple images, significantly streamlining the exit tax refund process and boosting overall efficiency by 2.7 times. This case demonstrates the immense potential of AI technology in optimizing government services and enhancing customs clearance efficiency.

6.3. "Smart certificate examination" mode of Guangzhou customs

Guangzhou Customs has implemented a "Smart Certification" system that enables intelligent recognition and cross-checking of 99 categories of international certificates for fruits, frozen meats, aquatic products, and dairy items from over 65 countries and regions. This innovative solution, now operational across all customs agencies nationwide, addresses the critical need for efficient clearance of perishable goods. By enabling real-time inspection of cold-chain fresh products upon arrival, it establishes a replicable model for expediting customs clearance procedures for import and export commodities.

7. Recommendations and outlook

7.1. Policy recommendations

Strengthen the combination of top-level design and grassroots innovation: On the basis of adhering to unified planning and unified standards, encourage local customs where conditions permit to take the lead in exploring characteristic application scenarios.

Increase investment and talent guarantee: Set up special fund for the construction of smart port, strengthen the training of compound customs information talents, and build a professional team which knows both business and technology.

Improve the legal system and standards system: timely revise the laws and regulations that are not suitable for the development of customs informatization, establish and improve the standards covering data sharing, network security, business coordination.

7.2. Implementation guarantees

Establish an inter-ministerial cooperation mechanism: The General Administration of Customs should strengthen overall coordination and follow-up supervision, and other relevant departments of the State Council should actively participate according to their respective responsibilities to form a joint effort.

Strengthen the coordination of government, enterprise, university and research institute, and promote the innovation and transformation of customs information technology.

Improve the performance evaluation system: Apply the evaluation results to the dynamic management of port classification and grading, promote the rational layout of ports and the efficient use of resources.

7.3. Development outlook

With the implementation of the 15th Five-Year Plan, China's customs informatization will usher in new development opportunities. By 2030, a well-established ecosystem will be formed where all port stakeholders achieve intelligent interconnection, seamless sharing, and efficient operations, with a significant portion of ports reaching internationally advanced smart standards. By 2035, modernized ports will be largely completed, leading global smart port development goals. The high-quality development of customs informatization will provide solid support for stabilizing and upgrading foreign trade volumes while serving high-level opening-up.

References

- [1] Xi Jinping. Explanation of the Proposal of the CPC Central Committee on Formulating the 15th Five-Year Plan for National Economic and Social Development [J]. Contemporary Jiangxi, 2025,(11): 11-14. DOI:10.16706/j.cnki.cn36-1279/d.2025.11.002.
- [2] Zheng Xia, Yang Dehui, Fan Ziyin, et al. Research on the Construction of China's Smart Customs under the Background of Digital Transformation [J]. Customs and Economic and Trade Research, 2025, 46(04): 1-20.
- [3] Nanjing Customs Research Group. Review and Prospects of the Business Reform of the "Big Clearance" System in Customs [J]. Customs and Economic and Trade Research, 2025, 46(05): 34-48.
- [4] Zhang Xing, Sun Jingshu, Wang Jing. Comparative Study on the Development of Smart Customs Systems in China and Overseas [J]. China Customs, 2025, (07): 86-88.
- [5] Li Yong. Research on Customs' Advancement of National Border Security Capability Modernization [J]. Customs

and Economic Trade Research, 2024, 45(06): 81-89.

[6] Hou Caihong, Lu Jianglin, Xu Jian. Research on the Relationship between National Border Security and Customs Risk Management under the Perspective of the Overall National Security Concept [J]. Customs and Economic and Trade Research, 2023, 44(06): 65-74.

[7] Zhao You, Xiang Hongbo. The Development of Sweden's Single Window for International Trade [J]. China Customs, 2025, (07): 84-85.

[8] Liu Jiawei. Research on Digital Economy and High-quality Development of China's Export Trade [D]. Southeast University, 2022. DOI:10.27014/d.cnki.gdnau.2022.003629.

[9] Zheng Tingting, Sun Qiang, Wang Wanchun, et al. Research on the Practical Logic and Framework of Smart Port Construction [J]. China Market, 2022,(22): 187-190. DOI:10.13939/j.cnki.zgsc.2022.22.187.

[10] Su Kai, Liao Kaiqi, and Fan Jianhong. Development and Trends of AI Image Review [J]. Fujian Architecture, 2025, (05): 139-143.

[11] Chen Bing, AI-powered centralized image and intelligent image review system. Jiangxi Province, CGN Beigu Technology Co., Ltd., February 13, 2023.

[12] Chen Lumen, Zhang Yining. Shenzhen: Full efforts to promote the quality and efficiency of departure tax refunds, continuously releasing the potential of inbound consumption [J]. China Finance, 2025,(12): 23-25.DOI:10.14115/j.cnki.zgcz.2025.12.001.