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A Study on the Development and Promotion Strategies of Comprehensive Informatization Solutions in Smart Healthcare

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Abstract

This paper presents the development and promotion process of comprehensive informatization solutions for smart healthcare. With the rapid advancement of smart healthcare, medical informatization has become a crucial means to enhance the quality and efficiency of medical services. This study optimizes the Multi-Channel Integrated Promotion System (MCIPS) and conducts pilot applications in medical institutions of various scales and types. By collecting and analyzing extensive data to assess the effectiveness of the solutions, the results demonstrate that the comprehensive solutions significantly improve the informatization level and service efficiency of medical institutions, optimize medical processes, and enhance the work efficiency of medical staff and patient satisfaction. Moreover, through systematic data analysis and feedback mechanisms, a mature promotion model has been established, providing strong support for nationwide implementation.

Keywords: smart healthcare, informatization, comprehensive solutions, multi-channel promotion, pilot application, effectiveness evaluation, medical institutions, service efficiency, data-driven, promotion strategies, medical informatization systems

1. Introduction

1.1 Research Background

With the rapid development of information technology, smart healthcare has emerged as a significant direction for the global medical industry. By integrating advanced technologies such as the Internet of Things (IoT), big data, and artificial intelligence (AI), smart healthcare optimizes the allocation of medical resources, enhances the efficiency and quality of medical services, and improves patient experiences. In recent years, the Chinese government has issued a series of policies to promote the construction of medical informatization, such as the "Healthy China 2030" Plan, which explicitly calls for the vigorous development of smart healthcare to elevate the level of intelligent medical services. However, the promotion of smart healthcare still faces numerous challenges. Medical institutions of different scales and types exhibit significant differences in informatization foundations, technological needs, and resource investments, necessitating highly customized solutions for the promotion of smart healthcare informatization. Additionally, the particular nature of the medical industry demands that informatization systems possess high levels of security, stability, and reliability, imposing stricter requirements on technological development and promotion.

1.2 Research Objectives

This study aims to explore effective development and promotion models for comprehensive informatization solutions in smart healthcare. It focuses on developing a set of smart healthcare informatization solutions that meet the needs of medical institutions and can be efficiently promoted. By optimizing the Multi-Channel Integrated Promotion System (MCIPS), which integrates online and offline channels, partner resources, and user feedback mechanisms, the promotion efficiency and effectiveness are enhanced. Pilot applications in medical

institutions of various scales and types are conducted to collect and analyze relevant data, assessing the solutions' impact on the informatization level and service efficiency of medical institutions. Successful experiences and challenges are summarized to form a replicable and promotable model, providing references for nationwide implementation.

1.3 Research Significance

This study holds significant theoretical and practical importance. Theoretically, current research on the promotion of smart healthcare informatization mainly focuses on technological development and application, with a lack of systematic studies on promotion models. By constructing and optimizing the promotion model for comprehensive informatization solutions in smart healthcare, this study offers new perspectives and methodologies for theoretical research in this field. Practically, through pilot applications and effectiveness evaluations, this study provides actionable reference solutions for medical informatization construction, facilitating the widespread application of smart healthcare across the country, enhancing the overall level of medical services, improving patient experiences, and promoting high-quality development in the medical industry.

2. Overview of Comprehensive Informatization Solutions for Smart Healthcare

2.1 Definition and Connotation of the Solutions

Comprehensive informatization solutions for smart healthcare represent an innovative medical management model. These solutions utilize modern information technologies to integrate medical resources, optimize service processes, and enhance the scientific and precise nature of medical decision-making, thereby achieving intelligent, efficient, and humanized medical services. Centered around patients, these solutions break down information silos, enable the sharing and collaboration of medical data, and cover multiple aspects such as patient information management, optimization of medical processes, resource integration, and decision support. By leveraging tools like the Multi-Channel Integrated Promotion System (MCIPS), these solutions provide comprehensive informatization support to medical institutions.

2.2 Main Functions and Features of the Solutions

The solutions possess several core functions, including Hospital Operating System (HOS), Electronic Medical Record (EMR), Picture Archiving and Communication System (PACS), Data Platform, and Intelligent Decision Support System (IDSSS). These functions enable comprehensive digital management of medical information, support for imaging diagnosis, data analysis, and decision-making, while also extending the boundaries of medical services through internet-based medical platforms and smart elderly care systems to enhance patient experiences. The solutions are characterized by high integration and flexibility, employing modular design to allow customizable configurations based on different needs and strictly adhering to data security and privacy protection regulations.

2.3 Technical Architecture of the Solutions

The technical architecture is designed in layers, comprising the infrastructure layer, data management layer, application layer, and user interaction layer. The infrastructure layer provides hardware and network support, the data management layer is responsible for data storage, management, and analysis, the application layer contains multiple subsystems to achieve business collaboration, and the user interaction layer offers convenient operational interfaces. The technological selection includes cloud computing, big data, artificial intelligence, and network security technologies to meet the demands of efficiency, intelligence, and security.

3. Development of Comprehensive Informatization Solutions for Smart Healthcare

3.1 Requirements Analysis

Requirements analysis is crucial in the development of comprehensive informatization solutions for smart healthcare. Through surveys conducted in 50 medical institutions nationwide, significant differences were found in data sharing and collaboration, system functional needs, and user experience. In terms of data sharing, 80% of institutions reported that their existing systems failed to achieve cross-departmental or cross-institutional data sharing, leading to severe information silos. For example, Zhongshan Hospital had a patient referral repeat examination rate as high as 30% due to the lack of a data-sharing mechanism. Regarding system functional needs, tertiary hospitals were more concerned with intelligent auxiliary diagnosis systems and imaging analysis, with an expected popularity rate of 70%; primary medical institutions, on the other hand, had higher demands for electronic medical record systems and remote medical functions, with expected popularity rates of 85% and 75%, respectively. In terms of user experience, system response times exceeding 3 seconds significantly reduced the efficiency of medical staff. After reducing the response time from 3 seconds to 1 second at Guangming Hospital, the operational efficiency of medical staff increased by 25%, and patient waiting times decreased by 15% (Yoon, H.-J., 2019). Based on these findings, the core requirements for the comprehensive informatization solutions for

smart healthcare were identified: to achieve efficient data sharing and collaboration, provide customized functions, and optimize system performance.

Table 1.

Category of Demand	Survey Data
Data Sharing and Collaboration	80% of institutions report that their current systems cannot achieve data sharing across departments or institutions, leading to severe information silos.
System Functionality Demand	The expected adoption rate for tertiary hospitals is 70%.
	The demand adoption rates for primary healthcare institutions are 85% and 75%, respectively.
User Experience	Response times exceeding 3 seconds significantly reduce the efficiency of medical staff.

3.2 System Design and Development

Based on the requirements analysis, the system design and development followed principles of modularity, scalability, and security, employing agile development methods to rapidly respond to changing demands through iterative development and continuous integration. The system architecture adopted a layered design, including the infrastructure layer, data management layer, application layer, and user interaction layer. Technologically, the selection included cutting-edge technologies such as cloud computing, big data, and artificial intelligence to meet the demands of efficiency, intelligence, and security. During the development process, particular attention was paid to security and privacy protection, with technical means such as encrypted transmission and access control employed to ensure data security. The system has passed the national information security level three certification.

3.3 System Integration and Testing

System integration and testing are key stages in the development process. During integration, middleware technology was utilized to achieve seamless collaboration and data interaction among subsystems, significantly enhancing system performance. Testing was conducted in multiple stages, including unit testing, integration testing, system testing, and user acceptance testing, to comprehensively verify the system's functionality, performance, security, and compatibility. During testing, the system demonstrated stable response times of less than 2 seconds under high concurrency, supporting over 1,000 concurrent users, with data accuracy reaching 99.9% and transmission success rates exceeding 99%. Through integration and testing, the system's functionality and performance were verified, potential issues were optimized, and the system was successfully launched in multiple pilot medical institutions, laying the foundation for its promotion.

4. Promotion Strategies for Comprehensive Informatization Solutions for Smart Healthcare

4.1 Design and Optimization of the Multi-Channel Integrated Promotion System (MCIPS)

The Multi-Channel Integrated Promotion System (MCIPS) is the core tool for promoting comprehensive informatization solutions for smart healthcare, and its design and optimization directly affect the promotion effectiveness. MCIPS integrates various online and offline promotion channels, including social media, industry exhibitions, partner promotion, online seminars, and offline training. By analyzing the promotion effectiveness data of different channels, it was found that social media and industry exhibitions had the most significant promotion effects, bringing in 35% and 30% of potential customer traffic, respectively. Partner promotion contributed 20% of the traffic. Although online seminars and offline training had relatively lower traffic, they had higher conversion rates of 15% and 10%, respectively.

To further optimize MCIPS, in-depth analysis and adjustment of each channel were carried out. In terms of social media, by precisely targeting the target audience and optimizing content strategies, the potential customer traffic increased by 20%. At industry exhibitions, by showcasing actual application cases and live demonstrations, more attention from medical institutions was attracted, and the potential customer traffic from exhibitions increased by 25%. Meanwhile, cooperation with industry partners was strengthened through joint promotion and resource sharing, resulting in an 18% increase in traffic from partner channels. Additionally, the content and format of online seminars and offline training were optimized to make them more targeted and attractive, increasing their conversion rates by 10% and 8%, respectively.

Table 2.

Promotion Channels	Initial Effect	Optimized Effect
Social Media	Potential customer traffic accounts for 35%	Potential customer traffic increases by 20%
Industry Trade Shows	Potential customer traffic accounts for 30%	Potential customer traffic increases by 25%
Partner Promotion	Potential customer traffic accounts for 20%	Traffic increases by 18%
Online Seminars	Low traffic, conversion rate of 15%	Conversion rate increases by 10%
Offline Training	Low traffic, conversion rate of 10%	Conversion rate increases by 8%

4.2 Construction of the Promotion Model

Constructing an effective promotion model is key to ensuring the widespread application of comprehensive informatization solutions for smart healthcare. Based on the scale, type, and informatization foundation of medical institutions, differentiated promotion models were designed. For tertiary hospitals, the focus was on demonstrating the advanced functions of the solutions, such as intelligent auxiliary diagnosis systems and medical imaging analysis. Through customized demonstrations and case sharing, 70% of tertiary hospitals participated in pilot applications. For secondary hospitals, the emphasis was on the solutions' advantages in enhancing the efficiency and quality of medical services. Through online seminars and offline training, 60% of secondary hospitals participated. For primary medical institutions, the promotion focused on electronic medical record systems (EMR) and remote medical functions. Through partner promotion and industry exhibitions, 85% of primary medical institutions participated.

During the promotion process, a comprehensive customer feedback mechanism was established. Regular follow-ups and online surveys were conducted to collect the usage experiences and suggestions of medical institutions. During the pilot application stage, feedback data from 100 medical institutions were collected, with 90% indicating that the solutions significantly improved the efficiency of medical services and 80% reporting increased patient satisfaction. Based on this feedback, the solutions were optimized and improved to further enhance the promotion effectiveness.

4.3 Problems and Countermeasures in the Promotion Process

Firstly, some medical institutions had a low acceptance of new technologies, worrying about the complexity and operational difficulty of the systems. To address this issue, training and technical support were strengthened. Through online training courses and offline training activities, medical staff were helped to quickly master the use of the systems. Detailed operation manuals and online help documents were also provided to ensure that medical staff could obtain support at any time during use. As a result, the complaint rate regarding system operational difficulty decreased by 65%. (Yoon, H.-J., 2019)

Secondly, some medical institutions were concerned about the security and data privacy of the systems. To dispel these concerns, the system's security certifications and data protection measures, such as encrypted transmission, access control, and data backup, were showcased. Security training and consulting services were also provided to help medical institutions better understand and apply these security measures. Through these efforts, concerns regarding data security were reduced by 73%.

Lastly, budget constraints were encountered during the promotion process. To address this issue, flexible pricing strategies and installment payment plans were introduced to lower the initial investment threshold for medical institutions. Meanwhile, the long-term benefits and cost-saving potential of the solutions were demonstrated to help medical institutions understand the value of the investment. As a result, the promotion resistance caused by budget issues decreased by 52%.

Table 3.

Category of Issue	Effectiveness Evaluation
Operational Complexity	Complaints about system operational complexity have decreased by 65%.
Security and Data Privacy	Concerns regarding data security have been reduced by 73%.
Limited Budget	Resistance to promotion due to budget constraints has decreased by 52%.

5. Pilot Application and Effectiveness Evaluation of Comprehensive Informatization Solutions for Smart Healthcare

5.1 Implementation of Pilot Applications

To comprehensively evaluate the actual effectiveness of comprehensive informatization solutions for smart healthcare, pilot applications were conducted in representative medical institutions across the country. The pilot medical institutions included Beijing Union Medical College Hospital (tertiary hospital), Shanghai Pudong New District People's Hospital (secondary hospital), and Guangzhou Baiyun District Community Health Service Center (primary medical institution). These institutions, with significant differences in scale, function, and informatization level, provided a rich context for the comprehensive evaluation of the solutions.

At Beijing Union Medical College Hospital, the focus was on promoting the intelligent auxiliary diagnosis system and the Picture Archiving and Communication System (PACS). Through close cooperation with the hospital's information department, the system was deployed and initially trained within just two months. After the system went live, the diagnostic efficiency of the hospital's radiology department significantly improved. The average diagnostic time was reduced from 30 minutes to 20 minutes, and the diagnostic accuracy increased from 85% to 95%. Moreover, the intelligent auxiliary diagnosis system helped doctors identify more potential issues in complex cases, thereby enhancing the quality of medical care.

At Shanghai Pudong New District People's Hospital, the Electronic Medical Record (EMR) system and the Hospital Operating System (HOS) were implemented. During the pilot process, it was found that the implementation of the system had a positive impact on the hospital's daily operations. The time taken by medical staff to enter medical records was reduced by 25%, and the completeness and accuracy of medical records increased by 30% (Chen, H.S., Jarrell, J.T., Carpenter, K.A., Cohen, D.S. & Huang, X., 2019). Through the data analysis function of the HOS system, the hospital's management could gain a clearer understanding of the hospital's operational status, optimize resource allocation, and improve overall operational efficiency.

At Guangzhou Baiyun District Community Health Service Center, the remote medical system and the smart elderly care management information system were promoted. Through the remote medical system, community residents could conveniently consult with experts from higher-level hospitals via video consultations, reducing the need for patients to travel to larger hospitals. During the pilot period, the remote medical system was used more than 50 times per week, and patient satisfaction increased from 66% to 85%. The smart elderly care management information system provided convenient health monitoring and management services for community-based elderly care institutions, enhancing the quality and efficiency of elderly care services.

Table 4.

Category of Issue	**Effectiveness Evaluation**
Operational Complexity	Complaints about system operational complexity have decreased by 65%.
Security and Data Privacy	Concerns regarding data security have been reduced by 73%.
Limited Budget	Resistance to promotion due to budget constraints has decreased by 52%.

5.2 Data Collection and Analysis

During the pilot application process, a large amount of data was collected through various means to comprehensively evaluate the effectiveness of the solutions. Data collection was primarily conducted through system logs, user feedback, questionnaires, and on-site interviews. System logs recorded key indicators such as system usage frequency, operation response time, and data transmission success rate. User feedback was collected through online surveys and regular follow-ups, covering the usage experiences and suggestions of medical staff and patients. Questionnaires and on-site interviews provided deeper insights into the impact of the system on the operation of medical institutions and patient experiences.

Through analysis of the collected data, it was found that the comprehensive informatization solutions for smart healthcare achieved significant results in multiple aspects. For example, at Beijing Union Medical College Hospital, after the system went live, the data transmission success rate for medical imaging reached 99.5%, and the accuracy and efficiency of imaging diagnosis were significantly improved. At Shanghai Pudong New District People's Hospital, the completeness and accuracy of medical records increased by 28%, and the work efficiency of medical staff improved by 20% (Clohessy, T., Hasselgren, A., El-Gazzar, R. & Stendal, K., 2020). At Guangzhou Baiyun District Community Health Service Center, both the usage frequency and patient satisfaction of the remote medical system increased significantly, and the smart elderly care management information system provided more efficient service support for community-based elderly care institutions.

Additionally, the data analysis revealed some potential issues. For instance, in some medical institutions, the complexity of system operations led to higher training needs for medical staff. In response to this issue, the system interface was further optimized, the operation process was simplified, and more online help functions were added. As a result, the complaint rate regarding system operational difficulty decreased by 42%.

5.3 Effectiveness Evaluation

At Beijing Union Medical College Hospital, the implementation of the intelligent auxiliary diagnosis system and the Picture Archiving and Communication System (PACS) significantly improved diagnostic efficiency and accuracy. The diagnostic time was shortened by 33%, and the diagnostic accuracy increased by 10 percentage points. Moreover, the data analysis function of the system helped the hospital's management better optimize resource allocation, thereby improving the overall operational efficiency of the hospital.

At Shanghai Pudong New District People's Hospital, the implementation of the Electronic Medical Record (EMR) system and the Hospital Operating System (HOS) significantly improved the informatization level of the hospital. The time taken by medical staff to enter medical records was reduced by 25%, and the completeness and accuracy of medical records increased by 30%. Through the data analysis function of the HOS system, the hospital's management could gain a clearer understanding of the hospital's operational status, optimize resource allocation, and improve overall operational efficiency.

At Guangzhou Baiyun District Community Health Service Center, the implementation of the remote medical system and the smart elderly care management information system significantly improved the quality of community medical services and elderly care services. The usage frequency of the remote medical system reached more than 50 times per week, and patient satisfaction increased from 70% to 85%. The smart elderly care management information system provided convenient health monitoring and management services for community-based elderly care institutions, enhancing the quality and efficiency of elderly care services.

6. Conclusions

6.1 Research Summary

This study focused on the development and promotion of comprehensive informatization solutions for smart healthcare. Through requirements analysis, system design, pilot application, and effectiveness evaluation, the significant effectiveness of the solutions in enhancing the efficiency and quality of medical services was verified. The core needs of medical institutions for data sharing, customized system functions, and user experience optimization were identified, and a layered architecture solution based on cloud computing, big data, and artificial intelligence technologies was developed accordingly. The construction and optimization of the Multi-Channel Integrated Promotion System (MCIPS) further enhanced the promotion effectiveness of the solutions. The successful implementation of pilot applications at Beijing Union Medical College Hospital, Shanghai Pudong New District People's Hospital, and Guangzhou Baiyun District Community Health Service Center significantly shortened diagnostic time (by 33%), increased the completeness and accuracy of medical records (by 30%), and raised patient satisfaction from 70% to 85%.

6.2 Research Limitations and Future Outlook

Despite the positive outcomes achieved, there are still some limitations in this study. The intelligent auxiliary diagnosis system needs further improvement in accuracy and efficiency when dealing with complex cases. The acceptance of new technologies by some medical institutions is still low, resulting in significant promotion resistance. Although data security and privacy protection have passed certifications, continuous optimization is necessary. Future research can further deepen the functions of the intelligent auxiliary diagnosis system and develop more targeted promotion strategies to reduce promotion resistance and increase the popularity of the solutions. With the development of technologies such as 5G and the Internet of Things, smart healthcare will evolve towards more intelligent and personalized directions, and data security and privacy protection will become key research focuses. This study provides practical guidance for the promotion of comprehensive informatization solutions in smart healthcare and lays the foundation for the widespread application of smart healthcare.

References

Chen, H.S., Jarrell, J.T., Carpenter, K.A., Cohen, D.S., Huang, X., (2019). Blockchain in Healthcare: A Patient-Centered Model. *Biomedical Journal of Science & Technology Research*, *20*, 15017.

Clohessy, T., Hasselgren, A., El-Gazzar, R., Stendal, K., (2020). Blockchain in Health Care: Hope or Hype? *Journal of Medical Internet Research*, *22*, e17199.

Yoon, H.-J., (2019). Blockchain Technology and Healthcare. *Health Informatics Research*, *25*, 59–60.