

AIRLINE INTERNATIONAL CREDIT CARD PAYMENT RISK CONTROL SYSTEM

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Abstract: The article focuses on the theme of "Airline International Credit Card Payment Risk Control System," analyzing the feasibility and advantages of such a system. Based on the discussion of the challenges faced by airlines in international credit card payment risk control, the article proposes an airline international credit card payment risk control system. It provides a detailed description of the system's structure, operational value, and application prospects, aiming to promote the adoption and implementation of the airline international credit card payment risk control system.

Keywords: International credit card; Risk control; Airline payments; Fraud prevention; Transaction security; Financial management

1 INTRODUCTION

Challenges in Payment Risk Management Faced by Airlines in Global Business Expansion. As the airline industry develops internationally, airlines have increasingly accepted international credit cards as one of the primary payment methods. However, the introduction of international credit card payments brings a series of risks, including but not limited to credit card fraud, transaction disputes, and liquidity risks. These risks pose challenges to the financial security and operational stability of airlines. To effectively manage these risks, airlines need to develop a risk control system for foreign card acquiring. The purpose of this system is to ensure the security of transactions, reduce the occurrence of fraud, and improve liquidity.

2 FEASIBILITY OF THE AIRLINE INTERNATIONAL CARD PAYMENT RISK CONTROL SYSTEM

Developing an airline international credit card payment risk control system can improve the efficiency of handling international credit card transactions and reduce fraud risks. This system can help airlines better comply with international payment regulations to ensure transaction security and provide real-time transaction monitoring and analysis to identify and prevent potential fraud.

2.1 Technical Aspects

Airlines can leverage existing risk control platforms and integrate the latest security technologies such as artificial intelligence, big data analysis, biometrics, and blockchain to build a comprehensive risk control system. AI and machine learning algorithms can help the system automatically identify abnormal transaction patterns, big data analysis can assess transaction risks, biometrics can enhance identity verification, and blockchain can improve data security and transparency[1].

2.2 Regulatory Compliance

The risk control system needs to align with the payment regulations and standards of various countries, such as complying with PCI DSS (Payment Card Industry Data Security Standard)[2]. This ensures that airlines can accept credit card payments from around the world while protecting consumers' financial information. Compliance with regulations and standards can also enhance the airline's credibility and increase consumer trust.

2.3 User Experience

The design of the risk control system should simplify processes and minimize unnecessary steps to ensure a fast and convenient payment experience. The system should offer an intuitive and user-friendly interface, enabling users to complete payments easily. Airlines can also provide multilingual customer service support to cater to the needs of consumers from different countries and regions, thereby enhancing user satisfaction and loyalty.

2.4 Collaboration and Sharing

Airlines can establish partnerships with payment service providers, banks, and security experts to jointly develop and optimize the risk control system, improving its overall performance and reliability. Through these measures, airlines can offer safer and more convenient payment services to meet the growing demands of international business.

3 ADVANTAGES OF THE AIRLINE INTERNATIONAL CARD PAYMENT RISK CONTROL SYSTEM

3.1 Global Service Support

The airline International Card Payment risk control system is dedicated to providing global service support. This not only means supporting credit card payments from multiple countries and regions but also deeply adapting to the payment habits, laws, regulations, and financial infrastructures of different countries and regions. The system can handle multiple currencies and provide a multilingual user interface, allowing travelers from different cultures to make payments seamlessly. Additionally, the system is backed by a robust technical support team to ensure 24/7 online service, providing convenient and reliable payment services to travelers regardless of their location[3].

3.2 Real-Time Risk Monitoring

Real-time risk monitoring is one of the core functions of the system. By integrating a risk management system, it performs in-depth analysis of each transaction, including transaction amount and frequency, location, time, and payment method. This multidimensional analysis helps the system accurately identify fraudulent behavior and take immediate action, such as issuing alerts or intercepting suspicious transactions, to protect the interests of both the airline and travelers.

3.3 Intelligent Decision Engine

The intelligent decision engine is the heart of the system. It uses advanced algorithms and AI technology to analyze transaction patterns, self-learn, and optimize to improve fraud detection accuracy and efficiency. The system can make automatic decisions to reduce reliance on manual intervention and predict potential risk points by analyzing vast amounts of historical and real-time data, achieving preventive risk management. This proactive risk management approach helps airlines control risks more effectively and reduce potential losses.

3.4 Customized Risk Control Strategies

Airline businesses are diverse, with a broad customer base, necessitating a system capable of tailoring risk control strategies based on specific characteristics. This includes risk management for different flights or passenger classes and addressing the personalized risk control needs of frequent flyers and corporate clients. The system should offer advanced configuration tools, allowing airlines to adjust risk control rules and thresholds according to actual conditions, ensuring the precision and flexibility of risk management strategies.

3.5 User-Friendly Interface

To enhance operational efficiency and user satisfaction, the system should feature an intuitive and easy-to-use interface. The interface should provide clear operation guides and prompts, enabling users to complete various operations effortlessly and reduce errors and misunderstandings. The system should also support a multilingual interface to cater to users from different countries and regions, enhancing the overall user experience. The design should consider the varying technical proficiency levels of users, offering simplified operation processes to ensure that even non-technical users can easily master and use the system.

4 CHALLENGES IN AIRLINE INTERNATIONAL CREDIT CARD PAYMENT RISK CONTROL

4.1 High Transaction Fees

When airlines use international credit card payment services, they typically need to pay a certain percentage of transaction fees, which may vary depending on the card type, transaction amount, and acquiring institution's policies. These fees often increase the airline's costs. For instance, some credit card companies may charge higher fees for international transactions, posing an additional financial burden for airlines operating across borders. Since these costs are unavoidable, airlines may choose to pass these fees onto consumers, potentially raising ticket prices and affecting consumer purchasing decisions.

4.2 Long Settlement Cycles

The settlement cycle for international credit card payments is usually long, which can negatively impact an airline's cash flow management. After a transaction occurs, airlines must wait for a period before receiving the funds, during which their capital is tied up and cannot be used for other potentially rewarding activities. A long settlement cycle can also lead to difficulties in financial planning, such as shortages when paying suppliers, employee salaries, and other operating costs.

4.3 Exchange Rate Uncertainty

Issues related to exchange rates can create uncertainty for airlines. When converting foreign currencies amidst fluctuating exchange rates, airlines may face exchange rate losses[4]. Additionally, different acquiring institutions may have varying exchange rate policies, making it difficult for airlines to predict and control conversion costs. This uncertainty affects cost control and can influence ticket prices, affecting consumer purchase decisions.

4.4 Insufficient International Credit Card Payment Capabilities

Some airlines may not have direct access to international credit card networks, limiting their ability to accept international credit card payments. This limitation can result in lost potential customers, especially in scenarios requiring convenient payment methods. A lack of international credit card payment capabilities can also affect an airline's competitiveness in the market.

4.5 Risks of Card Theft and Chargebacks

Despite having certain risk assessment and management systems, airlines still face risks of card theft and chargebacks. Credit card fraud can lead to financial losses for airlines and erode consumer trust. Chargeback situations may result in airlines being unable to recover sales revenue, impacting their financial health. To mitigate these risks, airlines must continuously update and optimize risk management strategies to ensure transaction security and reliability.

5 COMPOSITION OF THE AIRLINE INTERNATIONAL CREDIT CARD PAYMENT RISK CONTROL SYSTEM

5.1 Integration with Airline Information Systems

Constructing an airline international credit card payment risk control system requires deep integration with the airline information system to meet the risk management needs of domestic airlines when accepting international credit card payments. The airline information system, developed by China Civil Aviation Information Group Corporation, includes functions such as flight sales, reservations, departures, and operational control but lacks support for international credit card payment controls. To effectively operate the risk control system, professionals need to conduct secondary development of the airline information system to add international credit card payment risk management and control functions.

This integration project combines the risk control system with the airline information system to enhance the security and efficiency of handling international credit card transactions. By introducing international credit card payment controls, the system can effectively monitor and manage payment process risks, including preventing credit card fraud and managing transaction chargebacks and theft. Additionally, integrating the risk control system can optimize the payment process, improve transaction processing speed, reduce manual operation errors, and enhance overall service quality. Achieving this goal requires cooperation with professional payment service providers to jointly develop and refine international credit card payment controls. This involves technical adjustments and upgrades to the airline information system to support new international credit card payment functions. The risk control system also needs to have real-time monitoring and transaction data analysis capabilities to take timely action when issues arise.

By implementing this integration, airlines can establish a comprehensive international credit card payment risk control system to effectively reduce payment process risks and protect the interests of both the company and consumers. This also helps enhance the airline's brand image and competitiveness in domestic and international markets.

5.2 Integration with Acquiring Bank's 3D Verification System

In the airline international credit card payment risk control system, the acquiring bank's 3D verification system is a key component. Its primary function is to verify the authenticity of credit card transactions and the cardholder's identity. By sending the credit card number, expiration date, and security code (typically CVV2/CVC2) to the issuing bank or relevant authentication center for verification, it ensures that the transaction is authorized by the cardholder. The 3D verification system usually adopts industry-standard security protocols, such as ISO/IEC 8785-2:1999, which defines standardized methods for data exchange in an Open Systems Interconnection (OSI) environment.

During the transaction process, the airline's risk control system will transmit key credit card information to the acquiring bank's 3D verification system, which then forwards this information to the issuing bank or authentication center for verification. The verification process includes checking the card information and may also involve further authentication of the cardholder's identity through SMS verification codes, one-time passwords (OTP), or other methods. This process helps ensure transaction security and reduces the chargeback rate due to unauthorized transactions.

By incorporating the 3D verification system, airlines can significantly reduce the risk of credit card transactions and improve transaction success rates.

5.3 Integration with Acquiring Bank's Payment System

The integration of the acquiring bank's payment system with the risk control system is a critical aspect of the airline international credit card payment risk control system. This process involves sending key information such as credit card numbers, expiration dates, and transaction types to the acquiring bank's payment system. This step requires accurate information transmission and ensuring the security and efficiency of the data transfer.

During the integration process, the risk control system communicates with the acquiring bank's payment system through a series of interfaces, which may include XML-based API calls, JSON-format data transmission, or other communication protocols suitable for the payment industry. The risk control system packages the collected transaction information into an appropriate format and sends it to the acquiring bank's payment system through these interfaces.

Upon receiving the information, the acquiring bank's payment system processes it, including verifying the credit card's validity, checking if the transaction amount exceeds the credit card's limit, and identifying any suspicious transaction behavior. The payment system also handles the authorization request for the transaction, confirming whether sufficient funds are available to complete the transaction and generating an authorization code. This process may also involve the issuing bank.

The risk control system waits for the payment system's response and uses callback interfaces to determine whether the transaction is successful. If the transaction is successful, the risk control system records the relevant transaction information and continues monitoring the transaction to prevent potential fraud. If the transaction fails, the risk control system processes accordingly, such as notifying the airline's customer service department, recording abnormal transaction information, or taking other risk control measures.

The smooth operation of this integration is crucial to the entire risk control system, directly affecting the transaction's security, efficiency, and customer experience. Therefore, airlines need to ensure that the integrated payment system is stable, reliable, and capable of timely updates to adapt to the ever-changing payment security standards and regulatory requirements.

5.4 Internal Verification Module of the Risk Control System

The internal verification module is a core component of the airline international credit card payment risk control system. It establishes and maintains a blacklist mechanism through various means and uses artificial intelligence technology to dynamically analyze the security of the user's payment environment, identifying and blocking potential fraudulent transactions.

The blacklist mechanism is one of the fundamental defense measures in the risk control system. It constructs a database of common transaction characteristics used by fraudsters by collecting and updating information such as bad IP addresses and stolen user card BINs (Bank Identification Numbers). When user transaction information matches this blacklist data, the system immediately issues a warning, takes further verification measures, or directly blocks the transaction.

The internal verification module also employs AI and machine learning technologies to conduct real-time analysis and pattern recognition of user payment behavior. These technologies help the system better understand the differences between normal transactions and fraudulent activities, effectively identifying potential fraud risks even without obvious blacklist information.

The system dynamically analyzes the user's payment environment, including the geographical location of the IP address, device fingerprint information, and abnormal transaction times, to assess transaction security. For example, if a user suddenly conducts transactions from an IP address in another country or initiates transactions on a device that does not usually use electronic payments, these could be considered signs of fraud.

When the internal verification module identifies potential fraud risks during the initial transaction stage, it takes corresponding measures, such as delaying the transaction, sending additional verification information to the user, or directly blocking the transaction, preventing financial losses for the airline and protecting consumers' payment security.

6 OPERATION MECHANISM AND PROSPECTS OF THE AIRLINE INTERNATIONAL CREDIT CARD PAYMENT RISK CONTROL SYSTEM

6.1 Operation Mechanism of the Airline International Credit Card Payment Risk Control System

This project is based on secondary development on the Travelsky GDS platform. When airlines conduct international credit card payment business, they call this system's payment interface, transmit payment amounts, acquiring methods, and passenger information to the system, and input card numbers, expiration dates, security codes, and cardholder names through a web page. In the North American region, international credit cards support postal code verification, so for this region, additional verification of billing address and postal code is required. Once verification is passed, it proceeds to the next step.

The system performs multifactor portrait analysis of the IP address and network environment. If the risk verification level is low, it sends the card number, expiration date, and security code information to the acquiring bank interface, redirecting to the issuing bank's 3D verification page for 3D verification. If the risk verification level is medium, the system performs 3D verification and then returns the information to the airline system for secondary manual review to determine if on-site card verification at the airport is necessary. If the risk verification level is high, the transaction is rejected, and the risk control system returns a result of REJECT.

After passing 3D verification, the system sends an authorization command to the acquiring bank. If authorization is successful, the system returns the card number, authorization code, and expiration date information to the airline system. After ticketing, the system modifies the Form of Payment section in the ticket information to CC (credit card) and indicates the card number and expiration date. For medium risk levels, the system writes the ticket information into the PNR as a REMARK. When the passenger checks in at the airport, the departure system displays the REMARK information for further verification.

6.2 Prospects of the Airline International Credit Card Payment Risk Control System

The application prospects of the airline international credit card payment risk control system are very promising. With the continuous advancement of globalization and digitalization, airlines and various travel service providers will increasingly rely on electronic payment methods, especially international credit card payments. Therefore, an efficient and reliable risk control system becomes a necessary tool to ensure transaction security, safeguard enterprise interests, and enhance customer experience. In the future, the application of the airline international credit card payment risk control system will be further promoted and applied in the following aspects:

- **Cross-Border Transaction Security Assurance:** With the internationalization of the aviation industry, airlines will face more transactions from different countries and regions, bringing various security risks. The risk control system can help airlines effectively identify and prevent fraudulent activities in cross-border transactions, ensuring fund security.
- **Personalized and Intelligent Services:** Utilizing big data analysis and AI technology, the airline international credit card payment risk control system can not only prevent fraud but also provide personalized payment services based on customer behavior patterns, further enhancing customer experience.
- **Risk Management and Loss Control:** Through real-time monitoring and analysis of transaction data, the airline international credit card payment risk control system can help airlines better manage risks, promptly identify abnormal behaviors, and reduce fraud losses.
- **Adaptation to Emerging Payment Methods:** With the rise of mobile payments, digital currencies, and other emerging payment methods, the airline international credit card payment risk control system must continuously update and optimize to adapt to these new payment trends, ensuring airlines are not left behind by advancements in payment technology.

CONCLUSION

The airline international credit card payment risk control system is not only essential for current business security but also a critical tool for addressing future challenges in the payment sector. As technology continues to advance and application scenarios expand, such risk control systems will play an increasingly important role in the aviation industry and other sectors.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

REFERENCES

- [1] Zheng Xin. Research on the Issues of Passenger Fund Settlement and Clearing Management in Chinese Airlines Based on E-commerce. University of International Business and Economics, 2015.
- [2] Tian Yuan. Research on Risk Control of Online Payment for International Credit Cards by Domestic Airlines. Shandong University, 2024-06-13.
- [3] Zhao Xuwei. Analysis and Prevention Strategies of Credit Card Business Risks. 2024-06-13.
- [4] Ji Xiaojie. Exploration and Reflection on Digital Transformation of Credit Card Risk Control Empowered by UnionPay Data. China Credit Card, 2022(7): 21-26.