

Enhancing Financial Performance in E-Commerce Firms through AI-Agent-Assisted Risk Management

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Abstract: This research focuses on e-commerce enterprises, delving deeply into the application of artificial intelligence agents in risk management and their mechanism of enhancing financial performance. By analyzing representative cases such as Amazon and Alibaba, the study concludes that AI intelligent agents, relying on three core technologies: machine learning, natural language processing, and intelligent decision-making systems, Effective identification and early warning of market risks, credit risks, operational risks and compliance risks have been achieved. Research shows that AI agents can increase the accuracy rate of fraudulent transaction identification to 92%, raise inventory turnover rate by 31%, and significantly reduce operating costs through automated decision-making processes. This study also provides optimization strategies such as data governance, cross-departmental collaboration, and multi-agent systems, offering practical approaches for e-commerce enterprises to build intelligent risk management systems.

KeyWords: Financial Performance; E-Commerce Firms; AI-Agent-Assisted; Risk Management

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Introduction

As the scale of e-commerce continues to expand, the risks of fraudulent transactions, supply chain disruptions and compliance it faces are becoming increasingly complex, and traditional risk control methods have become difficult to cope with. This research takes AI intelligent agent technology as its core, systematically exploring its application status in e-commerce risk management, the mechanism of its impact on financial performance, and optimization strategies. The aim is to construct a new technology-driven risk control framework, providing theoretical basis and practical paths for e-commerce enterprises to achieve risk reduction and benefit growth.

1 The current application status of AI intelligent agents in e-commerce risk management

1.1 Risk Types and Management Requirements of E-commerce Enterprises

When e-commerce enterprises carry out operational activities, they will encounter complex and constantly changing risk situations. These risks have a direct impact on the financial status and sustainable development trend of the enterprises. According to the characteristics of all risks and their sources, the risks in the e-commerce field can mainly be classified into market risks and credit risks. There are four major types of market risks: operational risks and compliance risks. Market risks are mainly reflected in the imbalance between sales channel information and inventory management, uncertainties in contract production scheduling and delivery, as well as the control of contract changes such as discount returns. In global cross-border business, the shopping festival times in different countries and regions are not consistent, resulting in continuous and staggered peak traffic surges. This has intensified market volatility. Credit risks mainly focus on credit sales decisions in sales contracts, overdue accounts receivable, bad debt control, and write-offs, etc. This requires enterprises to establish a customer credit evaluation system and strictly implement the credit sales approval process. Data shows that in 2023, the direct economic losses caused by counterfeit goods in the global e-commerce sector have exceeded 40 billion US dollars, highlighting the severity of credit risks.

Table 1. Main Risk Types and Management Requirements of E-commerce Enterprises

Risk Type	Main Manifestations	Management Requirements
Market Risk	Information asymmetry in sales channels, inventory management imbalances, uncertainty in contract production and delivery, discount and return controls	Establish sales cost budgeting, track and supervise contract performance, control logistics and information flows
Credit Risk	Poor credit-sales decisions, accounts-receivable delinquencies, improper bad-debt write-offs	Build a customer credit-assessment system, strictly enforce credit-sales approval, set up a bad-debt provision
Operational Risk	IT system security threats, business-process interruptions, supply-chain collaboration gaps	Implement multi-level review and responsibility rules, establish system-monitoring mechanisms, create a business-continuity plan
Compliance Risk	Data-privacy violations, cross-border regulatory conflicts,	Comply with PCI DSS, ISO/IEC 27001 and other

Risk Type	Main Manifestations	Management Requirements
	intellectual-property infringement	international standards, institute a transp

1.2 Overview of AI Intelligent Agent Technology

AI intelligent agents belong to artificial intelligence systems, capable of autonomously perceiving the environment, making decisions and taking actions. Their role in e-commerce risk management is becoming increasingly crucial. Their core technologies encompass three major fields: machine learning, natural language processing, and intelligent decision-making systems. These technologies interweave with each other, jointly shaping the ability of intelligent agents to identify and respond to risks. Machine learning technology serves as the fundamental support for AI intelligent agents. By analyzing historical transaction data, user behavior patterns, and business process information, it can identify potential risk signals and predict the probability of risk occurrence. In e-commerce risk management, machine learning algorithms are particularly suitable for detecting fraudulent transactions, identifying false reviews, and predicting supply chain disruptions, etc. For instance, models constructed based on behavioral baselines and abnormal deviations can create exclusive behavioral baselines for each user. When a user's behavior deviates from the baseline is detected, the system will immediately determine it as high-risk and initiate intervention measures. This capability enables AI intelligent agents to identify subtle risk patterns that are difficult for humans to detect from massive amounts of data, achieving advanced and precise risk early warning.

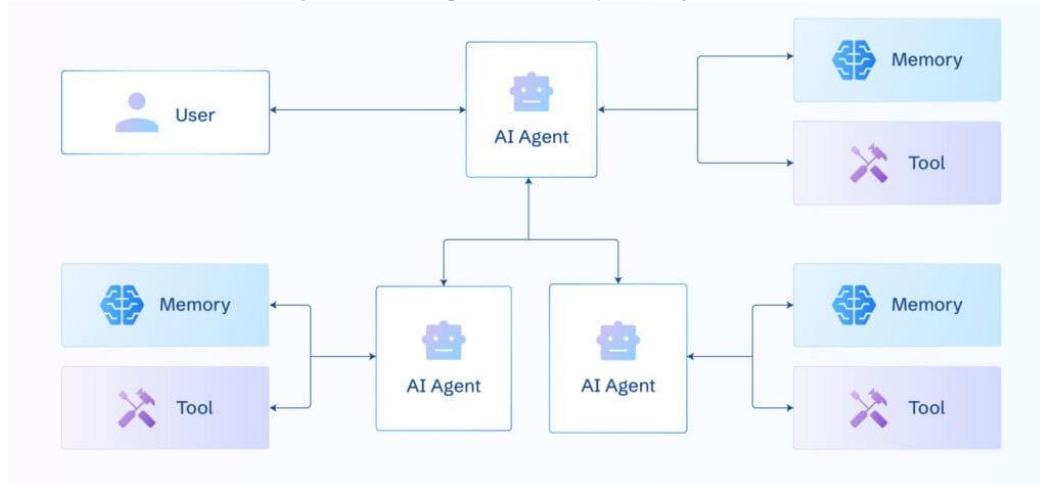


Figure 1. Schematic diagram of the AI-agent technical architecture

1.3 Analysis of Application Cases of E-commerce Enterprises

Global e-commerce giant Amazon has demonstrated industry-leading practical results when applying AI intelligent agents to the field of risk management. Amazon has upgraded its original Seller Assistant to an intelligent risk control system with "agent AI" capabilities. This system can proactively handle various tasks ranging from daily operations to complex risk strategies. It can also enable sellers to have ultimate control over key decisions. The core functions of this system include real-time marking of slow-moving inventory, providing suggestions for price adjustment or delisting decisions to avoid the accumulation of long-term storage costs. Additionally, it can analyze demand patterns and offer logistics optimization suggestions. In terms of risk prevention and control, Amazon's AI agent can automatically check whether all products meet the safety and compliance requirements of different international markets. This has reduced the regulatory risks in cross-border trade to some extent. Amazon's AI intelligent agent has evolved from a simple risk defense tool into a business growth partner. By analyzing the vast amount of data on the platform, it provides sellers with optimization suggestions in inventory management, pricing strategies, and marketing promotion, directly enhancing sellers' sales performance and the platform's financial returns.

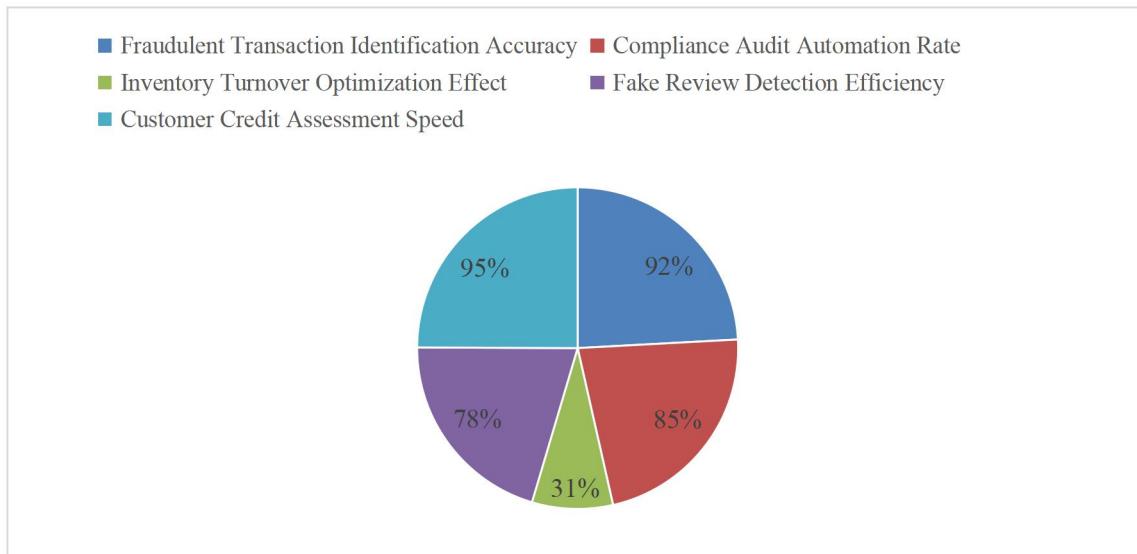


Figure 2. Data on the application effect of AI intelligent agents

2 The mechanism of AI-Agent's effect on financial performance

2.1 Risk identification and prediction capabilities

The risk identification and prediction capabilities of AI intelligent agents have become the primary defense line for them to enhance the financial performance of enterprises. The key to this capability lies in its ability to create a complete data-driven closed-loop system. To elaborate, the system continuously acquires multi-source heterogeneous data through application programming interfaces (apis). Such as real-time transaction flow, user browsing session logs, supply chain node status, and external market intelligence, etc. Then, feature engineering is used to clean, transform and reduce the dimension of these raw data, and extract risk feature indicators with predictive value from them, such as abnormal transaction frequency and deviation of logistics timeliness. At the model computing layer, integrated machine learning algorithms, such as the Isolated Forest for unsupervised anomaly detection and the XGBoost model for supervised classification prediction, jointly quantitatively assess the risk probability. The system outputs a list of high-risk orders, sellers or buyers, and automatically triggers corresponding intervention measures, such as transaction suspension, secondary verification or account review.

2.2 Decision Optimization and Resource Allocation

Based on the information provided by precise risk identification, AI intelligent agents, through automated and intelligent decision-making and execution methods, achieve the optimal allocation of key business resources, directly promoting the development of financial performance in a better direction. Traditional risk management relies on manual review and rule engines, which have problems such as response delay and rigid rules. AI intelligent agents can execute complex decision-making logic within extremely short milliseconds based on real-time risk assessment results. For instance, in terms of credit risk management, agents can dynamically adjust the credit limit and payment method of buyers based on their real-time behavior data and historical credit records, seeking the optimal balance between stimulating consumption and controlling bad debts. At the operational risk level, it can predict demand fluctuations and identify supply chain bottlenecks. Automatically generate and implement the optimal inventory replenishment strategy and logistics routing plan to reduce the cost of slow-moving inventory and the loss of out-of-stock sales.

2.3 The Impact Path on Enterprise Financial Performance

The ultimate improvement of an enterprise's financial performance brought about by AI intelligent agents cannot be achieved in a short period of time. Instead, it is realized through a clear and multi-level causal transmission path. The starting point of this path is the core capabilities of AI agents, namely the precise risk identification and intelligent decision-making optimization mentioned earlier. These capabilities first play a role at the operational level of the enterprise. It has produced a series of positive intermediate effects: in terms of cost, it is manifested as a certain degree of reduction in fraud losses, compliance fines, inventory overstock costs and manual review fees; in terms of revenue, it is reflected in the improvement of transaction conversion rates and customer retention rates due to reduced risks and reliable services.

3 Optimization Strategies of AI-Agent in Risk Management of E-commerce Enterprises

3.1 Data Governance and Intelligent Model Optimization

A stable data governance framework is the fundamental support for the effective operation of AI intelligent agents. E-commerce enterprises need to build a unified and high-quality data foundation, and carry out operations such as cleaning, labeling, and standardization on multi-source heterogeneous data from transaction flows, user behaviors, and supply chain logs, just as Microsoft has emphasized in its intelligent ecosystem. By leveraging OneLake to build a unified data lake, zero-copy access and centralized governance of structured and unstructured data can be achieved, thereby ensuring the integrity and consistency of the data used for AI model training. Given this situation,

AI agents can leverage the semantic understanding capabilities of large language models to automatically perform tasks such as data lineage tracing, metadata enrichment, and compliance strategy review, transforming data governance from a passive compliance state to an active value creation state.

3.2 Integration of AI-agent with Enterprise Processes

The value of AI intelligent agents is ultimately reflected in the in-depth collaboration with core business departments. It does not replace human experts but serves as a capability multiplier, reshaping the collaboration paradigm among risk control, finance, and operation departments.

To achieve the above-mentioned synergy, enterprises need to establish an operational framework of "humanity on the way back", which requires technological integration and a clear definition of responsibilities in the organizational structure. Risk control experts are responsible for defining risk strategies and approving key anomalies, while financial personnel are in charge of setting economic benefit indicators and reviewing budgets. Operation personnel must ensure that AI-driven process adjustments are in line with the actual business dynamics. Just as expected in the EY report, this deep collaboration is a crucial step for enterprises towards a superfluid organization, which can eliminate the efficiency loss caused by departmental walls.

3.3 Policy Recommendations and Future Development Directions

From a macro ecological perspective, the development of AI risk control in e-commerce enterprises urgently requires joint efforts at the policy, technological and industrial levels. In terms of compliance with regulations and ethical governance, enterprises should actively respond to the regulatory requirements of the state and the world. The "Opinions on Deeply Implementing the 'Artificial Intelligence Plus' Action" issued by The State Council clearly proposes to build a safe and controllable AI governance system. Enterprises should establish a responsible AI governance framework internally, record, audit and explain the decisions made by AI agents to ensure they comply with ethical norms. In the process of cross-border data flow, AI agents should be equipped with compliance engines that can automatically comply with data protection regulations in different jurisdictions, such as the EU GDPR. In terms of technological upgrades and architectural evolution, the most crucial aspect of future technological competition lies in the construction of a multi-agent collaborative ecosystem. Enterprises should move towards a direction where "scheduling agents" coordinate multiple "professional agents". The blueprint depicted by Microsoft Ignite 2025 indicates that the unified registration, monitoring, and security management of all AI agents within an enterprise through control planes such as Agent 365 is the future architecture for achieving large-scale intelligent operations. We should actively explore the application potential of cutting-edge technologies such as quantum computing in the optimization of complex risk control models.

4 Conclusion

This study comprehensively demonstrates how AI intelligent agents can effectively enhance the financial performance of e-commerce enterprises by leveraging three major mechanisms: precise risk identification, intelligent decision-making optimization, and cross-departmental collaboration. The research shows that AI agents have increased the accuracy rate of fraud identification to 92%, raised the inventory turnover rate by 31%, and reduced operating costs through automated risk control processes. A virtuous cycle of "risk control - efficiency improvement - profit growth" has been established. With the development of technologies such as multi-agent systems and federated learning, AI agents will drive e-commerce risk management towards a more adaptive and collaborative ecological direction, providing core guarantees for the sustainable development of enterprises in the digital economy era.

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