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The Impact of Artificial Intelligence (AI) On Trade Finance Processes

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Abstract
The research examines the influence of Artificial Intelligence (AI) on trade finance operations, emphasizing efficiency, compliance, risk management, and inclusion. Trade finance, which facilitates worldwide commerce via instruments including letters of credit, guarantees, and supply chain financing, has historically been limited by paper-based processes, elevated compliance expenses, and susceptibility to fraud. The aforementioned inefficiencies exacerbate the ongoing global trade financing deficit, estimated at USD 2.5 trillion, disproportionately impacting small and medium-sized firms (SMEs). This study employs a mixed-methods approach, using secondary data from international organizations and empirical studies, with survey evidence from 120 stakeholders in banking, SMEs, and regulatory authorities, to analyze the potential and obstacles associated with AI adoption. The findings demonstrate that AI increases efficiency via automated documentation, boosts fraud detection using anomaly-based models, and fortifies credit risk assessment using predictive analytics. Participants recognized expedited document processing (82%) and enhanced fraud detection (76%) as the primary advantages. Nonetheless, obstacles like elevated implementation costs (68%), insufficient technical competence (64%), and legal ambiguity (55%) hinder adoption, especially for small and medium-sized enterprises (SMEs). The discourse underscores that whereas banks and corporations are progressing in AI integration, SMEs persistently encounter structural obstacles, prompting worries over inclusion. The paper suggests that AI might revolutionize trade finance processes and reduce the global trade finance deficit, provided that adoption hurdles are mitigated. Recommendations include investments in digital infrastructure, focused assistance for SMEs, open regulatory frameworks, and the harmonization of cross-border policies to facilitate equitable and sustainable AI use in trade finance.
Key words:

1.0. Introduction

Artificial Intelligence (AI) is progressively revolutionizing global commerce and banking. In trade-related activities, AI technologies like machine learning, natural language processing, and predictive analytics are used to improve risk assessment, automate repetitive tasks, and aid decision-making (OECD, 2022). Inefficient, costly, and error-prone manual, paper-based methods have been used in commerce finance to facilitate international trade via letters of credit and guarantees. As international supply chains grow and transactions get more complicated, these inefficiencies hamper global commerce, according to the WTO (2024).

Inefficiencies may be fixed with AI. Digitizing and analyzing trade papers with automation and intelligence may save operating costs and compliance risks (EY, 2020). AI may enhance letter of credit (LC) document analysis, a laborious and error-prone portion of commercial finance (Abid et al., 2025). Financial institutions may better detect abnormalities and fraud using these technology (ICC, 2021).

These benefits aside, AI in trade finance faces significant challenges. Cross-country regulatory fragmentation is a problem. In its Trading with Intelligence research, the WTO (2021) warns that poor AI and data

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governance policies raise financial institution costs and hinder SMEs. Additionally, banks and regulators face data privacy, algorithmic transparency, and cybersecurity issues (OECD, 2022).

Asian Development Bank (ADB, 2022) expects a USD 1.7 trillion global trade finance imbalance. AI might reduce transaction costs and improve risk ratings, helping small and medium-sized firms obtain trade finance. García-Herrero & Ng (2021) suggest that AI-driven systems may automate document verification and evaluate creditworthiness for enterprises with limited collateral. In developing nations, SMEs frequently lack the digital infrastructure and resources to benefit on these innovations (OECD, 2022). However, AI has several benefits. Automation may save time and money for banks that process millions of trade finance transactions annually, according to EY (2020). AI reduces compliance assessment false positives by improving anomaly identification and fraud prevention (IOSR, 2023). Trade finance system resilience may be improved via efficiency and risk management.

In trade finance, it's important to understand AI's promise and risks. Too much AI may lead to algorithmic bias, poor explainability, and systemic errors if not monitored (Goodman & Flaxman, 2017). Trade finance drives global trade, but it also faces fundamental obstacles. According to the Asian Development Bank (ADB, 2022), the global trade finance imbalance rose to USD 2.5 trillion from USD 1.7 trillion before the COVID-19 pandemic. The gap between trade credit demand and bank and financial institution capacity is seen here. Due to limited collateral and compliance skills, SMEs have far higher rejection rates than large firms (Business Standard, 2016). SME participation in international trade and fair economic growth are hindered by this inequality.

The inefficiency of paper-based trade finance processes is a major cause of this imbalance. International trade is hampered by tedious and costly letter of credit paperwork (WTO, 2020). For financial institutions, strict regulatory requirements—especially AML and KYC verifications—add to their workload. According to the ADB study, banks often reject SME trade loan applications due to compliance issues (ADB, 2022). Thus, some viable commercial transactions cannot be financed, impeding trade flows.

These issues can be solved using AI. Artificial intelligence can automate document verification, identify fraud, and construct predictive credit models to help financial organizations evaluate risk more quickly and cheaply (EY, 2020). Recently, AI was shown to improve transactional transparency and trade finance by simplifying paperwork (Ozturk, 2024). Despite pilot projects and starting adoption by numerous international organizations, AI in trade finance remains inconsistent and underexplored (ICC, 2021).

Research is driven by the gap between AI's promise and its application. AI's promise for efficiency, cost reduction, and inclusion is clear, but there is little empirical data on its effects on trade finance outcomes. OECD (2022) reports that data quality, regulatory harmonization, and digital infrastructure readiness hinder adoption. This research examines how AI might transform trade finance procedures, eliminate inefficiencies, and sustainably close the global trade finance deficit.

2.0. Literature Review

The literature review is based on the impact of Artificial Intelligence (AI) on trade finance processes. Other sub-topics were taken into consideration during the review.

2.1. Conceptual Framework
2.2. Key Challenges in Traditional Trade Finance Processes

The high expenses and delays that result from the use of manual, paper-based methods constitute one of the key challenges in the traditional financing of trade. The Organization for Economic Co-operation and Development (OECD) has shown that trade paperwork, a large number of intermediaries, and human verification all contribute to increased transaction costs and extended processing times, especially when crossing countries with divergent regulatory frameworks (Ferencz, López, & Oliván, 2022). The competitiveness of businesses is reduced, and the amount of time it takes to finalize agreements is extended, as a result of these inefficiencies.

Access to financial resources, especially for small and medium-sized firms (SMEs), is one of the most critical obstacles that these businesses face. Small and medium-sized firms (SMEs) may have challenges as a result of an insufficient amount of historical financial data, inadequate collateral, or an inability to fulfil the strict documentation and compliance rules (Cui, 2025). There are greater gaps in access to trade finance in areas

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that are typified by either regulatory uncertainty or insufficient digital infrastructure. In places that are still in the process of development, these constraints related to access accentuate inequalities in trade engagement and impede economic progress.

The difficulties that arise when attempting to estimate risk and address information asymmetry are an additional topic that is related. Financial institutions and providers of trade finance frequently face difficulties when it comes to accurately assessing credit or fraud risk. These challenges arise as a result of receiving information that is inadequate, delayed, or conflicting. This is especially true in the case of cross-border transactions, when confirming the origins of commodities, shipments, or counterparties is more difficult (OECD, 2022). Furthermore, the extensive compliance obligations—which include legislation regarding anti-money laundering and know-your-customer—increase expenditures and create delays, which ultimately discourages some smaller merchants from engaging in trade finance (Ferencz et al., 2022).

In the end, traditional trade financing is faced with a considerable obstacle in the form of regulatory complexity and the expenses associated with compliance. The study conducted by the OECD in 2021, which is titled "Trade finance in the COVID era: Current and future challenges," emphasizes that the development of laws, inconsistent implementation across nations, and the need for human compliance inspections increase risk and its associated costs. These legal limits hamper trade and disproportionately harm smaller enterprises that do not have the compliance capacity of bigger organizations (OECD, 2021).

2.3. Role of AI in Enhancing Efficiency, Compliance, and Risk Management

Artificial intelligence (AI) offers a great deal of promise for resolving a number of the problems that have been previously discussed. In particular, "The Impact of Artificial Intelligence on International Trade: Opportunities and Challenges," written by Ozturk in 2024, illustrates that artificial intelligence (AI) has the potential to automate risk assessment and document processing in trade finance, which would result in a reduction in the amount of human labour required and an increase in the transparency of transactions. Delays might potentially be minimized, and costs could be reduced, by these benefits, especially for businesses that are engaged in international trade (Ozturk, 2024).

Artificial intelligence (AI) approaches, including machine learning, pattern recognition, and predictive analytics, are utilized in risk management and fraud detection to spot anomalies that would be difficult to detect by hand. A comprehensive study on risk management in banking, conducted by Akinnagbe, Akintayo, and Adanna in 2025, reveals that artificial intelligence (AI) improves institutions' ability to detect fraud, evaluate credit risk, and monitor transactions in near real-time, while also making it easier for institutions to comply with regulatory standards (Akinnagbe et al., 2025).

Artificial intelligence improves the effectiveness of compliance. The policy paper "Artificial Intelligence and International Trade" (Ferencz et al., 2022), published by the Organization for Economic Co-operation and Development (OECD), contends that enterprises and regulators are able to monitor regulatory changes, automate compliance checks (such as anti-money laundering and know your customer checks), and maintain uniformity across jurisdictions with the assistance of technologies that are driven by artificial intelligence. It is possible that this will lower the manual costs that are connected with compliance and lessen the likelihood of errors or dangers arising from non-compliance.

In addition, empirical research has shown that the effectiveness of artificial intelligence applications is influenced by contextual factors such as the legal environment, the size of the organization, and the infrastructure. The meta-analytic study on Southeast Asia conducted by Cui (2025) demonstrates that the use of artificial intelligence results in a considerable improvement in both trade volumes and performance in regions that have a stable legislative framework and a digital infrastructure that is of high quality. Conversely, when these supporting aspects are not there, the benefits are reduced (Cui, 2025).

2.4. Benefits and Limitations of AI Adoption in Trade Finance

The automation of document management is a key benefit of using artificial intelligence (AI) in trade finance. Automated extraction, verification, and classification of information from trade documents, such as invoices and letters of credit, are made possible by technologies like Optical Character Recognition (OCR) and Natural Language Processing (NLP). These technologies significantly reduce manual errors and improve turnaround times (Ozturk, 2024). According to a comprehensive literature review on Chinese small and medium-sized

enterprises (SMEs), digital technologies such as artificial intelligence (AI) have the potential to reduce information asymmetry, improve coordination across supply chains, and lower transaction costs. These improvements have the potential to lead to increased access to capital for SMEs (Wang, 2024).

Risk assessment and fraud detection are improved with the use of artificial intelligence. Machine learning algorithms are capable of examining large quantities of data, pinpointing problems, and predicting defaults with a greater degree of accuracy than traditional approaches. In 2024, Karimova showed that a random forest model, which is a kind of machine learning model, outperformed traditional Delphi-based methods when it came to assessing the credit risk of small and medium-sized enterprises (SMEs). The random forest model was superior in terms of accuracy, precision, and recall. This demonstrates the potential of artificial intelligence to improve the reliability of credit risk management while simultaneously decreasing susceptibility to defaults and fraudulent activity.

Despite these benefits, artificial intelligence (AI) has major limitations when it comes to the quality of data and openness. In order to provide accurate outcomes, algorithms that are powered by artificial intelligence (AI) need significant amounts of data that is both representative and of the highest quality. It is possible that the data in a number of emerging countries is inadequate, biased, or fragmented, which might lead to inaccurate estimates or credit decisions that are not fair (Ozturk, 2024). Ethical concerns, such as algorithmic bias, explainability, and accountability, are of equal importance. The findings of a recent study conducted in Ghana on the use of artificial intelligence (AI) in financial reporting revealed problems related to professional autonomy, transparency of algorithms, and accountability when decisions are delegated to AI (Mensah, 2024). The need for both technical skill and financial resources is an additional limitation. The implementation of artificial intelligence requires investment in infrastructure, the recruitment of skilled workers, and the ability to interface with legacy systems that are already in place.

Small and medium-sized firms (SMEs) may not always have the financial and technical resources that are required to build and maintain AI systems, which might restrict the adoption of these systems to larger corporations and financial institutions (Cui, 2025). In addition to this, the fact that there is no interoperability with existing systems continues to be a problem, particularly in cross-border scenarios where technological standards differ from one country to the next.

2.5. Implications of AI for Banks, Corporates, SMEs, and Regulators

Banks that use artificial intelligence (AI) stand to benefit from considerable prospects for increased competitiveness and efficiency. The use of automated processes reduces operational costs, strengthens compliance via real-time Anti-Money Laundering (AML) and Know Your Customer (KYC) verifications, and improves the identification of fraudulent activity. In spite of this, banks are still required to implement robust governance systems that provide both data security and algorithm control. Yellen (2024) has issued a warning that relying too much on artificial intelligence without human oversight might pose systemic concerns to financial stability (Reuters, 2024).

There is an opportunity for businesses to make improvements to their logistics, increase the openness of their supply chain, and improve the accuracy of their trade forecasts by using artificial intelligence. When it comes to international transactions, these benefits allow businesses to keep expenditures and delays to a minimum (Ozturk, 2024). In addition, businesses are obligated to resolve issues such as the cost of integration, the reputational risks that arise from algorithms that are not easily understood, and the need of retraining employees in order to ensure that they can effectively engage with systems that are powered by artificial intelligence (Ozturk, 2024).

Increased inclusiveness has the potential to provide major benefits to medium-sized and small businesses. It is possible that financing for small and medium-sized enterprises (SMEs) that do not have significant collateral needs may be made easier via the use of artificial intelligence (AI)-based credit evaluation that incorporates alternative data, such as records of supply chains and histories of digital payments (Wang, 2024). Small and medium-sized enterprises (SMEs) face challenges that include high costs for implementation, a lack of technical expertise, and poor digital infrastructure (Cui, 2025), notwithstanding this. Unless help that is

specifically targeted to each company is provided, the benefits of artificial intelligence may continue to be monopolized by larger corporations.

Regulators are confronted with both opportunities and challenges as a result of the rise of artificial intelligence in trade finance. It is essential that regulators develop frameworks that strike a balance between innovation and accountability, with particular focus on algorithmic fairness, transparency, and data protection (Ferencz, López & Oliván, 2022). They are also faced with the problem of harmonizing rules across different nations in order to enable business between countries. The research that was conducted in Southeast Asia shows that strong institutions and regulatory clarity both improve the benefits of artificial intelligence (AI) adoption, but that weak frameworks hinder these advantages (Cui, 2025).

2.6. Theoretical framework

Technology Acceptance Model (TAM)

Davis (1989) created the Technology Acceptance Model (TAM), which explains how people embrace technology by taking into account two key factors: how easy it is to use and how useful it is judged to be. When it comes to trade finance, this implies that banks, companies, and small and medium-sized enterprises (SMEs) would be more receptive to the idea of adopting artificial intelligence (AI) if they believe that it will improve compliance and efficiency while still being simple to use. The Technology Acceptance Model (TAM) is a model that is used frequently in research on financial technology, which makes it a practical tool for assessing how users perceive artificial intelligence in trade finance (Venkatesh & Davis, 2000).

Transaction Cost Economics (TCE)

According to Transaction Cost Economics (TCE), a theory developed by Williamson in 1981, businesses use innovations in order to reduce the expenses that are connected with transactions, which include fraud, monitoring, and information asymmetry, among other things. Documentation and compliance are the primary foundations of traditional trade finance, which results in higher expenses and longer timescales. These expenditures are reduced with the use of artificial intelligence, which automates document verification, improves fraud detection, and optimizes processes. As a result, Transaction Cost Economics provides a strong justification for the use of artificial intelligence (AI) in trade finance (Rindfleisch & Heide, 1997).

Resource-Based View (RBV)

Barney (1991) was the one who presented the Resource-Based View (RBV), which argues that businesses get a competitive edge via the development of resources that are considered valuable, are in short supply, are one-of-a-kind, and cannot be replaced by other resources. It is possible that artificial intelligence technologies that are used in trade finance, such as predictive analytics, automated compliance, and fraud detection, would be considered to be strategic assets in the future. Small and medium-sized businesses stand to gain from the use of credit scoring powered by artificial intelligence in order to enhance financial accessibility, whilst companies and financial institutions that make effective use of artificial intelligence (AI) may be able to cultivate unique capabilities, regardless of how little such competencies may be (Wade & Hulland, 2004).

2.7. Empirical Review

Empirical research indicates that the use of AI in trade finance may significantly enhance efficiency by decreasing processing durations and mitigating human mistakes. Wang (2024) conducted an extensive literature review of Chinese small and medium-sized enterprises (SMEs) and found that digital technologies, including artificial intelligence (AI), lowered transaction costs, improved coordination of the supply chain, and made it easier to get trade financing. The claim that inclusive and efficient financial alternatives are improved by the automation of trade documentation and verification via the use of artificial intelligence (AI) is supported by these findings.

Through empirical observation, it has been shown that artificial intelligence (AI) is correlated with advances in the assessment of credit risk. Karimova (2024) carried out an investigation in Azerbaijan utilizing machine learning techniques for SME credit evaluation and found that a random forest model outperformed standard Delphi-based models in terms of both accuracy and precision. This demonstrates the ability of artificial intelligence (AI) to lessen the risk of default while also making it easier to make financing decisions that are more predictable in situations where small and medium-sized enterprises (SMEs) are often denied finance because they lack appropriate collateral.

In addition to that, the incorporation of artificial intelligence has improved the identification of fraudulent activities and compliance. According to Ozturk (2024), the use of anomaly detection algorithms in artificial intelligence systems improved the detection of transactions in trade finance that were not typical, which in turn reduced the likelihood of fraud. In a similar vein, EY (2020) highlighted in an industry survey that banks that used artificial intelligence (AI)-driven compliance systems had reduced expenditures and accelerated verifications for Anti-Money Laundering (AML) and Know Your Customer (KYC) protocols. The integrity of trade finance systems can be strengthened by artificial intelligence, as these empirical findings show, and this technology may also help improve regulatory compliance.

In spite of the fact that these findings are encouraging, there are a number of empirical studies that highlight the long-standing barriers that prevent adoption from becoming more widespread. Cui (2025), in a meta-analysis that looked at the impact of artificial intelligence on commerce in Southeast Asia, made the observation that the effect that AI has on trade facilitation is significantly influenced by the state of the infrastructure, the level of digital literacy, and the clarity of the regulations. In the context of financial reporting for small and medium-sized enterprises in Ghana that is based on artificial intelligence, Mensah (2024) brought up ethical issues, such as openness and accountability of decisions made by artificial intelligence. These findings suggest that while artificial intelligence (AI) has the potential to lead to revolutionary changes, problems pertaining to data, governance, and institutional readiness need to be addressed in order to ensure that its adoption is equitable.

3.0. Methodology

In order to evaluate the impact that artificial intelligence (AI) has on operations related to trade finance, this study used a mixed methods approach, which combined secondary data analysis with primary survey evidence. In addition to peer-reviewed articles that were published between the years 2020 and 2025, studies conducted by the Asian Development Bank (ADB), the World Trade Organization (WTO), the International Chamber of Commerce (ICC), and the Organization for Economic Co-operation and Development (OECD) provided the secondary data that were used for this research.

The primary data were gathered from 120 individuals who took part in an online survey. These participants included regulators from around Asia and Africa, small and medium-sized enterprise (SME) exporters, and officials from commercial banks that work in trade financing. In order to collect data on the opinions of respondents on the effect of artificial intelligence (AI) on efficiency, compliance, and risk management, a systematic questionnaire was used. The data were analyzed by means of descriptive statistics, which included percentages and averages, and theme analysis, which was used for qualitative responses.

The purpose of method integration was to triangulate findings, which is why the decision was made to integrate methods. Secondary data provided in-depth information on trade finance shortfalls and artificial intelligence implementations, while the survey provided contextual awareness of real-world adoption and related issues.

4.1. Results

Table 1: Perceived Benefits of AI in Trade Finance (n = 120)

Benefit Identified	Percentage (%)	Mean Score (1–5 scale)
Faster document processing	82%	4.3
Improved fraud detection	76%	4.1
Enhanced credit risk assessment	71%	3.9
Reduced compliance costs	65%	3.7
Better SME access to financing	58%	3.5

Source: Survey Data, 2025

The table shows the key benefits of AI integration in trade finance as reported by survey respondents (n = 120). Expedited document processing and improved fraud detection received the highest ratings, indicating significant perceived advancements in efficiency and security; yet, increased financial access for SMEs was seen as a minor but noteworthy advantage.

Table 2: Key Challenges in AI Adoption (n = 120)

Challenge Identified	Percentage (%)	Mean Score (1–5 scale)
High cost of implementation	68%	3.9
Lack of technical expertise	64%	3.8
Data privacy/security concerns	61%	3.7
Regulatory uncertainty	55%	3.5
Limited SME digital readiness	52%	3.3

Source: Survey Data, 2025

The table illustrates the main problems related to AI implementation in trade finance (n = 120). Significant implementation expenses and insufficient technical proficiency surfaced as the primary obstacles, followed by apprehensions over data security, legislative ambiguity, and the digital preparedness of SMEs.

4.2. Discussion of Findings

The findings suggest that the majority of the benefits that come from using artificial intelligence in trade finance are related to increases in efficiency. Ozturk (2024) emphasized that artificial intelligence (AI) can automate and digitize trade papers. This was further supported by the fact that the majority of respondents (82%) regarded faster document processing as the key benefit of artificial intelligence (AI) in trade. In a similar vein, the increases in fraud detection and credit risk, which were stated by 76% and 71% of respondents, respectively, are in agreement with the empirical results of Karimova (2024), who revealed that machine learning models exceeded traditional scoring methodologies in SME financing.

However, the results bring attention to the significant challenges that come with using artificial intelligence. The main impediments to the adoption of artificial intelligence in Southeast Asia were considered to be substantial implementation expenses (68%) and a lack of technical expertise (64%). These findings are consistent with the results of Cui (2025), who determined that restricted infrastructural and digital capability are obstacles to the adoption of AI in Southeast Asia. Mensah (2024) has expressed concerns over the issues of transparency and accountability in financial reporting that is driven by artificial intelligence. These concerns are mirrored in the substantial amount of legal uncertainty that exists in this area, as well as in the level of importance that is placed on data privacy.

It is worth mentioning that while 58% of those who responded to the survey recognized that artificial intelligence (AI) had the potential to improve access to capital for small and medium-sized enterprises (SMEs), same respondents were more likely to cite efficiency-related benefits as the primary reason for their support of AI. This suggests that despite the fact that artificial intelligence has the potential to improve inclusion, structural barriers, such as the lack of adequate digital readiness among small and medium-sized businesses, continue to stand in the way of achieving equitable adoption. The findings of this study support the Transaction Cost Economics (TCE) paradigm, which suggests that artificial intelligence (AI) lowers trade costs but that its widespread impact may be restricted due to uneven adoption rates.

5.1. Conclusions

The impact of artificial intelligence (AI) on trade finance operations was the subject of the investigation, which placed a focus on efficiency, compliance, risk management, and inclusivity. The findings demonstrate that artificial intelligence (AI) is a valuable tool for automating paperwork, improving fraud detection, and refining credit risk assessment, which leads to a reduction in inefficiencies in traditional trade finance. Nevertheless, adoption is uneven because to challenges that include, but are not limited to, the high cost of implementation, a lack of technical expertise, concerns over the protection of data, and ambiguity in the legislation. Small and medium-sized enterprises (SMEs) are facing structural barriers that are limiting their participation, despite the fact that financial institutions and companies are making progress in the implementation of artificial intelligence (AI). Artificial intelligence has the potential to significantly lower the global trade finance gap; however, its effectiveness is dependent on eliminating structural barriers and encouraging fair adoption.

5.2. Recommendations

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1. **For Banks:** Invest in AI-driven solutions for document processing, compliance, and risk management, while maintaining robust oversight and transparency in algorithm utilization.
2. **For Corporates:** Incorporate AI into supply chain and trade finance operations to save expenses and enhance transaction transparency, while training personnel to adjust to digital processes.
3. **For SMEs:** Utilize AI-based credit scoring and alternative financing platforms to get trade finance, bolstered by collaborations with fintech companies and development institutions.
4. **For Regulators:** Establish unified regulatory frameworks that ensure AI transparency, accountability, and data protection, while promoting cross-border innovation.
5. **For Policymakers/Development Banks:** Deliver focused assistance to SMEs via investments in digital infrastructure, enhancement of capabilities, and subsidized access to AI-driven trade financing platforms.

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