Asia Pacific Science Press

Asia Pacific Economic and Management Review
ISSN(O):3005-9275
ISSN(P):3005-9267
Vol. 2 No.3 (2025)

Research on the Risks and Strategies of 'Trust and Safety' in the Context of Platform Economy: Based on the Perspective of Fuzzy Analytic Hierarchy Process

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Abstract: The platform economy is centered around digital platforms, leveraging advanced capabilities in data collection, transmission, computation, processing, and algorithms to create and exchange value. It represents a new form of digital economic circulation. Compared to the traditional linear economic model, the platform economy exhibits a cyclical trend, facilitating transactions, communication, and value creation through digital platforms. Previous studies have shown that, as a space for communication across time and space, it organizes trust among individuals and determines which trust is reliable to achieve interaction and communication goals. Therefore, trustworthy security providers are crucial. Based on this, this paper constructs a risk indicator system for "Trust and Safety (T&S)", considering the contribution value of each indicator's evaluation. The Analytic Hierarchy Process (AHP) is used to calculate the weights of the indicators, and normalization is applied to conduct pairwise comparisons and provide quantitative descriptions of the different indicators. Based on the principle of maximum membership degree, a Fuzzy Analytic Hierarchy Process (FAHP) indicator system is applied. Through fuzzy evaluations by experts, a specific set is chosen from multiple fuzzy sets as the decision result. The analysis reveals that the model addresses the differences in the trust and safety impacts on the platform economy from different evaluation objects, with discourse and algorithmic mechanisms having the greatest influence on the platform economy.

Keywords: Platform Economy; Trust and Safety; Strategic Research; Fuzzy Analytic Hierarchy Process (FAHP)

Published: May 23, 2025

DOI: https://doi.org/10.62177/apemr.v2i3.347

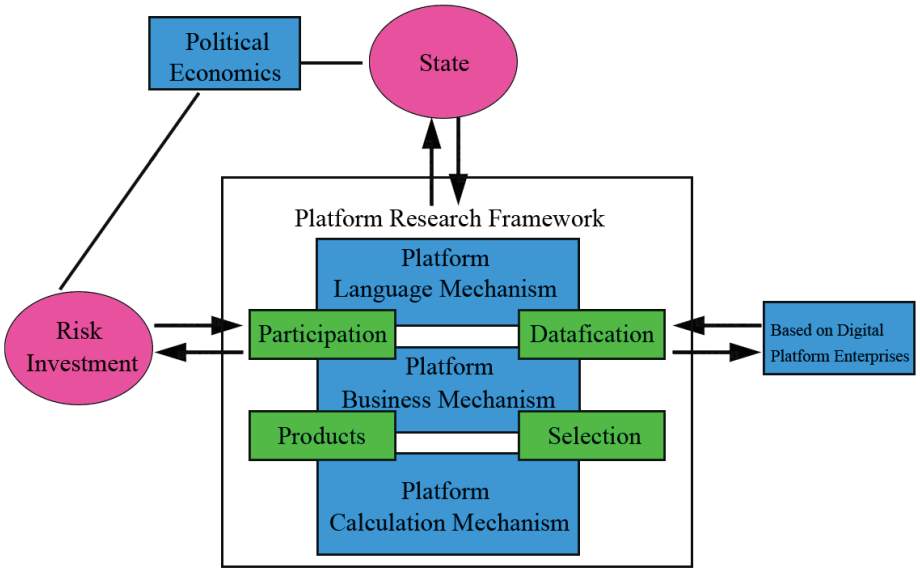
1.Introduction

The platform economy is the core of platform capitalism. It involves connecting service providers and consumers through digital platforms, using data as a resource, "digital labor" as productivity, and the value of the internet as the structure of a new interest-circulation network[1].

The platform economy reflects the central role of digital technologies in modern market transactions and drives disruptive changes in economic models[2]. Trust and Safety (T&S), as a barrier of digital platforms, raises the question: when individuals are required to provide personal information to use services on platforms such as apps, should they refuse outright or reluctantly accept? Digital platforms seem to have reached a consensus and are tightly interconnected, attempting to make these unequal conditions an inevitable foundation[3]. The transformative impact of the platform economy on politics, society, and the economy is now self-evident. Today, most believe that the platform economy raises key issues regarding the ongoing

transformation of capitalism and its evolving social relations, including private governance advocating for free speech, algorithmic regulation of the internet, unrestricted control over data, general deletions, the ethics of artificial intelligence and machine learning, and the displacement of social jobs by digital automation. While each of these issues is significant, they represent only a part of a larger concern: the platform economy accumulates wealth and utilizes its value through "data governance," which, in the context of intensifying economic conditions, prioritizes profit over democracy and is not fully democratized. Based on Western experience, platform capitalism has its own peculiarities, which are rooted in historical causes and are also related to contemporary political and economic changes. The interaction between platform companies, various levels of government, digital platform-based enterprises, and venture capital has collectively shaped the current platform-based capitalism[4]. While there is a growing recognition of the "concentrated audience power" of the internet, under limited regulation and weak governance of the online space, individuals' perception of the trade-off between risks and rewards has not yet resulted in an environment that is both protective and open. It is necessary to analyze a platform paradigm to explore how algorithms, business practices, and discursive mechanisms intersect with venture capital, digital platform-based enterprises, and the evolving political and economic forces, thus forming the practical relationship between state, platform, and capital, as illustrated in Figure 1[5]. Based on this, enhancing platform trust and safety is essential to ensure that the behaviors of online audiences can have a positive impact on social and economic development.

Fig. 1 : Comprehensive Research Methodology of Platformization



2.Literature Review

Recent academic studies have extensively explored the trust and safety mechanisms of the platform economy.This study briefly outlines aspects in which it differs from previous research.

The widespread adoption and significant characteristics of the platform economy have made it an indispensable tool in contemporary life, contributing to maintaining economic and social balance.The advent of the platform economy era has enhanced people's awareness of trust protection and provided new avenues for their participation in trust protection activities. Additionally, we have adjusted our quantification system to incorporate more comprehensive behavioral approaches covering all stages of trust and safety.Recent studies have demonstrated that implementing trust and safety mechanisms helps reduce platform system failures, enhance efficiency, and optimize the utilization of existing platform resources, thereby promoting economic consumption.However, some studies have also indicated that these mechanisms may pose risks to personal data privacy.The utilization of trust mechanisms and security technologies driven by technological advancements can enhance economic consumption and payment efficiency.Taking Chongqing Benjing Technology Co., Ltd. as a case study, this research analyzes how the company leverages platform economy policies to achieve sustainable economic growth through trust mechanisms and security systems, providing insights for other technology enterprises.The research confirms that user demands and market dynamics are crucial for sustainable economic benefits within the platform economy.

2.1 Trust Mechanisms in the Platform Economy

User demand is the lifeblood of the platform economy. In his study on users' access to information, Must's Law reveals that "an information system engine, if it does not respond to users' information requests instantly, will fail to support users." This highlights that user support is a critical aspect of trust[6]. Trust behavior is inherently social. The subject of this behavior (the user) is social, and the objectives, targets, and methods of the behavior are all shaped by the social environment in which it occurs[7]. With the arrival of the AI era and the widespread application of digital interaction technologies, on the one hand, they provide strong technical support for the platform economy, leading to greater economic benefits; on the other hand, they disrupt the traditional point-to-point trust-building mechanisms, prompting platform capital to establish new trust mechanisms to overcome information barriers[8].Platforms such as "ChatGPT," "Google," and "Amazon," as leaders in the platform economy sector, have loyal users and strong brand trust[9].Some scholars, in their research on platform customer loyalty, have developed the idea that brand image and trust positively influence users' brand trust in the platform, which in turn positively impacts user loyalty, thereby enhancing their willingness to participate in value co-creation on the platform[10]. Other scholars, after studying social platforms, found that once users trust the platform's brand, it positively influences their attitude toward participating in value co-creation, thus increasing their willingness to consume[11].In the triangular interaction between the platform economy, media, and users, all parties influence and depend on each other. The platform, as the builder and manager, and the media, as the regulatory and promotional vehicle, are the main creators of a healthy platform ecosystem. However, the trust environment may undergo significant changes due to interference from various stakeholders, which has attracted increasing attention. The platform influences users' media exposure, allowing users to assess the platform based on its reputation, make preemptive judgments, and influence consumption behavior. Users' perception of media trust is partly derived from the platform's public opinion effects[12]. Issues such as insufficient privacy protection and low efficiency in offline identity verification persist in user information authentication, increasing users' perceived uncertainty toward the platform. In summary, users' willingness to participate in trust-based value co-creation on the platform is influenced by four factors: platform reputation, customer support, media attention, and online identity verification.

2.2 Security Mechanisms in the Platform Economy

The primary purpose of vulnerability scanning on digital platforms is to identify and fix potential security issues, thereby enhancing system security[13].However, vulnerability scanning itself can introduce risks and dangers, especially if it is not properly managed or is misused. If the vulnerability scanning tools are improperly configured or poorly managed, the scanning process itself may be exploited maliciously. For example, attackers could use the data traffic generated during the scan to launch attacks or exploit flaws in the scanning tools to infiltrate the system[14]. Platform security incidents can lead to direct financial losses for users, such as ransom payments following data theft. After a security breach is made public, user trust declines sharply, and the damage to the platform's image is often difficult to recover quickly, affecting both customer loyalty and the acquisition of new customers[15]. Identifying potential security vulnerabilities is typically done through vulnerability scanning software, penetration testing, and user reports. Regularly conducting these checks is key to preventing security issues[16]. When a platform is compromised by a cyber intrusion, it means that unauthorized individuals or organizations have successfully breached the platform's security defenses[17]. Such an intrusion can lead to serious security incidents, impacting platform operations, user data security, and the company's reputation. In such cases, prompt response and isolation of affected systems to prevent further data breaches or damage is critical[18].

2.3 Compliance in the Platform Economy

Jessica Basukie et al. selected multiple countries from Africa, Asia, and the Pacific region as samples to analyze the positive impact of compliance on the platform economy.Through qualitative content analysis, the study found that regulatory mechanisms enhance the reliability, intelligence, and security of the platform economy, thereby fostering economic growth. Regulatory fairness reduces industry monopolies and promotes market diversification[19].Zhang Tao et al. argue that in the era of "Internet Plus," e-commerce and digital marketing have brought revolutionary transformations to the platform economy. The researchers employed the Durbin model to analyze the relationships among digital marketing, e-commerce, and the platform economy across 30 Chinese provinces.The study indicates that the openness of business mechanisms, along with

their broad influence, immediacy, interactivity, intelligence, and information-sharing capabilities, facilitates the formation of payment-friendly practices[20].In a study of emerging countries, Karolina Mikołajewska-Zając found evidence of a positive relationship between discourse mechanisms and platform reputation.However, a few studies indicate that negative news surrounding discourse mechanisms exacerbates the complexity of dispute resolution.This transformation has led to an increase in disputes and has negatively impacted platform systems[21].For instance, Kitae Kim et al. utilized annual report data from various regions in South Korea.Their research suggests that an inverted U-shaped relationship exists between excessive reliance on user preference algorithms and disputes.In the early stages of algorithmic mechanisms, their high intensity of use and low cost may instead lead to severe issues of excessive online data collection[22].Similarly, Edouard Pignot et al. examined the impact of algorithmic mechanisms on resource acquisition patterns in the platform economy.Contrary to expectations, the study found that excessive expansion of algorithms to acquire prospective user information or analyze user preference data increases the level of information resource acquisition[23].Likewise, Muhammad Khan et al. argue that customer information traceability is a positive outcome of improved compliance in the platform economy[24].

2.4 Demand in the Platform Economy

We anticipate that user demand will significantly drive the growth of the platform economy.The increase in users, along with the expansion of enterprises' market shares, has introduced additional instability into the platform economy, underscoring the importance of trust and security.Researchers have conducted multiple assessments to explore the relationship between user demand and trust and security[25].S. Sicari et al. examined the influence of social factors, income, and information accessibility on user demand in Canada.According to their findings, an increase in social consensus and income levels is closely associated with greater use of information platforms, while enhanced information accessibility contributes to higher business transaction volumes.Their empirical study indicates that both information accessibility and economic structural adjustments contribute to the stable economic growth of enterprises.Additionally, Huai Cao et al. investigated the correlation between GMV and user demand.The study suggests that the total transaction volume of goods and services on the platform significantly influences users' willingness to engage.Moreover, their comparative analysis reveals that, compared to other regions, the eastern region demonstrates higher efficiency in product scaling and enterprise engagement with transaction platforms[26].Similarly, Mohd Johan et al. examined the impact of user retention rates on Malaysian users' willingness to participate in the platform economy.According to their empirical research, user retention enhances both willingness to use the platform and customer loyalty[27].

Additionally, the authors emphasize the need for collaboration between the public and commercial sectors to replace outdated, cumbersome multi-verification technologies with an innovative trust and security system.Such collaborations are expected to facilitate the development of high-efficiency platform technologies for enterprises.Bob Feinberg and Maurizio Zanardi examined the relationship between economic cooperation, organizational trust and security, and economic growth[28]. We recommend that service-oriented enterprises increase their investment in platform technologies to foster economic growth and enhance user loyalty, a recommendation supported by case evidence.This approach may help mitigate negative media coverage.Heejeong Jeong et al. investigated the impact of trust and security on the relationship between innovative enterprises and user registration rates.The researchers found a significant negative correlation between user preference algorithms and user retention rates, indicating that users place high importance on information protection[29].This finding suggests that enterprises can enhance user loyalty by strengthening technologies for user information security.Their empirical study demonstrates that trust and security play a crucial role in the long-term economic development of innovative enterprises. They suggest that innovative enterprises should drive technological advancements in trust and security to achieve long-term economic growth objectives and foster development.

3.Construction of an Indicator System Based on FAHP

The platform economy has become the primary channel for capital to collect data. Capitalists analyze data through platforms, transforming general data into economically valuable data commodities, thereby realizing the capital value of data.Use the equation editor to show each equation. In this process, platform companies become the main possessors and beneficiaries of data[30].The separation between digital labor, data ownership, and its profits has become increasingly apparent. Constructing

a “Trust and Security” indicator system for the platform economy is a prerequisite for ensuring platform operations and information security.

3.1 Construction of the Indicator System

Through a comprehensive analysis of the risk factors associated with “Trust and Security,” and considering the characteristics of the platform economy, it is essential to not only account for business needs but also evaluate data reliability and managerial operability to ensure that the indicator system can effectively support the development and management of the platform economy.This paper, based on the “Comprehensive Research Methodology of Platformization,” selects indicators that can comprehensively assess the risks in the platform economy.It establishes a “Trust and Security” indicator system for the platform economy, consisting of three primary indicators, nine secondary indicators, and twenty-nine tertiary indicators, as shown in (Table 1).

Table 1 Platform Economy ‘Trust and Security’ Indicator System

Primary Indicator	Secondary Indicators	Tertiary Indicators	Indicator Explanation
Platform Indicator	Security	Vulnerability Scan Reports (Number)	Regularly conduct vulnerability scans to monitor the number, types, and severity of vulnerabilities in systems and applications.
		Number of Security Incidents (Count)	Track and record the number of cybersecurity incidents, including intrusions, attacks, and data breaches.
		Time to Fix Security Vulnerabilities (Hours)	Monitor and assess the time taken to fix security vulnerabilities after their discovery, ensuring prompt response and resolution.
		Intrusion Detection Rate (%)	Monitor and evaluate the performance and effectiveness of intrusion detection systems (IDS/IPS), including intrusion detection rate and false positive rate.
	Trust	Online Identity Verification (Yes/No)	Whether the website offers multi-factor authentication, single sign-on, or other security verification mechanisms.
		Media Attention (Yes/No)	The level of attention and activity on social media platforms, including follower count and interaction frequency.
		Customer Support (Yes/No)	The types of customer support offered by the website, response time, and whether satisfactory solutions are provided.
		Platform Reputation (Excellent/ Good/Fair/Poor)	The reputation index of the website, including user reviews, ratings, and comments.
Compliance Indicators	Speech Mechanism	Freedom of Expression (Yes/No)	Allow individuals and organizations to freely express opinions, views, and information on the internet.
		Information Traceability (Yes/No)	The source and dissemination path of any information can be traced back to the original publisher, ensuring transparency and authenticity.
		Dispute Resolution Mechanism (Yes/No)	Providing various dispute resolution methods, such as mediation bodies and complaint platforms, to handle disputes and conflicts.
	Business Mechanism	commerce Platform (Yes/No)	Offering features such as product display, order management, and payment settlement.
		Digital Marketing (Yes/No)	Using internet and digital channels for marketing, including search engine marketing (SEM) and social media marketing.
		User Experience Optimization (Yes/No)	Enhancing user experience and satisfaction on internet business platforms, including website interface and interaction design.

Primary Indicator	Secondary Indicators	Tertiary Indicators	Indicator Explanation
Compliance Indicators	Algorithm Mechanism	Data Analysis (Yes/No)	Using big data and data mining technologies to analyze and predict user behavior and market trends.
		Dynamic Pricing Algorithm (Yes/No)	Adjusting the pricing of goods or services dynamically based on changes in market supply and demand and user behavior.
		Ranking Algorithm (Yes/No)	Ranking goods, services, or users to provide the most relevant and valuable content or information to users, promoting transactions.
	Regulatory Mechanism	Industry Standards (Yes/No)	Promoting relevant industry standards, such as e-commerce industry standards and online payment industry standards.
		Antitrust Regulation (Yes/No)	Regulating and combating monopolistic behavior, maintaining market competition, and protecting the rights of small and medium-sized enterprises and consumers.
		User Service Regulation (Yes/No)	Regulating user service quality, providing effective complaint handling mechanisms, and ensuring customer service protection.
Demand Indicators	User	User Activity Rate (%)	Including daily active users (DAU), monthly active users (MAU), and other indicators.
		User Growth Rate (%)	Measuring the growth rate of new users, including registered and newly added users.
		User Retention Rate (%)	Measuring user loyalty and stickiness, considering 30-day retention rate.
	Enterprise	Transaction Frequency (%)	Measuring user purchase frequency and transaction activity, including average monthly transactions per user.
		Gross Merchandise Volume (Ten Thousand Yuan)	Total transaction value of goods, reflecting the overall transaction scale of goods or services on the platform.
		Market Share (%)	Measuring the platform's market share and competitive position in the relevant market.
	Transaction	Transaction Volume (Count)	Reflecting the transaction activity on the platform, including transaction amount, order quantity, and volume.
		Transaction Frequency (%)	Measures the purchase frequency and transaction activity per 100 users, including the average number of transactions per user per month.
		Platform Revenue and Profit (Ten Thousand Yuan)	Reflecting the platform's profitability and the sustainability of its business model.

3.2 Establishment of the Analytic Hierarchy Process (AHP) Model

The basic concepts of the AHP method include three analytical principles.Within the framework of the hierarchical structuring principle, a logically interconnected indicator structure is created[31].The priority principle involves making pairwise comparisons across all evaluation levels.Pairwise comparisons are made based on proportions, and the resulting values are used by peer experts to create a new matrix.The logical consistency principle involves measuring the strength of consistency between objectives, criteria, and variables.Pairwise comparisons are made within the matrix to obtain the weight vector for each level[32].The indicator weights are determined, and the overall score is calculated in conjunction with the model.This method combines the advantages of both fuzzy comprehensive evaluation and AHP, avoiding the redundant steps of the two methods.Therefore, this paper uses the fuzzy AHP method to determine the weights of the indicator system. For a complex multi-rule evaluation problem, the evaluation indicators and objects are divided into hierarchical levels. Pairwise

comparisons are made within the same level of elements, forming a fuzzy judgment matrix.

$$A=\begin{bmatrix} \alpha_{11} & \alpha_{12} & \cdots & \cdots & \alpha_{1n} \\ \alpha_{21} & \alpha_{22} & \cdots & \cdots & \alpha_{2n} \\ \cdots & \cdots & \alpha_{ij} & \cdots & \cdots \\ \cdots & \cdots & \cdots & \cdots & \cdots \\ \alpha_{n1} & \alpha_{n2} & \cdots & \cdots & \alpha_{nm} \end{bmatrix} \tag{1}$$

In the matrix, represents the relative importance of A_i compared to A_j. If A_i is more important, then > 1; if both are equally important, then = 1.To calculate the weight vector of the indicators, the first step is to normalize the matrix using the following formula.

$$\overline{a_{ij}}=\frac{a_{ij}}{\sum_{i=1}^{n} a_{ij}} \quad (i,j=1,2,\cdots n) \tag{2}$$

Here, α_{ij} represents the data in the *i*-th row and *j*-th column of the judgment matrix *A*, and $\overline{\alpha_{ij}}$ represents the data in the *i*-th row and *j*-th column of the normalized matrix.

$$\overline{w_i}=\sum_{j=1}^{n}\overline{a_{ij}} \quad (i,j=1,2,\cdots n) \tag{3}$$

The third step is to normalize $\overline{w_i}$ in the above equation, where w_i represents the weight of the *i*-th indicator.

$$w_i=\frac{\overline{w_i}}{\sum_{i=1}^{n}\overline{w_i}} \quad (i=1,2,\cdots n) \tag{4}$$

The fourth step is to calculate the largest eigenvalue of the judgment matrix *A*.

$$\lambda_{\max}=\frac{1}{n}\sum_{i=1}^{n}\frac{(Aw)_i}{w_i} \tag{5}$$

Here, *n* represents the order of the matrix, *A* is the judgment matrix, w_i is the weight of the *i*-th indicator, and $\lambda_{\max}$ is the largest eigenvalue of matrix *A*.Consistency check: The obtained vector and eigenvalue are subjected to a consistency test. If the test is passed, it means the judgment matrix is reasonable and has explanatory value.Let *CI* represent the consistency index, and the following is the calculation method, with results shown in (Table 2).

$$CI=\frac{\lambda_{\max}-n}{n-1} \tag{6}$$

By using the value of *n*, the *RI* value can be obtained, thus allowing the calculation of the consistency ratio, i.e., $CR=\frac{CI}{RI}$, When $CR < 0.1$, the test is considered to meet the requirements.

Table 2 Average Random Consistency Index (RI)

N	1	2	3	4	5	6	7	8	9	10	11
RI	0	0	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49	1.51

Here, for 1st and 2nd-order judgment matrices, *RI* is purely formal, as these matrices always exhibit perfect consistency. When the order is greater than 2, the ratio of the consistency index *CI* of the judgment matrix to the corresponding average random consistency index *RI* is called the random consistency ratio, denoted as *CR*.When $CR < 0.1$, the judgment matrix is considered to have satisfactory consistency; otherwise, the matrix needs to be adjusted to achieve satisfactory consistency.

3.3 Construction of the Judgment Matrix and Calculation of Weights

After constructing the comprehensive evaluation system for platform economy based on “Trust and Security,” a weight judgment matrix is established using the fuzzy analytic hierarchy process (FAHP). Expert scoring is then applied to assess the importance of each indicator in the judgment matrix, using a 1-9 scale.Experts in the field are selected to score the importance of each indicator, followed by internal discussion and summarization of the results. The pairwise comparison matrix is shown in (Table 3).

Table 3 Discriminant Matrix

	Platform Indicator	Compliance Indicators	Demand Indicators
Platform Indicator	1.0000	1.4310	2.1689
Compliance Indicators	0.6988	1.0000	1.7826
Demand Indicators	0.4611	0.5610	1.0000

First, calculate the largest eigenvalue $\lambda_{\max} = 3.0030$ of the judgment matrix.Next, perform a consistency test, which requires calculating the consistency index *CI*:

$$CI = \frac{\lambda_{\max} - n}{n-1} = \frac{3.0030 - 3}{3-1} = 0.0015$$

Average Random Consistency Index $RI = 0.58$.Random Consistency Ratio:

$$CR = \frac{CI}{RI} = \frac{0.0015}{0.58} = 0.0026 < 0.10$$

Since *CR* is less than 0.1, the construction of the judgment matrix is considered reasonable. Using this method, the consistency tests for all other judgment matrices at each level have been passed.

Table 4 Weight of Indicators at Each Level

Primary Indicator	Weight	Secondary Indicators	Weight	Tertiary Indicators	Weight	Composite Weight or Overall Weight
Platform Indicator	0.4598	Security	0.5	Vulnerability Scan Reports	0.2964	0.068142
				Number of Security Incidents	0.5084	0.116881
				Time to Fix Security Vulnerabilities	0.1157	0.026599
				Intrusion Detection Rate	0.0795	0.018277
		Trust	0.5	Online Identity Verification	0.4317	0.099248
				Media Attention	0.0947	0.021772
				Customer Support	0.1799	0.041359
				Platform Reputation	0.2937	0.067522
Compliance Indicators	0.3393	Speech Mechanism	0.2139	Freedom of Expression	0.3124	0.022673
				Information Traceability	0.5675	0.041187
				Dispute Resolution Mechanism	0.1201	0.008716
		Business Mechanism	0.1071	commerce Platform	0.2931	0.010651
				Digital Marketing	0.144	0.005233
				User Experience Optimization	0.5629	0.020455
		Algorithm Mechanism	0.4652	Data Analysis	0.4333	0.068393
				Dynamic Pricing Algorithm	0.4333	0.068393
				Ranking Algorithm	0.1335	0.021072
		Regulatory Mechanism	0.2139	Industry Standards	0.2632	0.019102
				Antitrust Regulation	0.6056	0.043952
				User Service Regulation	0.1312	0.009522

Primary Indicator	Weight	Secondary Indicators	Weight	Tertiary Indicators	Weight	Composite Weight or Overall Weight
Demand Indicators	0.201	User	0.1907	User Activity Rate	0.1544	0.005918
				User Growth Rate	0.5271	0.020204
				User Retention Rate	0.3184	0.012204
		Enterprise	0.3064	Transaction Frequency	0.1543	0.009503
				Gross Merchandise Volume	0.5302	0.032653
				Market Share	0.3155	0.019431
		Transaction	0.5029	Transaction Volume	0.2471	0.024978
				Transaction Frequency	0.1275	0.012888
				Platform Revenue and Profit	0.6255	0.063227

The results show that the total weight of the demand indicator (0.201) is significantly lower compared to the platform indicator (0.4598) and the compliance indicator (0.3393).This indicates a lack of emphasis on user and transaction demands in the overall evaluation system.In the platform economy, user demands and market dynamics are crucial for sustainable economic benefits.

4.Discussion of Results

4.1 Analysis of Platform Strategies

In August 2021, Accenture was hit by a LockBit ransomware attack, resulting in the leakage of 6TB of data. At the same time, the renowned IT solutions provider Kaseya was also attacked, impacting its services and customers.Capital One suffered a data breach affecting over 100 million customers due to a misconfiguration in its firewall.Multiple zero-day vulnerabilities in Microsoft Exchange Server were exploited.These security incidents highlight the security challenges faced by global digital platforms during their digital transformation.At the same time, they remind us that while the platform economy brings significant benefits, it also requires us to focus on platform cybersecurity to protect sensitive data, maintain user trust, and ensure the stability of the platform economy.Both security and trust are equally important. Among the security sub-indicators, the number of security incidents holds the highest weight (0.117), indicating that the frequency of security incidents is a key factor in measuring platform security.Beyond these cases, the emergence of AI-generated models such as DALL-E and ChatGPT has enabled criminals to mass-produce fake yet credible identities, facilitating scams under legitimate guises, as seen with telecom fraud rings in Southeast Asia.Banks and financial institutions need to adopt advanced authentication and verification technologies to combat such fraud, including document verification, identity graph analysis, and behavioral biometrics.Additionally, collaborative data-sharing initiatives can help uncover synthetic identity patterns across institutions. Among the trust sub-indicators, online identity verification holds the highest weight (0.093), emphasizing the core role of verifying user identity in establishing platform trust.

4.2 Analysis of Compliance Strategies

In the platform economy, big data algorithms do not always yield positive results and can sometimes have negative consequences.For example, Amazon was exposed for using an automated recruitment tool, which was found to be discriminatory against women during the resume screening process.This system disadvantaged female applicants for technical positions because it favored resumes reflecting the gender ratio in the company's technical roles, which were predominantly male.The tool even lowered the scores of resumes mentioning words like "female" (e.g., "women's rugby team") while boosting the scores of resumes using male-leaning language such as "executive" and "capture."Amazon discontinued the use of the tool after realizing that the issue was difficult to resolve, but many other companies may still be using similar flawed recruitment tools.Additionally, IBM mentioned in its discussion of AI bias that AI biases reflect existing societal prejudices, including historical and current social inequalities.For instance, if a facial recognition algorithm's training data is racially

biased, it may produce errors when attempting to recognize the faces of people of color.Furthermore, if the security data used by AI tools deployed by law enforcement contains information collected from racially biased geographical areas, it may introduce racial biases into the AI tool.

These cases indicate that big data algorithms, if not carefully designed and regulated, may replicate or even amplify existing societal biases.Therefore, to ensure the fairness of AI systems, it is necessary to rigorously examine and test the training data, the algorithms themselves, and the predictions generated by the algorithms to identify and mitigate potential biases.When utilizing big data, it is crucial for platform companies to implement effective AI governance and bias testing, which helps build a system that is fair to everyone and ensures that the true benefits of AI systems can be realized.This also highlights the importance of transparency when using big data algorithms.In the compliance indicators, the algorithmic mechanism holds the highest weight (0.465), with data analysis and dynamic pricing algorithms having equal weights (0.068 each), indicating that these technologies play a critical role in ensuring compliance.

In April 2021, China's market regulatory authorities imposed a hefty fine of 18.2 billion yuan on Alibaba Group for abusing its dominant market position and engaging in the "choose one of two" monopolistic behavior.This event sparked widespread attention and discussion across society and industry, involving the enforcement of antitrust laws, regulation of the digital economy, and competition in the internet platform market, among other aspects.Antitrust regulation holds the highest weight (0.044) within the regulatory framework, highlighting the importance of preventing market monopolies in the platform economy. even amplify existing societal biases.

4.3 Analysis of Demand Strategies

Platform revenue and profit serve as the foundation for reinvestment, which is critical for improving services, driving technological innovation, and expanding market presence.Without sufficient profit, a platform may struggle to invest in new product development or service improvements, which could impact its long-term competitiveness and market demand.Stable revenue and profit ensure that the platform can cover operational costs, including employee salaries, equipment maintenance, marketing, and other daily expenses.If a platform cannot sustain profitability, it may fail to maintain long-term operations and ultimately lose users and market share.The weight of platform revenue and profit (0.0632) reflects the significance of profitability from transactional activities for the platform.Revenue and profit provide the platform with a buffer, enabling it to survive during periods of market downturns.This is because profitable companies are more likely to remain stable during uncertain economic periods, thus continuing to meet customer demands.

Among the user and enterprise sub-indicators, user growth rate and GMV (Gross Merchandise Volume) carry relatively high weights, as they are key metrics for evaluating platform expansion and market performance.Transaction volume is a key indicator of platform economic success, as it directly impacts the platform's revenue, market share, and growth potential.As one of the world's largest e-commerce platforms, Amazon's success is largely attributed to its massive transaction volume. This not only brought significant revenue to Amazon but also attracted more sellers and buyers through its "network effect," further strengthening its leadership position in the platform economy.Taobao is renowned for its massive transaction volume and user base, with Taobao and Tmall having become the leading e-commerce platforms in China.These platforms play a central role in the platform economy, both in China and globally, by meeting the demands of a large number of consumers and businesses.As a global online auction and shopping platform, eBay leverages its large-scale transactions and extensive user base to offer a diverse marketplace.By offering a broad rental accommodation market, Airbnb rapidly grew and disrupted the traditional hospitality industry due to its large transaction volume.It created new market opportunities through a vast number of listings and bookings, impacting the development of the travel industry.These cases illustrate that transaction volume is an undeniable factor in the platform economy, with significant influence on consumers, business users, and the industry as a whole.The growth of transaction volume is often accompanied by a strengthening of network effects, where each additional user adds value to the platform and attracts more users, thereby creating a positive feedback loop.

4.4 Conclusion

The characteristics of the platform economy and the trust and security challenges it presents, including data breaches, identity theft, fraudulent activities, and algorithmic biases.These risks not only threaten the security of users' personal information

but may also damage the platform's business reputation and market competitiveness.This study examines this issue from the perspective of Fuzzy Analytic Hierarchy Process (FAHP), aiming to provide more scientific and systematic solutions to the trust and security challenges in the platform economy.Using FAHP, the study assigns weights and ranks the priority of trust and security risk factors in the platform economy.Through this approach, the study identifies the relative importance of various risk factors, providing a basis for platforms to develop targeted security strategies.For instance, data security management, user authentication, and algorithm transparency were identified as the areas requiring the most attention. Corresponding strategic recommendations include strengthening data encryption technologies, implementing multi-factor authentication, improving algorithm transparency and fairness, and enhancing collaboration with government and industry to create a secure platform economy environment.The study emphasizes that continuous monitoring and evaluation are key to ensuring trust and security in the platform economy.It is recommended that platform operators regularly conduct security audits and adjust security strategies based on audit results to ensure their effectiveness and timeliness.Through the application of FAHP, this study offers a new perspective and methodology for addressing trust and security issues in the platform economy, with the hope of providing valuable insights and references for both industry and academia.

Funding

no

Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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