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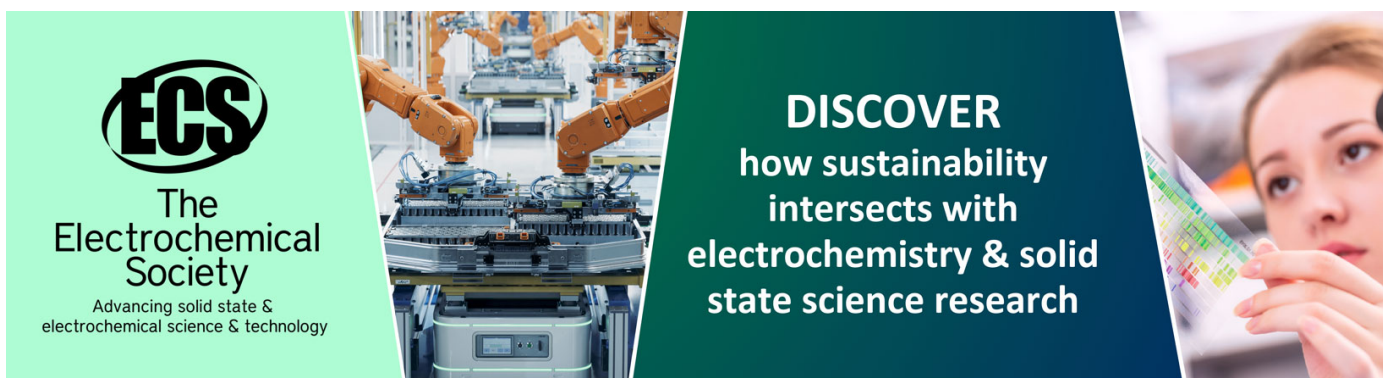
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The effectiveness evaluation of system construction for compliance management in the electricity market

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Abstract. The establishment of a scientific and effective evaluation index system is essential for the healthy development of China's electricity market. This paper focuses on the effectiveness evaluation of the system construction for compliance management. We propose a three-level index system of compliance management. Further, the weight of each index is measured by the weighting method for group decision based on AHP method. Finally, a modal analysis has been made to illustrate the suitability and effectiveness of the proposed framework. Some suggestions on compliance management are provided to ensure the sustainable development and promote the electricity market reform in China.

1. Introduction

For a long time, China's power market has been greatly influenced by the vertical integrated regulation and the market competition awareness, risk prevention and compliance for electric power companies are not strong. With the advancement of new reform in 2015, the trading mode in China's electric power market is becoming more and more complicated. However, the non-compliance cases happen one after another, such as price monopoly, market power manipulation and corporate defaults, which lead to the distortion and losses inevitably. At the same time, challenged by the increasingly severe overseas compliance regulatory environment, China's step of energy equipment exports and foreign investment has to slow down. Therefore, it is necessary for power companies to comply with laws, regulations and market rules to deepen the domestic market and expand overseas business. In this context, a scientific and effective compliance management system urgently needs to be established for the healthy development of power market. To study the compliance management in China's electricity market, we try to propose a three-level index system of compliance management. Further, the weight of each index is measured by the weighting method for group decision based on AHP method. The plan of this paper is as follows. Section 2 reviews related literature. In section 3, we construct the effectiveness evaluation index system for the compliance management in the electricity market. Section 4 discuss the methods to calculate the weights of each index, and then conducts a modal analysis. Section 5 concludes.

2. Literature Review

It is obvious that compliance management plays an important role in companies' development process. Up to now, the research on the risk management system of the power market mainly focuses on the credit risk, transaction risk and regulatory risk. Siddiqui (2003) found that the power call option could



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be used to manage risks in the competitive environment. Toyoda et al. (2004) discussed that risk assessment would be the key factor for safe operation of power supply system in severe network environment. Tang and Yang (2016) thought that with the new development of electricity reform, many problems that involving the release of retail side needed to be solved, which made the compliance risk management very crucial. Abdin et al. (2017) proposed a new risk assessment method for power grid failures under the unified pricing market environment. Li et al (2018) concluded that the credit risk of large power consumers was closely related to production and operation risk, transaction credit risk, external environment risk and financial risk. Zheng (2018) gave tips on main compliance risks and initially explored the scheme for improving the compliance management of power grid companies. Jiang (2020) classified the compliance risks faced by power trading institutions, constructed a compliance risk model of power trading institutions and used analytic hierarchy process (AHP) to evaluate the compliance risks of trading institutions. All in all, the research of compliance management in the power market is still limited. As for the evaluation of compliance risk management system, the literature mainly focuses on the banking and securities industry. For example, Yang and Zhao (2008) analysed the role of compliance risk management in rural cooperative financial institutions. Zhang (2008) analysed the main problems existing in the compliance risk management of commercial banks in China. Lagzdins (2011) studied the compliance organization structure, reports, compliance culture, the purpose and tasks of compliance personnel, and performance and risk assessment of compliance personnel. Wu (2020) pointed out the deficiencies of the compliance risk management of commercial banks in China. Liu (2020) compared the differences and common points between risk, internal control and compliance management.

Overall, there are few literatures on power market compliance risk management and evaluation. However, with the development of power market and tougher national supervision, the importance of compliance management has become increasingly prominent. Therefore, how to systematically evaluate compliance risk management has become an important issue that needs to be addressed.

3. Index system of compliance management in electricity market

Establishing a scientific and effective compliance risk management system is important for the implementation of compliance management policies and systems, thus ensuring that business activities can meet the requirements of laws and regulations. And this paper tries to evaluate the effectiveness of the power market compliance risk management system. An effective evaluation system generally includes evaluation objects, evaluation index systems, and evaluation methods. Among them, the evaluation index system is the basis and should be selected based on the characteristics of the evaluation object in accordance with the principles of system design. Therefore, this paper will focus on building the effectiveness evaluation system and calculate the weights of each index.

The effectiveness evaluation index system for the construction of the electricity market compliance management system can be considered from multiple dimensions, mainly including compliance management system, business management compliance, electricity market compliance, and major risks. Further, the dimensions can be decomposed and a three-level evaluation system for compliance management is built in this paper.

3.1. The index for compliance management system

The indicators for the compliance management system should have five aspects, including the compliance management for organization construction, institutional development, process construction, cultural progress and information system construction. More specifically, organization construction should be considered in terms of the company's organizational structure, staffing, and guarantees for personnel performance. Further, the institutional development should be considered at the company level, management level and employee level. As for process construction, more attention should be paid to whether the business process and management process are compliant. The cultural progress focuses much on the compliance management culture and training culture. Finally, information system

construction mainly refers to the information system on risk control and ensuring information security. The specific second grade and third grade indicators are shown in table 1.

Table 1. The second grade and third grade indexes for compliance management system

Grade II	Grade III
Organization construction	Whether a compliance management department is established and there is full-time compliance management Whether the compliance management personnel (including quantity and professional knowledge) can meet the requirements of compliance management Whether the company establish relevant internal mechanisms to ensure compliance personnel perform responsibilities Whether the company's directors, senior managers and department heads have not restricted or prevented the compliance department from performing their duties Whether the compliance department promptly urge the company to revise and improve relevant systems to make business processes in accordance with changes in laws, regulations and standards
Institutional development	Whether the company's compliance management system is sound Whether the company has established a compliance manual covering all employees Whether the company has formulated a implementation plan for compliance management Whether the company has formulated compliance management measures or basic systems Whether the company has formulated specific rules, including compliance performance evaluation rules, compliance risk accountability rules, compliance reporting rules etc.
Process construction	Whether the company have established standardized business procedures for market registration, transactions, settlement, inquiries and responses, and contract signing Whether the company has established a compliance management process for risk monitoring, risk identification, risk assessment, and risk response Whether the company use information technology to achieve a standardized business process Whether the company establishes or updates a compliance risk database
Cultural progress	Whether the company's senior managers are involved in activities related to compliance culture Whether the company has developed and implemented an annual compliance training plan Whether the new employee has signed a compliance commitment before entering the job Whether the business department conducts compliance training for new staff Whether the compliance department has organized special compliance training in accordance with regulatory requirements or management needs Whether to conduct necessary inspections (such as testing) on the effectiveness of compliance training Whether the average attendance rate of compliance training is higher than 90%
Information system construction	Whether the company has established an information system related to compliance management for risk control Whether the information system can realize the collection, analysis, and trace function Whether the company takes necessary measures to ensure information the security

3.2. The indexes for business management compliance

As for the business management compliance, it includes six third level indexes, and that are the management compliance for market entity registration and delisting, electricity trading organization, transaction settlement, information disclosure, market service, and trading system. The specific second and third grade indicators for business management compliance are shown in table 2.

Table 2. The second grade and third grade indexes for the business management compliance

Grade II	Grade III
	Whether the trading center has established a public market registration management system

Market entity registration and delisting	Whether the audit procedures of market entities are compliant Whether the trading center timely accepts the registration, information change, and delisting applications of market entities, and reviews the feedback in time
Electricity trading organization	Whether there is transaction that are not in accordance with the market rules Whether there is dispute caused by the improper or untimely operation of the trading center that causes market entities to fail to participate in the transaction Whether the transaction settlement and result release are accurate Whether there is complaint from market entities caused by that the unrestricted transaction result is not cleared in a timely manner Whether the trading plan indicators are completed
Transaction settlement	Whether the prompt rate of issuance of settlement vouchers meets the requirements Whether the accuracy of the settlement voucher meets the requirements
Information disclosure	Whether there is unfair power transaction caused by no timely and accurate information disclosure of transaction information Whether there is market operation deviation caused by obvious error in the published electricity market transaction information Whether the information disclosed is accurate and the scope is appropriate Whether there is leakage of commercial confidential information and private information, leading to the economic losses and customer complaints Whether the notices or documents about business adjustments are timely issued to market entities
Market service	Whether there is misconduct in the service attitude of the personnel Whether the trading center has no adequate training on market rules and trading product design Whether satisfaction rate of market entities is higher than 98%
Trading system	Whether the trading system is operating normally without attack or crash

3.3. The indexes of the compliance in the electricity market

The indicators for the compliance management system should be considered from the perspectives of market environment and market entity management. Market environment mainly refers to any non-compliance, such as market manipulation and abnormal price fluctuation. As for market entity management, the focus is on the compliance of the market entities, including the compliance of contract performance, deviation assessment and so on. Specifically, the second grade and third grade indexes for the compliance in the electricity market are shown in table 3.

Table 3. The second grade and third grade indexes for the compliance in the electricity market

Grade II	Grade III
Market environment	Whether there is market manipulation Whether there is abnormal price fluctuation
Market entity management	Whether the market entities submit the review registration materials on time Whether the market contract performance rate meets the standard Whether there is no contract dispute Whether power generation companies timely issue settlement invoices Whether there are too many deviation assessment of the electricity sales company (greater than the set threshold) Whether there is arrear of electricity users and the payment is made on time after being reminded Whether there is major public opinion in the market Whether there is market complaint/prosecution Whether there is false information provided by market entities Whether there is illegal attack on the trading system

3.4. The indexes of major risks

The indicators of major risks mainly include lawsuit risk, punishment risk and non-sudden risk. Specifically, the second grade and third grade indexes for major risks can be seen in table 4.

Table 4. The second grade and third grade indexes for major risks

Grade II	Grade III
Lawsuit risk	Whether no related cases have been prosecuted
Punishment risk	Whether it has not been subject to regulatory penalties
Non-sudden risk	Whether there is no sudden risk event and the number of times does not meet the requirements (threshold can be set)

4. Index weighting of effectiveness evaluation system

4.1. Model construction

To ensure a scientific and comprehensive evaluation, it is necessary to clarify the importance of indicators at all levels. That is, to determine the weight of each indicator based on the above-mentioned three level index system. Many methods have been used to calculate the indicator weight and analytic hierarchy process (AHP) is a typical one. However, the representative AHP is based on a single expert, which may be susceptible to high subjectivity and arbitrariness. Thus, this paper applies the weighting method for group decision to determine the optimal weighting of each index. The main idea is that we obtain the reasonable range of the indexes based on of the experts by AHP method and then the optimization model is built to calculate the combination weight. The specific steps of the combination weight calculation are as follows. Moreover, according to the indicator system constructed above, we have three levels of indicator layer, namely, first grade, second grade and third grade. This paper calculates the weights under each grade respectively and the final weights for the third-grade index is the product.

Step 1: calculate the weight decided by each expert based on the AHP method

As the expert is professional and has practical work experience, AHP method can be used by the expert to decide the weights of the indicator. First, the expert ranks the indicators according to the importance in compliance management. And next the following comparison matrix M^k can be constructed.

$$M^k = (m_{ij}^k)_{n \times n} = \begin{pmatrix} m_{11}^k & m_{12}^k & \cdots & m_{1n}^k \\ \cdots & \cdots & \cdots & \cdots \\ m_{n1}^k & m_{n2}^k & \cdots & m_{nn}^k \end{pmatrix}$$

The weights of each index are determined based on the comparison matrix. What should be point out is that comparison matrix should satisfy consistency to avoid estimation bias. If the consistency test is rejected, the comparison matrix needs to be adjusted. Suppose the weight of the i factor is ω_i and calculate the maximum eigenvalue meeting $AW = \lambda_{max}W$ and normalized eigenvector $W = \{\omega_1, \omega_2, \dots, \omega_n\}$ with $\sum_{i=1}^n \omega_i = 1$. The normalized eigenvector is the weights of each index.

Step 2: consistency check based on index weight

The weight matrix for p indicators $V_{p \times k}$ determined by k experts is shown as follows.

$$V_{p \times k} = (v_{ij})_{p \times k} = \begin{pmatrix} v_{11} & v_{12} & \cdots & v_{1k} \\ v_{21} & v_{22} & \cdots & v_{2k} \\ \vdots & \vdots & \cdots & \vdots \\ v_{p1} & v_{p2} & \cdots & v_{pk} \end{pmatrix}$$

Here, v_{ij} is the weight of i th index decided by j th expert. And then, we calculate the weight range of the index. The smallest neighbourhood of δ is the range of expert's approve. For i th index, the range of vales acceptable to all experts is in the interval v_i^-, v_i^+ .

$$v_i^- = \min(v_{i1}, v_{i2}, \dots, v_{ik})$$

$$v_i^+ = \max(v_{i1}, v_{i2}, \dots, v_{ik})$$

Next, we delete the weight of experts which has not passed the consistency test to determine a reasonable range of combination weights. The specific method is as follows. We first reorder the index and have $x_{i1} < x_{i2} < \dots < x_{i(k-1)} < x_{ik}$. As the singularity point can only be at the left and right endpoints of the interval, x_{i1} and x_{ik} are firstly tested. The way to judge whether a point is a singular

is to look at the density of other points in the δ neighbourhood. Smaller δ means higher requirement for singularity. The value of δ is set as $d_i/2$ with $d_i = v_i^+ - v_i^-$. If there are no other points in the δ neighbourhood of x_{i1} , x_{i1} can be regarded as a singular point and we should delete x_{i1} . And finally, we obtain the optimal and reasonable interval $[x_{id}, x_{iq}]$.

Step 3: calculate the combination weight

The final combination weight should consider the information given by all experts to ensure that group decision-making reflects the idea of the minority subordinating to the majority. The objective function of the optimization model is set according to the idea of minimum deviation between the index combination weight w_i and the expert index weight v_{ij} .

$$\min \sum_{i=1}^p \sum_{j=1}^{k'} (v_{ij} - w_i)^2, k' \leq k$$

The constraints for the above optimization issue are as follows.

$$\sum_{i=1}^p w_i = 1$$

$$x_{id} \leq w_i \leq x_{iq}, i=1,2,\dots,p$$

Step 4: calculate the comprehensive weight of third-grade index

We use the mentioned method to calculate the weight of index at each level. And the comprehensive weight of third-grade index is shown as follows.

$$w_i = w_{fi} * w_{si} * w_{ti}$$

Here, w_{fi} , w_{si} and w_{ti} are the optimal combination weights of corresponding first grade, second grade, and third grade indexes.

4.2. Modal analysis

To illustrate the suitability and effectiveness of the proposed framework, a modal analysis has been made in this section. Three experts are invited to group decision. And the optimal combination weights under different level of indexes are shown in the parentheses of table 5. And the comprehensive weights of third grade index is presented in last column. Further, this paper also scores the index based on preparation documents, interview, system and data test, questionnaire etc. Combining the scores and weight, the final evaluation value of compliance management system in this case is 2.29. It should be noted that our analysis framework can be applied to other cases with more experts.

Table 5. Effective evaluation form of electricity market compliance management System

Grade I	Grade II	Grade III	Score	weight
Compliance management system (0.47)	Organization construction (0.15)	Whether a compliance management department is established and there is full-time compliance management (0.31)	2	0.02
		Whether the compliance management personnel (including quantity and professional knowledge) can meet the requirements of compliance management (0.16)	2	0.01
		Whether the company establish relevant internal mechanisms to ensure compliance personnel perform responsibilities (0.26)	2	0.02
		Whether the company's directors, senior managers and department heads have not restricted or prevented the compliance department from performing their duties (0.11)	2	0.01
		Whether the compliance department promptly urge the company to revise and improve relevant systems to make business processes in accordance with changes in laws, regulations and standards (0.16)	2	0.01
	Institutional development (0.42)	Whether the company's compliance management system is sound (0.1)	2	0.02
		Whether the company has established a compliance manual covering all employees (0.06)		

Grade I	Grade II	Grade III	Score	weight
		Whether the company has formulated a implementation plan for compliance management (0.16)	2	0.01
		Whether the company has formulated compliance management measures or basic systems (0.26)	2	0.03
		Whether the company has formulated specific rules, including compliance performance evaluation rules, compliance risk accountability rules, compliance reporting rules etc. (0.42)	2	0.05
	Process construction (0.27)	Whether the company have established standardized business procedures for market registration, transactions, settlement, inquiries and responses, and contract signing (0.47)	2	0.08
		Whether the company has established a compliance management process for risk monitoring, risk identification, risk assessment, and risk response (0.28)	3	0.06
		Whether the company use information technology to achieve a standardized business process (0.15)	3	0.04
		Whether the company establishes or updates a compliance risk database (0.1)	2	0.02
	Cultural progress (0.06)	Whether the company's senior managers are involved in activities related to compliance culture (0.04)	2	0.01
		Whether the company has developed and implemented an annual compliance training plan (0.13)	2	0
		Whether the new employee has signed a compliance commitment before entering the job (0.1)	2	0
		Whether the business department conducts compliance training for new staff (0.3)	2	0
		Whether the compliance department has organized special compliance training in accordance with regulatory requirements or management needs (0.35)	1	0.01
		Whether to conduct necessary inspections (such as testing) on the effectiveness of compliance training (0.05)	1	0.01
		Whether the average attendance rate of compliance training is higher than 90% (0.03)	1	0
	Information system construction (0.1)	Whether the company has established an information system related to compliance management for risk control (0.54)	1	0
		Whether the information system can realize the collection, analysis, and trace function (0.3)	4	0.02
		Whether the company takes necessary measures to ensure information the security (0.16)	3	0.01
Business management compliance (0.28)	Market entity registration and delisting (0.17)	Whether the trading center has established a public market registration management system (0.3)	3	0.01
		Whether the audit procedures of market entities are compliant (0.54)	4	0.03
		Whether the trading center timely accepts the registration, information change, and delisting applications of market entities, and reviews the feedback in time (0.16)	4	0.01
	Electricity trading organization (0.29)	Whether there is transaction that are not in accordance with the market rules (0.16)	2	0.01
		Whether there is dispute caused by the improper or untimely operation of the trading center that causes market entities to fail to participate in the transaction (0.26)	2	0.01
		Whether the transaction settlement and result release are accurate (0.42)	2	0.02

Grade I	Grade II	Grade III	Score	weight
		Whether there is complaint from market entities caused by that the unrestricted transaction result is not cleared in a timely manner (0.1)	2	0.03
		Whether the trading plan indicators are completed (0.06)	2	0.01
	Transaction settlement (0.17)	Whether the prompt rate of issuance of settlement vouchers meets the requirements (0.33)	2	0
		Whether the accuracy of the settlement voucher meets the requirements (0.67)	5	0.02
	Information disclosure (0.1)	Whether there is unfair power transaction caused by no timely and accurate information disclosure of transaction information (26)	5	0.03
		Whether there is market operation deviation caused by obvious error in the published electricity market transaction information (0.16)	3	0.01
		Whether the information disclosed is accurate and the scope is appropriate (0.42)	2	0
		Whether there is leakage of commercial confidential information and private information, leading to the economic losses and customer complaints (0.1)	2	0.01
		Whether the notices or documents about business adjustments are timely issued to market entities (0.06)	2	0
	Market service (0.17)	Whether there is misconduct in the service attitude of the personnel (0.16)	1	0
		Whether the trading center has no adequate training on market rules and trading product design (0.54)	3	0.01
		Whether satisfaction rate of market entities is higher than 98% (0.3)	3	0.03
	Trading system (0.1)	Whether the trading system is operating normally without attack or crash (1)	4	0.01
Compliance in the electricity market (0.16)	Market environment (0.33)	Whether there is market manipulation (0.67)	10	0.03
		Whether there is abnormal price fluctuation (0.33)	5	0.04
	Market entity management (0.67)	Whether the market entities submit the review registration materials on time (0.04)	5	0.02
		Whether the market contract performance rate meets the standard (0.26)	1	0
		Whether there is no contract dispute (0.21)	1	0.03
		Whether power generation companies timely issue settlement invoices (0.15)	1	0.02
		Whether there are too many deviation assessment of the electricity sales company (greater than the set threshold) (0.11)	1	0.02
		Whether there is arrear of electricity users and the payment is made on time after being reminded (0.08)	1	0.01
		Whether there is major public opinion in the market (0.04)	1	0.01
		Whether there is market complaint/prosecution (0.07)	1	0
		Whether there is false information provided by market entities (0.02)	1	0.01
		Whether there is illegal attack on the trading system (0.02)	1	0
Major risks (0.1)	Lawsuit risk (0.3)	Whether no related cases have been prosecuted (1)	1	0

Grade I	Grade II	Grade III	Score	weight
	Punishment risk (0.35)	Whether it has not been subject to regulatory penalties (1)	4	0.03
	Non-sudden risk (0.35)	Whether there is no sudden risk event and the number of times does not meet the requirements (threshold can be set) (1)	4	0.03

5. Conclusion and suggestion

The smooth operation of the electricity market depends much on the compliance management. Therefore, the establishment of a scientific and effective evaluation index system is essential for the healthy development of China's electricity market. This paper focuses on the effectiveness evaluation of the system construction for compliance management in the electricity market. In this paper, a three-level index system of compliance management is proposed. Further, the weight of each index is measured by the weighting method for group decision based on AHP method. Finally, a modal analysis has been made to illustrate the suitability and effectiveness of the proposed framework. Based on the above conclusions, we have the following recommendations. First, it is necessary to raise the barriers to entrance in the electricity market. Relevant agencies should establish a strict market access mechanism, adhere to the principle of "putting quality before quantity". Further, only when the corresponding standards are met can they be allowed to enter into this market. Second, supervision and guidance of enterprises should be enhanced. Regular assessments of companies need to be made in the electricity market. The companies which cannot stratify the requirements of compliance management for a long time can be included in the blacklist and should be punished.

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Reference

- [1] Abdin, I., Li, Y.F., Zio, E., (2017). Risk assessment of power transmission network failures in a uniform pricing electricity market environment. *Energy*. 138: 1042-1055.
- [2] Jiang, L. (2020). Research on compliance risk management of power trading institutions based on Analytic Hierarchy Process. *Electrotechnical Application*. 39(10):52-56.
- [3] Lagzdins, A. (2011). Compliance risk Management: on Definition Approaches. In *Proceedings - International Conference on Current Issues in Management of Business and Society Development*. 378-387.
- [4] Li, F.L., Xu, E.F., Sun, K., Liu, D.N., Shen, S.Y. (2018). Credit Risk Evaluation of Large Power Consumers Considering Power Market Transaction. *IOP Conference Series: Earth and Environmental Science*. Sci. 127, 12011.
- [5] Liu, S.F. (2020). Compliance Risk Management of Commercial Bank. *Modern Business*. 22:92-93.
- [6] Siddiqui, A. (2003). Managing Electricity Reliability Risk Through the Forward Markets. *Networks and Spatial Economics*. 3(2): 225-263.
- [7] Tang, T.Q., Yang, J.H. (2016). The Compliance Analysis on Transaction Risk of Electricity Market Based on the Release of Retail Side. In *Proceedings - 2016 2nd International Conference on Advances in Energy, Environment and Chemical Engineering*. 89: 36-39.
- [8] Toyoda, J., Minazawa, K., Iwaita, H. (2004). Behaviour of market players and risk assessment of network congestion in electric power supply system. *Probabilistic safety assessment and management*. 1- 6: 1339-1344
- [9] Wu, J. (2020). Problems in the Compliance Risk Management of Commercial Banks and the Countermeasures. *Enterprise Reform and Management*. 18:129-130.

- [10] Yang, H.F., Zhao, X.J. (2008). The Researches on Compliance Risk Management Mechanism of Rural Cooperative Financial Institution. In Proceedings - Conference on Regional Economy and Sustainable Development. 755-760.
- [11] Zhang, X.F. (2008). On Compliance Risk Management Mechanism of Commercial Banks. In Proceedings - International Conference on Management of Technology. 557-561.
- [12] Zheng, Z.M. (2018). Preliminary Research on Compliance Management of Power Grid Enterprises. New Industrial Economy. 09: 47-50.