

# Research on the optimization and improvement of business environment based on the customer satisfaction model of 'Access to Electricity'

Yanni You<sup>a\*</sup>, Hong Huang<sup>b</sup>, Lanyan Shao<sup>c</sup>, Ming Ma<sup>d</sup>

State Grid Wenzhou Electric Power Supply Company, Wenzhou, Zhejiang Province, 310007, China

**Abstract.** In order to further promote the reform of "deregulation and service" and continuously optimize the business environment, the power industry as the important part of national economic development, optimizing the business environment is urgent. Based on the customer satisfaction survey of 'Access to electricity', this paper constructs a set of targeted, complete and practical multiple regression model of electricity consumption satisfaction, and puts forward relevant strategies to help optimize and improve the business environment of the power industry.

## 1. Introduction

In October 2019, Premier Li Keqiang promulgated the Regulations on Optimizing the Business Environment (No.722), which requires all localities to comply with social expectations, continue to promote reforms such as "deregulation, regulation and services"[1,2], continuously improve the business environment, unleash and develop social productive forces, accelerate the building of a modern economic system and promote high-quality development. As the power industry is the lifeblood of the national economic development, the optimization of the power business environment is more urgent. The National Energy Administration and Zhejiang Energy Regulatory Office also issued a clear document requiring the power enterprises to take the optimization of the business environment as an important goal. From the perspective of the reform direction of the national electric power system, optimizing the business environment is also an important direction of future reform and development. 'Access to electricity' is one of the ten main evaluation indicators of the ease of doing business. The 'Access to electricity' indicator describes all the processes and costs of an enterprise to obtain a permanent power connection for a standardized place. Beijing, Shanghai, Guangzhou and Shenzhen have all taken 'Access to electricity'[3,4] as a breakthrough to improve their business environment. For example, Beijing launched small and micro enterprises low-voltage power connection "zero door, zero approval, zero investment" service. The improvement of business environment is closely related to the convenience, economy and reliability of 'Access to electricity'. The customer satisfaction survey and evaluation of 'Access to electricity' [5-7] are also the focus of the assessment of

business environment. In order to fully improve the overall service level of the power industry, meet the people's demand for electricity in pursuit of a better life, and create a convenient and high-quality electricity business environment, we cannot do without the improvement of the 'Access to electricity' [8-10] index, so as to promote the upgrading and optimization of the overall business environment..

## 2. Research Status

### 2.1 Research on business environment optimization

The World Bank provides long-term loans and technical assistance to developing countries to help them implement their anti-poverty policies. On the basis of the World Bank's definition of doing business, many domestic and foreign research institutions and scholars have conducted research on the assessment and optimization of doing business environment. R.B. Stobaugh (1969), an American scholar, proposed the "hierarchical scale method" to evaluate a country's business environment. According to Daniel M and Klerman (2007), the business environment assessment systems are similar. Although they all adopt quantitative analysis methods, there are different differences in data collection methods and calculation methods due to different "facets" of the indicators on the research objects. Hong Hai (2018), Vice president of Suzhou Market Regulation Association, pointed out that there are some problems in the construction of business environment, such as lack of systematic understanding of business environment index system, too long policy transmission and implementation chain, and lack of effectiveness evaluation dimension. Meng Fanjie etc.

<sup>a\*</sup>20905508@qq.com, <sup>b</sup>870828669@qq.com, <sup>c</sup>23990183@qq.com, <sup>d</sup>20228426@qq.com

(2019) studied the current situation of the business environment of electric power enterprises and proposed that the operation situation, production capacity, organizational performance and other aspects of the enterprises should be comprehensively considered, and the policy support should be strengthened and the quality improvement actions should be comprehensively carried out. Yuan Zhang (2019) studied the unified Internet service for business expansion under the background of electric power business environment optimization.

## **2.2 Research on satisfaction evaluation of 'access to electricity'**

Starting from the evaluation system of 'Access to electricity' released by the World Bank, domestic and foreign scholars combined with practice, the theoretical research on the evaluation of 'Access to electricity' mainly focuses on the evaluation index construction and the optimization and promotion strategy of access to electricity, but there are some problems such as the evaluation of the index system is biased towards the result analysis, the model construction is one-sided and shallow, and the research is not in-depth. In terms of practical research, since 2015, the Sichuan, Guangdong and Wuhan branches of China Power Media Group have successively conducted surveys on social electricity satisfaction and business environment of 'Access to electricity' in Sichuan, Guizhou, Gansu, Guangdong, Hubei, Hunan, Jiangxi and other places. It also released the 2019 Regulatory Evaluation Report on 'Access to Electricity' in the three Southern provinces (autonomous regions), which provided important data support for government departments and regulatory agencies to implement scientific decision-making and accurate supervision. Therefore, in the context of the national call to comprehensively promote the reform of "deregulation and service" and further optimize the business environment, this paper starts from the customer satisfaction evaluation of 'Access to electricity', builds a multiple regression model of electricity satisfaction based on the satisfaction survey results of 'Access to electricity', and finds out the weak links of power supply enterprises in access to electricity. Relevant entities will find out rectification measures and improvement plans according to the actual situation, so as to continuously improve users' satisfaction with electricity consumption and optimize the business environment of 'Access to electricity'.

## **3. Data source and research design**

### **3.1 Data pre-processing**

In order to more scientifically and objectively evaluate the satisfaction status of users of 'Access to electricity' in Wenzhou Wan New District and strengthen targeted power generation, this study conducted a questionnaire survey for industrial and commercial users in Wenzhou Wan New District. Guided by the World Bank's Doing Business Survey, the questionnaire fully draws on the

relevant questions covered by the 'Access to Electricity' index designed by the World Bank and the relevant questionnaires of China's energy regulatory authorities. Multiple rounds of expert consultation, questionnaire test, reliability and validity repeated inspection and optimization methods are adopted to comprehensively improve the scientific, targeted and effective nature of the questionnaire. The survey subjects are all from Wenzhou Bay New District, which is divided into two areas, namely high-tech industrial Development Zone and Airport area. The survey mainly covers ten aspects, including user information, overall service evaluation, business expansion, market order, power supply reliability, power supply quality, service quality, power supply capacity, information disclosure, and complaint handling, in order to fully understand the sense of power acquisition and satisfaction of industrial and commercial users in Wenzhou Bay New District.

### **3.2 Reliability and validity test**

The KMO (Kaiser-meyer-olkin) test statistic is an index used to compare simple correlation coefficients and partial correlation coefficients between variables. And the value of Cronbach  $\alpha$  coefficient is between 0 and 1. If the alpha coefficient does not exceed 0.6, the internal consistency is considered to be insufficient; when the alpha coefficient reaches 0.7-0.8, the scale has considerable reliability, and when the alpha coefficient reaches 0.8-0.9, the scale has very good reliability. In this paper, KMO test and Cronbach  $\alpha$  coefficient method were adopted to test the validity and reliability of the questionnaire on the satisfaction of power supply users in Wenzhou Bay New District: First, the content validity test usually adopts the subjective evaluation method, namely the expert evaluation. Since the opinions of relevant experts have been collected in the design process of this questionnaire, and the questionnaire content has been recognized by the power experts, there is no need to discuss the content validity test of this questionnaire again. Secondly, KMO test can verify the rationality of the survey index structure, and has the characteristics of confirmatory analysis, with stronger explanatory power. Third, Cronbach  $\alpha$  coefficient method has higher operability and convenience than retest method and split half reliability method. The KMO test result is  $0.899 > 0.7$ , and the Bartlett test value has passed the significance test, that is, the index structure in the questionnaire on the satisfaction of power supply users in Wenzhou Bay New District has strong rationality, and it has the ability to further analyze the satisfaction of power supply users, indicating that the index has good structural validity. The Cronbach  $\alpha$  coefficient test result of the survey item was  $0.803 > 0.7$ , indicating that the index results of the questionnaire had a high reliability value, and the results obtained by the questionnaire had a high reliability, which could be used for further analysis.

### 3.3 Sending and Receiving Questionnaires

The questionnaire will be conducted from July 1 to August 31, 2022. The questionnaire will be distributed by the questionnaire star. A total of 300 questionnaires were sent out, and 288 were effectively received, with an effective recovery rate of 96%, which met the recycling requirements of conventional questionnaires.

### 3.4 Questionnaire survey results

The satisfaction of industrial and commercial users in Wenzhou Wan New District on the overall power supply

service and various contents is shown in Table 1. Satisfaction rate refers to the proportion of the total number of users who are satisfied and very satisfied. The satisfaction rate mentioned in the questionnaire is calculated in this way. As can be seen from the survey results, Wenzhou Bay New District has made good achievements in optimizing the electric power business environment in recent years. Through interviews, users have been widely praised by industrial and commercial users for reducing the requirements for electric power business handling, simplifying user application materials and reducing the links of electric power business handling.

**Table 1** Questionnaire survey results

| Investigation               | Very satisfied | Satisfied | General Satisfied | Not satisfied | Very dissatisfied |
|-----------------------------|----------------|-----------|-------------------|---------------|-------------------|
| Overall Service             | 75.45%         | 19.09%    | 0.91%             | 0%            | 4.55%             |
| Business Expansion          | 69.09%         | 28.18%    | 0.91%             | 0%            | 1.82%             |
| Market Order                | 70.91%         | 25.45%    | 0.91%             | 0%            | 2.73%             |
| Reliability of power supply | 70%            | 28.18%    | 0.91%             | 0%            | 0.91%             |
| Quality of power supply     | 71.82%         | 26.36%    | 0.91%             | 0%            | 0.91%             |
| Quality of service          | 68.18%         | 30%       | 0.91%             | 0%            | 0.91%             |
| Power supply capacity       | 72.73%         | 25.45%    | 0.91%             | 0%            | 0.91%             |

## 4. Construction and result analysis of the satisfaction regression model of 'Access to electricity'

### 4.1 Construction of the satisfaction regression model of 'Access to electricity'

$$OS = \alpha_0 + \alpha_1 YKBZ + \alpha_2 SCZX + \alpha_3 KKK + \alpha_4 GDZL + \alpha_5 JFFS + \alpha_6 FWRX + \alpha_7 GZQX + \alpha_8 FWZZL + \alpha_9 GDNL + \alpha_{10} XXGK + \alpha_{11} TSXY + \mu$$

The explained variable OS is Overall Satisfaction (OS) of power supply users in Wenzhou Wan New District, where  $\alpha_0$  is a constant and  $\mu$  is a random error term. In the explained variable, YKBZ, SCZX, KKK, GDZL, JFFS, FWRX, GZQX, FWZZL, GDNL, XXGK and TSXY respectively show business expansion Installation satisfaction, market order satisfaction, power supply reliability satisfaction, power supply quality satisfaction, payment method satisfaction, service hotline satisfaction, fault repair satisfaction, service quality satisfaction, power supply capacity satisfaction, information disclosure satisfaction and complaint response satisfaction,  $\alpha_1 \sim \alpha_{11}$  represents the regression coefficient of each sub-satisfaction.

### 4.2 Model regression and result analysis

Based on the above model, the regression analysis of the satisfaction of power supply users in Wenzhou Bay New

Based on the results of the questionnaire, in order to further analyze the influencing factors of the overall satisfaction of users with electricity consumption, combined with various project indicators of satisfaction involved in the questionnaire, the multiple regression model of user satisfaction with electricity consumption in the paper is built as follows:

District is carried out. The regression process adopts the step-up regression method, and finally the three variables, namely YKBZ, JFFS and TSXY, have a significant impact on the explained variables. The specific regression results are shown in Table 2.

**Table 2** Regression analysis results of power supply users' satisfaction in Wenzhouwan New District

| Variable | Regression coefficient | Model test  | Test Statistics |
|----------|------------------------|-------------|-----------------|
| YKBZ     | 0.358                  | R2          | 0.768           |
| JFFS     | 3.691                  | F statistic | 13.622          |
| TSXY     | 0.228                  | ESS         | 27.864          |
| constant | 0.533                  | RSS         | 8.399           |
|          |                        | TSS         | 32.264          |

As can be seen from Table 2, first of all, the overall goodness of fit of the model is 0.768 respectively, while

the F statistic is 13.622, both of which pass the significance test at the 1% level, indicating that the regression of the model is reasonable and the regression results are credible. Secondly, user satisfaction with in-service expansion (YKBZ), payment mode (JFFS) and complaint response (TSXY) has a significant positive impact on the final overall satisfaction, that is, when the user satisfaction of the three increases by 1%, It will drive the overall satisfaction of users to increase by 0.39%, 0.29% and 0.23% respectively, indicating that the overall satisfaction level of users can be effectively improved after the improvement of users' satisfaction with the service expansion, payment method and complaint response. In the investigation and analysis, all the user areas are divided into high-tech industrial development Zone (New District for short) and airport area, and the enterprise attributes of users are divided into large industrial users (above 10kv), low-voltage non-residents (380/220v), general industry and commerce, and others (within 10kv). In order to further explore whether there are differences in electricity consumption satisfaction based on different user characteristics, the difference analysis of satisfaction based on user characteristics is carried out. Among them, due to the small number of samples in the airport area, the accuracy of statistical analysis results is greatly affected, and the users of the power supply company in Wenzhouwan New District are mostly concentrated in the New District, so the user areas are divided into two categories: New District and non-New District. Independent sample T test is adopted for the satisfaction difference analysis of the region to which the user belongs, and Kruskal-Wallis test is adopted for the satisfaction difference analysis of the enterprise attributes of the user, so as to verify whether there are differences in the satisfaction of the users among different groups. First of all, the satisfaction difference test results based on the user's region show that all the satisfaction indicators except the payment method pass the significance test, indicating that there is a big difference in the satisfaction level between the new district and non-new district users. Secondly, the results of the satisfaction difference test based on the user enterprise attributes show that the K-W statistics of all satisfaction indicators fail to pass the significance test, indicating that there is no significant difference in the satisfaction of users with different enterprise attributes. Therefore, it is necessary to calculate the satisfaction score based on the region the user belongs to (see Table 3 for specific score results). After calculating the satisfaction scores of new districts and non-new districts respectively, it is found that the satisfaction scores of new districts are all higher than 4.60 points, while the satisfaction scores of non-new districts remain between 4.48 and 4.55 points, that is, the satisfaction scores of new districts are higher than those of non-new districts in each satisfaction index. Therefore, focusing on improving the satisfaction level of non-new district users and maintaining the existing satisfaction level of Wenzhou Wan New District is one of the key points for the power supply company in Wenzhou Wan New District to optimize the business environment. Since the

users of the power supply company in Wenzhou Wan New District give significantly different satisfaction scores based on different regional distributions, it is necessary to carry out further research on the influencing factors of the overall satisfaction in each region in order to further improve the overall satisfaction level. Based on this, this study conducted a regression analysis on the influence degree of sub-satisfaction of new District users and non-new district users on the overall satisfaction level, and the specific results are shown in Table 3.

**Table 3** Regression analysis results of power supply users' satisfaction in Wenzhouwan New District

| Variable       | New District | Non-New District |
|----------------|--------------|------------------|
| YKBZ           | 0.228        | /                |
| JFFS           | 0.2793       | 0.259            |
| FWZL           | 0.2452       | /                |
| TSXY           | /            | 0.416            |
| GDZL           | /            | 0.205            |
| GZQX           | /            | 0.333            |
| Constant       | 1.288        | 1.251            |
| R <sup>2</sup> | 0.596        | 0.960            |
| F statistic    | 27.297       | 218              |
| ESS            | 7.605        | 20.88            |
| RSS            | 5.154        | 0.862            |
| TSS            | 12.759       | 21.742           |
| Sample number  | 79           | 31               |

By observing the results in Table 3, regression analysis is conducted between new districts and non-new districts, and it is known that there are great differences in the influencing factors of overall user satisfaction between them. First, in the New District, users' satisfaction in the aspects of business expansion, payment method and service quality has a high promoting effect on the overall satisfaction, and the regression coefficient shows a significant positive correlation, indicating that improving the satisfaction level of users in the new District in these three aspects is conducive to the improvement of the overall satisfaction level. Secondly, among all users in non-New District, the aspects of payment method, complaint response, power supply quality and fault emergency repair have a significant promoting effect on the overall satisfaction, indicating that the higher the satisfaction level of non-new District users in these four aspects, the more conducive to the improvement of the overall satisfaction level.

## 5. Strategies for improving the business environment

### 5.1 Research on business environment optimization

Improving the quality of the business environment cannot be achieved without policy support from government departments. Relevant departments should

formulate optimized policies according to the characteristics of the business environment of local enterprises, so that the competitiveness of the business environment can be rapidly improved. Electric power enterprises should, according to the relevant policies and regulations of the state, establish action plans to optimize the business environment of electric power enterprises, put forward feasible plans, enrich and innovate the power service mode, focus on expanding the market scope, provide power support to more enterprises, and optimize the business environment.

### 5.2 Research on business environment optimization

All electric power enterprises should closely focus on the six aspects of reducing the process link, reducing the power connection time, reducing the power cost, strengthening the service innovation, strengthening the process supervision, improving the reliability of power supply, comprehensively establishing the "strong front end, big background" standardized service system that runs through the whole link of the installation and connection, and actively building a new customer power management mode with fewer links, short time, low cost and excellent service. Meanwhile, relying on the whole-process information disclosure and real-time management and control platform, early warning and control are carried out on the work time limit and service quality of each link of business expansion and installation, and the daily monitoring and evaluation mechanism for key work such as business acceptance, solution reply, external engineering construction, meter installation and power connection, and data archiving is established.

### 5.3 Research on business environment optimization

Combined with the local reality, the power enterprises accelerate the construction of a modern service system by promoting the development and upgrading of the power grid and vigorously consolidating the foundation of serving people's livelihood, so as to make 'Access to electricity' more convenient and fast, and take the initiative to meet the diversified demand of each unit. At the same time, it should strengthen the application of the Internet, build a unified network service platform, so that users can apply for and handle business through various channels, improve the efficiency of business handling. With the help of the Internet, all kinds of businesses such as new clothing, capacity increase and payment are fully handled, so that users can realize "business without leaving home". Enterprises should also improve the timeliness and transparency of business management, allow customers to evaluate all aspects of business management by strengthening supervision and management, improve efficiency and optimize the business environment with the help of mass supervision.

## 6. Strategies for improving the business environment

To sum up, the business environment of power enterprises will not only affect the development of the enterprises, but also affect the comprehensive evaluation of the business environment of various regions. Therefore, power enterprises should constantly explore management measures to improve the satisfaction of users who "get power", strengthen lean management of enterprises, take practical actions to reduce power connection links, shorten power connection time and reduce power connection costs, meet the requirements of power users to a greater extent, and accelerate the construction of a standardized, convenient and competitive quality business environment. The construction of our modernization economic system, for promoting our country's high quality economic development to increase momentum, solid foundation.

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