

1 Platform is introduced

1.1 Web profile

1.1.1 Main Functions

Browse existing ESG Performance Appraisal Reports: Users can search the website for completed ESG performance reports of the enterprise.

Upload data to evaluate enterprise ESG performance: Users can upload enterprise data to evaluate ENTERPRISE ESG performance.

1.1.2 Function display

(1) Home page

Users can log in by clicking the button in the upper right corner of the home page. Unregistered users can click the registration button to jump to the registration page and register by email. Registered users can enter their email addresses and passwords for quick login.



After login, a website introduction and a list of existing reports are displayed on the home page. Users can swipe up or down to view ESG reports by industry, and double-click the name to access the detailed report page.



(2) Querying existing reports

Users can directly enter the search list by industry by clicking "Industry" on the task bar of the home page or clicking "Learn more" under the rating results on the home page.

Click the enterprise that you want to query the ESG performance to jump to the ESG performance display page of the enterprise.



You can download the enterprise ESG rating file at the bottom of the screen.



(3) Upload report evaluation

Users can directly click "EVALUATE" on the task bar of the home page or click "one-click Evaluation" under "Pratt & Whitney - Independent Evaluation" on the home page to enter the upload report evaluation interface.



Users can fill in the enterprise indicator data according to the text guide on the web page.

提供您的公司信息

环境管理实践 (选填)

每百万元营收温室气体排放 (吨)	每百万元营收氮氧化物排放量 (吨)
每百万元营收挥发性有机化合物排放量 (吨)	每百万元营收废水排放量 (吨)
每百万元营收悬浮粒子与颗粒物排放量 (吨)	每百万元营收排放的化学需氧量 (吨)
每百万元营收氨氮排放量 (吨)	每百万元营收用电量 (千瓦时)
每百万元营收能源消耗量 (吨标准煤)	每百万元营收天然气使用量

社会管理实践 (选填)

Or upload enterprise annual report and social responsibility report and other relevant materials.

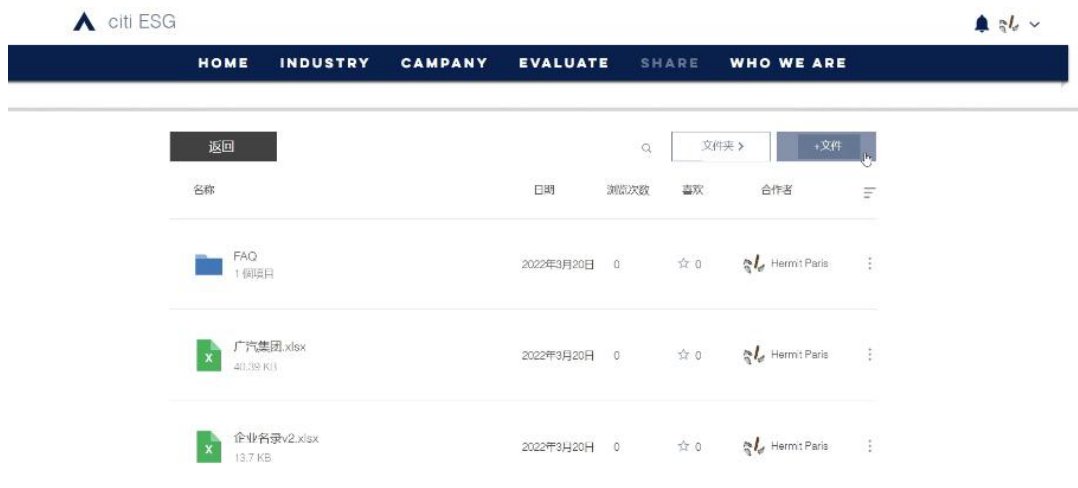
社会管理实践 (选填)

董事会成员出席率 (%)	是否交叉上市
每百万元营收向关联方销售产品规模 (万元)	每百万元关联方向上市公司提供资金 (万元)
前十大股东持股比例	高管持股比例 (%)
关联方销售和采购比例	是否VIE架构
审计委员会会议次数 (次)	薪酬委员会会议次数 (次)

[上传文件 >](#)

[确认](#)

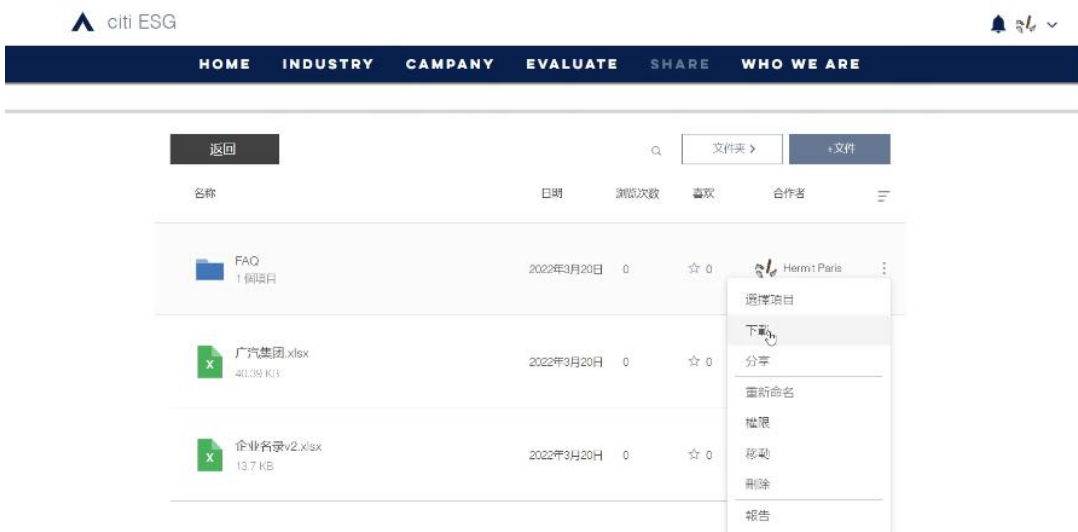
After clicking the submit button, the Citi ESG platform system will automatically evaluate THE ESG performance based on the uploaded corporate data. When the evaluation is complete, the platform notifies the user. The evaluation results are automatically sent to the user's email address.



(4) Download enterprise Report

Users can directly click "SHARE" on the task bar of the home page to enter the interface for downloading enterprise reports.

On this screen, you can save the report collection of each enterprise. Users can right click the folder and then click Download to download the enterprise's report collection (such as annual report, semi-annual report, etc.).



(5) Personal center

Users can click the icon in the upper right corner of the home page to enter the personal center. If the customer has logged in, the personal center interface will display the basic information submitted by the user when registering the account. The customer can also click the Modify button to modify the information. If logged in

customers want to log out, they can click the Log out button to quickly and easily log out of Citi ESG platform.

Users can view the notifications sent by the platform on the personal center page.



(6) feedback

In the feedback interface, users can upload photos or text to the Citi ESG platform to put forward their difficulties in using the Citi ESG platform, and the Citi ESG platform staff will remotely provide detailed answers to the difficulties encountered by users in using the Citi ESG platform. The Feedback interface allows users to upload their suggestions for the development of the Citi ESG platform, which is regularly reviewed and maintained and upgraded.



(7) Business cooperation

The website provides the contact information for users to conduct business negotiations with Citi ESG platform. Merchants can contact the background staff of Citi ESG platform through the contact information on the interface for business cooperation.

1.2 Product positioning

1.2.1 Target market positioning

Citi ESG, an ESG evaluation platform based on machine learning training, aims to objectively and comprehensively evaluate the company's ESG performance and help investors identify the degree of inclusiveness and diversity of the company, so as to help investors make more effective investment decisions. Citi ESG platform is mainly targeted at investors who prefer to make decisions based on the company's ESG performance.

1.2.2 Product demand positioning

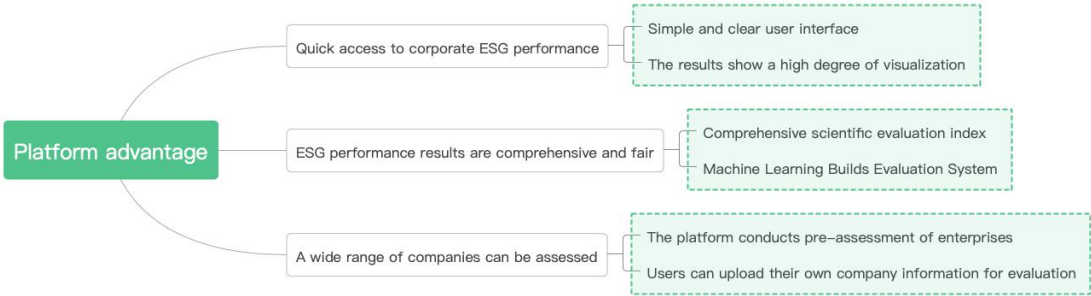
Citi ESG's clients are mainly investors who need to make decisions based on the company's ESG performance. For these investors, access to our platform can meet their needs in the following aspects:

(1) Quick access to enterprise ESG performance. Citi ESG platform clearly and accurately presents enterprise ESG performance to investors through the simple user interface, and the platform information visualization degree is strong, helping investors to quickly obtain effective information.

(2) ESG performance results are comprehensive and fair. Citi ESG platform has

established a set of objective, fair and comprehensive evaluation system for enterprise ESG performance through extensive machine learning in-depth training, which can quickly assess the degree of enterprise inclusion and diversity.

(3) A wide range of enterprises can be evaluated. For large well-known enterprises and enterprises that are frequently reviewed by users, Citi ESG platform will conduct comprehensive ESG performance evaluation on them in the background and publish the results on the platform according to industry classification. Meanwhile, for small local enterprises, investors can upload their annual report and social responsibility report to conduct ESG performance evaluation through Citi ESG platform system, and the platform will provide the general performance results according to the data uploaded by users.



Studies have shown that enterprises with excellent ESG performance have a long-term and stable positive correlation between ESG performance and financial performance. Before making decisions, investors can use Citi ESG to evaluate ESG performance and other non-financial indicators, which can more scientifically and reasonably identify the degree of inclusiveness and diversity of the company, thus reducing investment risks and promoting the development of green finance.

1.2.3 Differentiated value point positioning

Compared with other ESG evaluation platforms, Citi ESG has the following advantages:

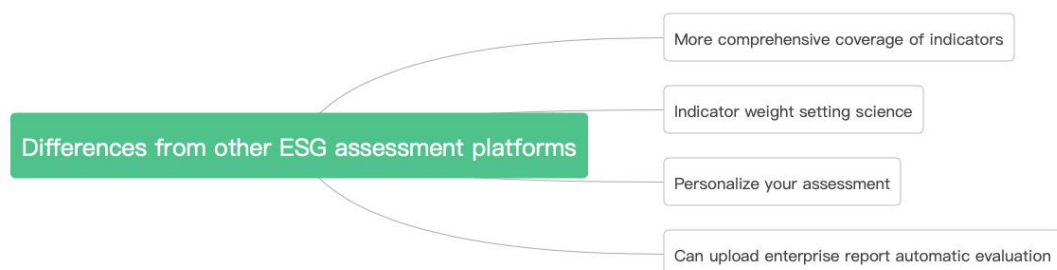
(1) Index range coverage is more comprehensive. Based on various reports of the existing ESG evaluation system, this project made reasonable increases and

decreases of the existing indicators, and determined 3 dimensions and 5 major aspects, a total of 111 indicators.

(2) Scientific index weight setting. This project uses machine learning training and entropy weight method to formulate the weight of indicators, and the weight setting of each indicator is scientific and reasonable.

(3) Individualized assessment methods. Error cannot be avoided by using the same set of evaluation system for companies in different industries. Therefore, this project makes a breakthrough in developing different index weights for companies in different industries, focusing on personalized ESG performance evaluation for companies in different industries.

(4) Can upload enterprise report automatic evaluation. Unlike the existing ESG performance evaluation platform, which can only view the ESG performance of a small number of enterprises, this project supports investors to upload relevant reports of the company voluntarily. Citi ESG platform will automatically identify the indicators in the uploaded files and conduct ESG performance evaluation, supplementing the existing ESG performance evaluation enterprise database.



1.3 Platform advantages

1.3.1 ESG evaluation results are more scientific

During the development of Citi ESG platform, our team extensively investigated white papers, industry reports and other authoritative documents in the field, deeply analyzed, classified and optimized the logic of existing ESG evaluation indicators, and innovatively constructed a more scientific and systematic evaluation indicator system. Using machine learning to a large amount of data training at the same time, in

accordance with the industry of industry classification of the target weights of the categories of different enterprises, to ensure that when making personalized ESG performance evaluation, Citi ESG to corporate annual reports from users to upload files accurately and effectively capture the evaluation indicators, to assess the accuracy of the results provide a reliable guarantee

1.3.2 Strong visualization of ESG results

Citi ESG evaluation results presentation interface is simple, beautiful, clear and easy to understand. The platform will mainly present performance evaluation results through dynamic charts, while assisting to highlight key results with colors, special dynamic symbols and other identifiers. Subsequently, the platform can further develop the visualization of data analysis process, multi-format export of evaluation results and other functions to further improve the result display effect, so that users can choose the required format to export and save the evaluation results.

1.3.3 Provide excellent interactive experience for users

In the process of building the Citi ESG platform, in addition to improving the reliability of evaluation results, we also focused on optimizing customers' interactive experience when using the platform. Citi ESG platform will provide clear operation guidance for users. Users only need to upload the annual report and other documents for ESG evaluation, and the platform will automatically extract and integrate the key information from the uploaded documents without other complicated manual annotation and data input. At the same time, the platform will later develop a corporate performance comparison function, users can choose more companies through the Citi ESG evaluation platform to compare their inclusion and diversity.

1.3.4 Strong platform plasticity

At present, Citi ESG aims to help investors who prefer to make decisions based on the performance of the company to identify the degree of inclusiveness and

diversity of the company. However, the Citi ESG platform can be connected to citibank's daily credit business and become a green credit booster for Citibank, contributing to the strategic layout of citibank's green credit. In January 2020, CBRC issued the Guiding Opinions on Promoting high-quality Development of Banking and Insurance industry, which clearly pointed out that banking institutions need to establish and improve environmental and social risk management systems, and incorporate ESG management factors into the whole process of credit decision-making. Integrating Citi ESG platform into Citibank's daily credit granting business process, and using Citi ESG to evaluate enterprise ESG performance and other non-financial indicators before providing credit and other financial support to enterprises, citibank can select businesses in a more scientific and reasonable way, reduce the credit risk of Citibank and improve its sustainable competitiveness.



2 Business model

2.1 Overview

2.1.1 The overview of business model

Business model is to form a complete and efficient operation system with unique core competitiveness, which points to achieve the maximization of customer value, integrates the elements inside and outside the enterprise operation; and at the same time, to make the system achieve sustainable profitable overall solution through the optimal realization form in order to satisfy customers' demand, and carry out customers' value.

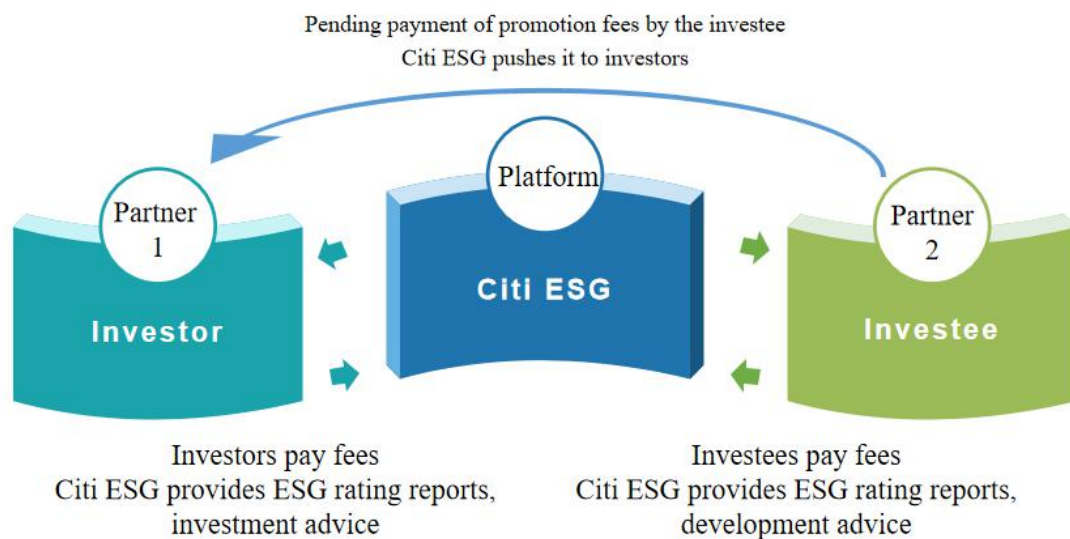
ESG, short for Environmental, Social and Governance, is an investment concept and corporate evaluation criteria which focuses on corporate Environmental, Social and Governance performance rather than financial performance. Based on ESG evaluation, investors can evaluate the investment performance and the contribution of enterprises (investment objects) in promoting sustainable economic development and charging social responsibility, through observing ESG performance of the enterprises. According to academic studies, the performance of an enterprise is not only related to the realization of profit goals and shareholder value, but more importantly depends on whether it can coordinate with the society and the environment and make its own progress without damaging the sustainable development of the economy and society. Traditional evaluation methods of the enterprise performance take financial factors into account more than environmental, social, corporate governance and other factors, especially the environmental factors. This leads to the phenomenon that the traditional evaluation methods can not fully measure the sustainable development ability of enterprises. Therefore, the advantages of ESG corporate rating method, which evaluates corporate performance in environmental, social and governance comprehensively, have been becoming increasingly outstanding.

Nowadays, the ESG evaluation platform available on the market is still in an incomplete development state. The index score often deviates from the objective

reality. Scores don't fully capture their true value especially for companies with more inclusiveness and variety. As a result, investors may not be able to judge the value of the companies they want to invest in accurately, and they may miss the companies that are truly worth investing in.

Citi ESG provides an ESG rating platform for investors who prefer to invest in companies that fit the ESG strategy, in order to help identify companies that are more inclusive and various. As to Citibank and its cooperative companies, this increases the customer base; while as to their customers, it provides convenient and affordable ESG rating service, ultimately enabling customers, major cooperative companies and Citibank to obtain high profits.

2.1.2 Canvas diagram of business model



Canvas diagram of business model

Future explanation:

Citi ESG's customers can be divided into two categories. One is investors, mainly including enterprises and financial institutions (investors) that need to invest in ESG company; the other is companies to be invested (investees), mainly including enterprises with financing needs.

As for the first type, Citi ESG provides the customers with ESG rating report and investment advice required by the customers.

As for the second type, Citi ESG provides customers' ESG rating reports and gives customers' development suggestions in the direction of ESG. This type of customers may pay for certain Citi ESG fees and promotion fees in order to objectively promote their ESG rating reports to the customers of the first type to attract investment.

2.1.3 Core competitiveness

(1)Scientific and comprehensive ESG rating index

The reasonable selection of rating index is the core issue of ESG evaluation platform operation. During the development stage of Citi ESG platform, our team extensively investigated The White Papers, industry reports and other authoritative documents in related field, and then deeply analyzed, classified and optimized the logic of current ESG evaluation index, and innovatively constructed a more scientific and systematic evaluation index system. Thus, when conducting ESG evaluation, Citi ESG can positively obtain and organize 111 indicators from 3 dimensions and 15 aspects from corporate annual reports and other documents uploaded by users, providing the most reliable guarantee for the accuracy of final results.

(2)Break through the barriers between investors and investees

Enterprises to be invested may pay for certain Citi ESG fees and promotion fees in order to objectively promote their ESG rating reports to the customers of the first type to attract investment.

Citi ESG creatively connects enterprises invested and to be invested directly. While realizing the ESG rating function, it provides channels investment and financing for the two types of customers.

3 Technology Implementation

3.1 Model Construction - Entropy Method

To build ESG indicators, we noticed that ESG data and the rating agencies, in the source, the organization's mission, legal status, rating, the products and services, etc., there are big differences, hard to auto industry's unique properties (for example, brought by the new energy battery technology innovation results in a decrease of carbon emissions should be given more weight). Therefore, based on the existing ESG rating agencies in the market, we constructed an ESG scoring method for automobiles and new energy vehicles covering multiple stock markets.

3.1.1 Index selection

Indicators are divided into the following three categories. The first category is the traditional numerical variable, indicating the specific performance of the company in esG-related aspects, such as the company's nitrogen oxide emissions per million receivable. The second type is a series of dummy variables that indicate whether the company has taken effective measures in some aspect of ESG. A value of 1 for this variable indicates that we have found relevant measures confirmed by the company through open channels, such as whether the company has set up a CSR committee to regulate its social responsibilities. The third category is word frequency from the company's annual report, we believe that the higher the word frequency number represents the company's attention to this aspect. Even if companies can whitewash their ESG behavior with non-quantitative indicators, we can still use the corresponding method to judge the quality of information disclosed by ESG text. Due to the inconsistent disclosure standards of A-shares, American stocks and Hong Kong stocks, these indicators may be missing to A certain extent, but we have improved the construction of these indicators to the greatest extent in order to get the most accurate results. By the submission date of this report, we have completed most of the index search.

3.1.2 the entropy weight method

ESG comprehensive evaluation system includes three parts: environment, society and corporate governance, and each part has many small items. Therefore, we consider a two-step fitting method. In the first step, the entropy weight method is used to determine the weight required for the numerical weighted fitting of each sub-item to synthesize the scores of each major part. In the second step to determine the final score, we consider environmental, social and corporate governance to be equally important. Therefore, we consider the equal-weight method to determine the final score.

The entropy weight method carries out objective weight assignment based on the index variability: the smaller the information entropy of an index is, the greater the variation degree of the index is and the more information it provides, namely, the greater the influence and the greater the weight. The entropy weight method is used to assign weights to the indexes of small items. First of all, we need to determine the cost index and benefit index in the sub-item and adopt different normalization methods respectively.

The efficiency indicators shall be standardized as follows:

$$x'_{ij} = \frac{x_{ij} - \min\{x_{1j}, \dots, x_{nj}\}}{\max\{x_{1j}, \dots, x_{nj}\} - \min\{x_{1j}, \dots, x_{nj}\}}$$

Cost indicators are treated in a similar way:

$$x'_{ij} = \frac{\max\{x_{1j}, \dots, x_{nj}\} - x_{ij}}{\max\{x_{1j}, \dots, x_{nj}\} - \min\{x_{1j}, \dots, x_{nj}\}}$$

Step1: Calculate the ratio under the training set to reflect the variation degree of indicators x'_{ij}

$$p_{ij} = \frac{x'_{ij}}{\sum_{i=1}^n x'_{ij}} (i = 1, \dots, n)$$

Step2: calculate the information entropy x'_{ij}

$$e_j = -\ln(n)^{-1} \sum_{i=1}^n p_{ij} \ln p_{ij}$$

Step3: determine the weight of each minor item based on information redundancy

$$w_j = \frac{1 - e_j}{\sum_{i=1}^n (1 - e_{ij})}$$

Step4: The weight obtained by Step3 is weighted to determine the score of each major item

$$F_i = \sum_{j=1}^m w_j x'_{ij} (i=1, \dots, n)$$

Step5: The equal-weight method was used to determine the comprehensive ESG score

$$F = \frac{1}{n} \sum_{i=1}^n F_i$$

3.2 Machine Learning——NLP

3.2.1 background

Because we need according to the given keywords extracted from annual reports of massive amounts of text information related to the ESG, a very natural idea is using the keyword matching, but this method has some problems, such as the annual report only semantic similar word, or is the order of the phrases and we provide the key words do not match the sequence of Chinese characters, These problems all lead to the failure of the matching task. Therefore, we thought of using BLEU(Fluent Evaluation Understudy), an indicator of NLP(Nature Language Process) in machine learning to measure the distance between translated text and Ground Truth.

3.2.2 The principle of

Here is the formula for BLEU

$$BLEU = BP \cdot \exp\left(\sum_{n=1}^N w_n \log P_n\right)$$

$$BP = \begin{cases} 1 & \text{if } c > r \\ e^{1-r/c} & \text{if } c \leq r \end{cases}$$

BLEU starts from a single word to match the given keyword with the sentence to get P_1 , and then gradually increases the number of matching words to get P_2, P_3, \dots . Finally, these scores are weighted (the actual operation is to calculate the expectation) to obtain the BLEU score of a set of keywords for a given sentence.

3.2.3 Implementation details

PDF miner is used to extract text information from PDF files.

Since we need to process Chinese text, we use some methods of NLP for Chinese preprocessing:

- Create stopwords to remove nonsense words such as "of" and "of".
- Jieba, a natural language processing library, is used to achieve sentence segmentation in Chinese text paragraphs.
- Then we calculated the corresponding BLEU score for each sentence, and selected the result with the highest score from all the results as the result of enterprise ESG score.