COMP9900

INFORMATION TECHNOLOGY PROJECT

PROJECT NUMBER: P13

PROJECT TITLE: ESG MANAGEMENT SYSTEM (WEB APPLICATION) FOR FINTECH INDUSTRY

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Contents

1. Background

1.1 Problem statement

In the current era, where sustainability and environmental concerns are gradually going at the forefront of the world discourse, the financial industry is facing a significant transformation. The emphasis on sustainable development and green finance not only reshapes the strategies of investment but also redefines the methodologies of company operation and governance. This conversion is mainly driven by a growing recognition of the financial risks and opportunities along with the concept of environmental protection, which causes corporations to adopt sustainable business ethics.

Initiatives such as the United Nations Environment Programme (UNEP) and the Task Force on Climate-related Financial Disclosures (TCFD) highlight the importance of integrating environmental considerations into financial decision-making. Furthermore, the adoption of International Financial Reporting Standards (IFRS) and the focus on Fixed Income (FI) markets also reflect the industry's commitment to transparency and accountability. These standards ensure that financial statements provide a true and fair view of a company's financial performance, including its environmental impact and sustainability practices.

In response to the evolving landscape of sustainable finance and the pressing need for transparency and accountability in environmental, social, and governance (ESG) practices, our project aims to develop a cutting-edge ESG Management System specifically designed for the FinTech industry. This web application will serve as a comprehensive platform for financial institutions to manage and report on their ESG metrics and integrate these considerations into their core business strategies.

By leveraging big data analytics and visualization, the ESG Management System will provide insights into ESG risks and opportunities, facilitating informed decision-making and enhancing transparency. In doing so, it will contribute to the broader effort to promote sustainable finance and investment, supporting the transition to a more sustainable and resilient global economy.

1.2 Existing system analysis

For reference learning, we search for the existing ESG rating sites MSCI (https://www.msci.com/), and REFINITIV (https://www.refinitiv.cn/) to summarize the advantages and disadvantages of these two websites.

MSCI:

MSCI provides comprehensive research and ratings for thousands of companies, evaluating their resilience to long-term, industry-material ESG risks. The ratings range from 'CCC' to 'AAA' and encompass a diverse array of industries and geographies. It offers valuable insights for investors and businesses looking to integrate ESG considerations into their decision-making processes. However, MSCI's complexity and cost can limit accessibility for

smaller investors or firms. Additionally, its static nature of rating may not fully capture the rapid changes within a company's ESG performance over time.

Refinitiv ESG Scores:

Refinitiv ESG scores aim to measure ESG performance across ten main themes. Its strengths lie in extensive, objective scoring and dynamic bench-marking. By leveraging publicly available data, Refinitiv provides a comprehensive assessment of companies' ESG practices. However, transparency can be an issue, as companies may find it challenging to understand how to improve their scores.

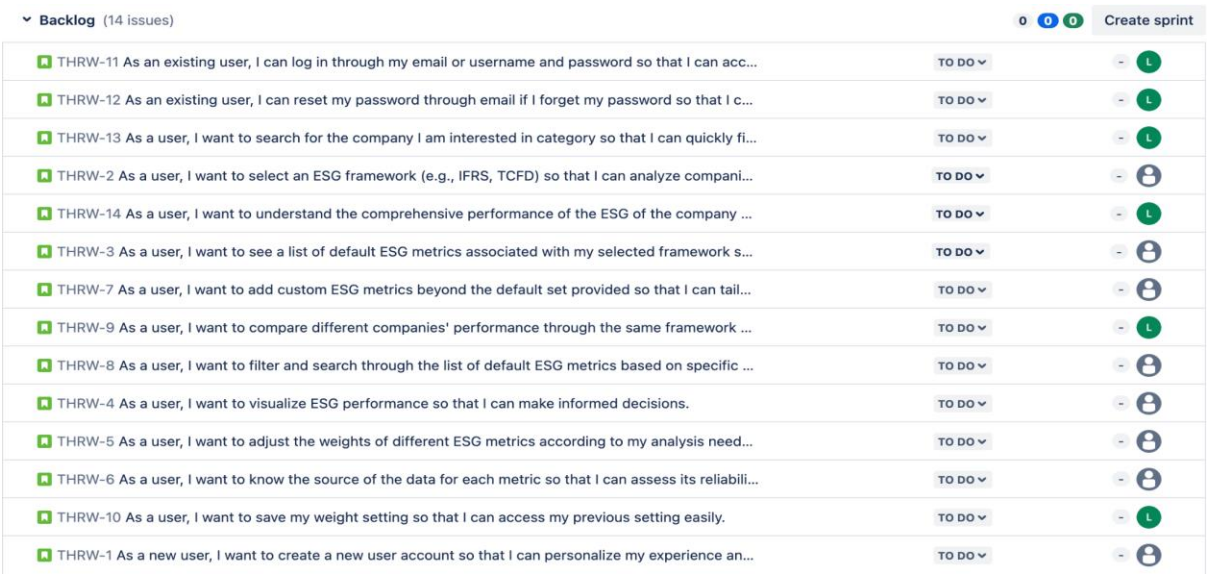
Both MSCI and Refinitiv ESG scores represent significant advancements in ESG management, offering robust frameworks for evaluating and integrating ESG criteria into investment and business decisions. Their contributions have helped to drive the adoption of ESG practices and enhance transparency and accountability in the corporate world.

2. User Stories and Sprints

2.1 Product Backlog

The product backlog for the ESG Management System project is structured around user stories that clearly define the functionality we aim to deliver. These functions are designed to meet the specific needs and insights of our users, ensuring the platform adds value and improves their experience.

Backlog in Jira:



2.2 User Stories and Acceptance Criteria:

Objectives	User Story	Acceptance Criteria
User Authentication and Management	As a new user, I want to create a new user account so that I can personalize my experience and save my preferences.	1. User can fill a registration form with personal information. 2. System validates email uniqueness. 3. User receives a confirmation email to verify the account. 4. Upon email verification, the user can customize preferences.

	As an existing user, I can login via my email or username and password so that I can access my personalized settings and data.	1. User enters email/username and password. 2. System validates credentials against the database. 3. On successful login, the user is redirected to the dashboard. 4. User can access and modify personalized settings.
	As an existing user, I can reset my password through email if I forget my password so that I can regain access to my account without hassle.	1. User requests password reset via email. 2. System sends a reset link to the user's email. 3. User sets a new password using the link. 4. System confirms the password reset.
ESG Framework and Matrix Selection	As a user, I want to select an ESG framework (e.g., IFRS, TCFD) so that I can analyze companies' performances based on this framework.	1. User presented with a list of ESG frameworks. 2. User selects a framework from the list. 3. System displays the metrics associated with the selected framework. 4. User can view company performances under the chosen framework.

	As a user, I want to see a list of default ESG metrics associated with my selected framework so that I can quickly understand the standard criteria used in ESG analysis.	1. Default metrics for the selected framework are listed clearly. 2. Descriptions and sources for each metric are provided. 3. User can add metrics to their analysis dashboard. 4. System updates the analysis based on selected metrics.
	As a user, I want to filter and search through the list of default ESG metrics based on specific categories like Environmental, Social, and Governance, so that I can find metrics relevant to my analysis focus quickly.	1. Filters available for ESG categories. 2. Search results update in real-time based on filters. 3. System provides brief descriptions for each metric. 4. User can select metrics directly from the search results for analysis.
Custom ESG Metrics Management	As a user, I want to add custom ESG metrics beyond the default set provided so that I can tailor the analysis to meet specific needs or insights.	1. User can access a form to add new metrics. 2. Custom metrics require a name, description, and data source. 3. System validates the new metric for duplication. 4. User can view and use the custom metric in their analysis.

	As a user, I want to adjust the weights of different ESG metrics according to my analysis needs so that the analysis reflects my priorities.	1. Weight adjustment feature is intuitive and user-friendly. 2. Changes in weights immediately reflect in analysis results. 3. System allows saving and retrieval of weight settings. 4. User can reset weights to default settings.
	As a user, I want to save my weight setting so that I can access my previous setting easily.	1. Save functionality is clearly marked and accessible. 2. Users receive confirmation upon saving settings. 3. Saved settings are listed for easy access. 4. System allows multiple saved settings per user.

ESG Performance Visualization	As a user, I want to understand the comprehensive performance of the ESG of the company through a dashboard that I choose, such as the ESG rate.	1. Dashboard displays key ESG performance indicators. 2. User can customize dashboard widgets. 3. Historical performance trends are visualized. 4. Comparative analysis with industry benchmarks available.
	As a user, I want to visualize ESG performance so that I can make informed decisions.	1. Visualization tools include line graphs, bar charts, etc. 2. User can choose the time frame for analysis. 3. System displays data trends over the selected period. 4. Visualizations are interactive and customizable.

Industry-Specific Company Exploration	As a user, I want to compare different companies' performance through the same framework so that I can identify leaders and laggards in ESG practices.	1. Comparison tool allows selection of multiple companies. 2. System displays ESG data side-by-side for chosen companies. 3. Comparisons can be customized by selecting specific metrics. 4. Results highlight performance leaders and laggards.
	As a user, I want to search for the company I am interested in category so that I can quickly find and analyze companies relevant to my ESG interests.	1. User inputs search criteria in the search bar. 2. System displays matching companies in real-time. 3. User can refine search with filters. 4. Selected company's ESG data is accessible with one click.

Data Source Verification	As a user, I want to know the data source for each metric so that I can assess its reliability.	1. Each metric is accompanied by its data source. 2. Sources include publication date and reliability rating. 3. User can access the original data source with a click. 4. System alerts users to outdated or unreliable sources.

2.3 Novel Functionalities

Our ESG Management System introduces several innovative features through its user stories, distinguishing it from existing platforms like MSCI and Refinitiv:

Dynamic ESG Metric Weighting:

- User Story: As a user, I want to adjust the weights of different ESG metrics according to my analysis needs so that the analysis reflects my priorities.
- Novel Functionality: Unlike static ESG evaluation models, our system allows users to dynamically adjust the weightage of ESG metrics to tailor the analysis to their specific investment strategy or risk appetite. This personalized approach enhances decision-making

Custom ESG Metric Integration:

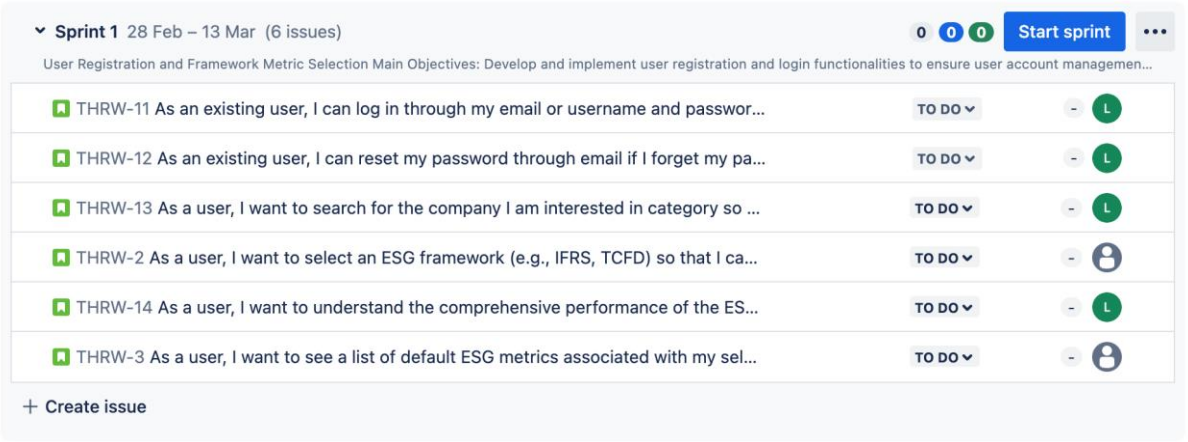
- User Story: As a user, I want to add custom ESG metrics beyond the default set provided so that I can tailor the analysis to meet specific insights or regulatory requirements.
- Novel Functionality: Our system empowers users to integrate bespoke ESG metrics into their analysis, offering flexibility to accommodate unique regulatory environments or corporate sustainability goals, a feature often absent in rigid, predefined models.

2.4 Project Sprints

The project includes three sprints which are focused on different goals. Also, each sprint period is 2 or 3 weeks.
The details are shown below.

First Sprint:

Dates	Objectives	Jira Backlog ID
28/02/2024-13/03/2024	The first page for a new user or existing user without a login should be accomplished. This supports creating a new user account, logging in through username/email address and resetting the password. In addition, the home page, used to choose the framework for the single company, should be completed.	THRW-1 THRW-11 THRW-12 THRW-13 THRW-2 THRW-14 THRW-3



Second Sprint:

Dates	Objectives	Jira Backlog ID
13/03/2024-3/04/2024	The page which is used to compare multiple companies' ESG performance should be accomplished. In addition, the page which is mentioned before should support graphs and tables to illustrate the data. The entire website should support a filter or search function for ESG metrics. The other metrics which is not associated with the framework should be supported and illustrated.	THRW-7 THRW-9 THRW-15 THRW-8

Third Sprint:

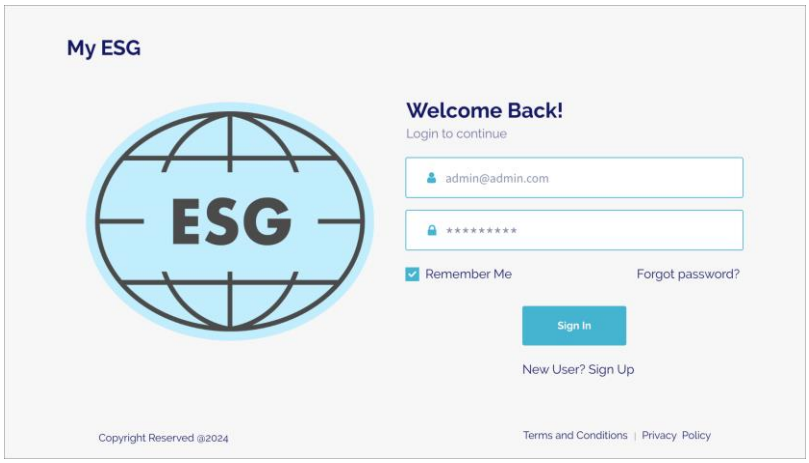
Dates	Objectives	Jira Backlog ID

3/04/2024- 17/04/2024	The real-time update of the website should be supported, and the metrics should be updated with the changed data. The website should support changing the weight of the framework chosen. The website should illustrate the data source of the metrics. The personal information should be stored locally.	THRW-4 THRW-5 THRW-6 THRW-10

3. Interface and Flow Diagram

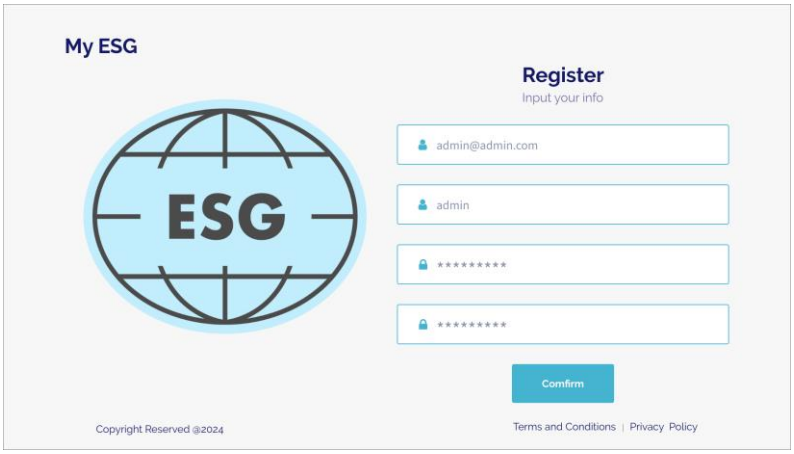
3.1 Login Page

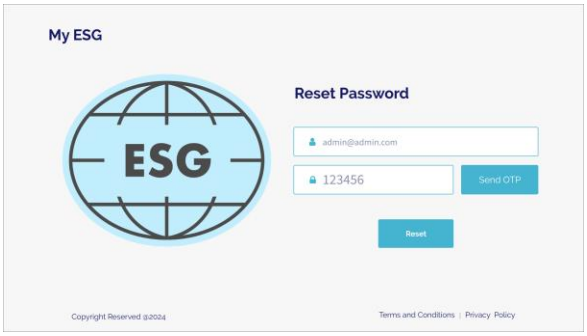
On the Login page, there are options for both registering a new account and resetting a forgotten password. Select "Remember Me" to automatically log in for future visits.

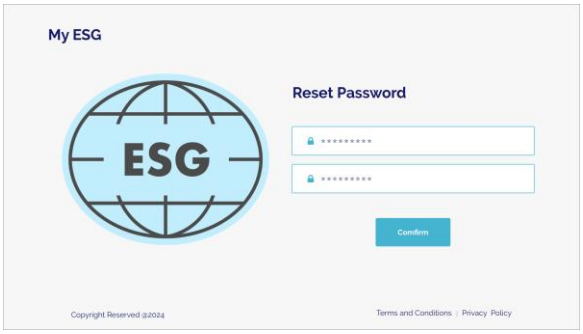


3.2 Register Page and Search Page

Clicking the "Send OTP" button initiates a process where verification information is sent to the user to confirm their identity. Once verified, the user is directed to the page where they can set up a new password.

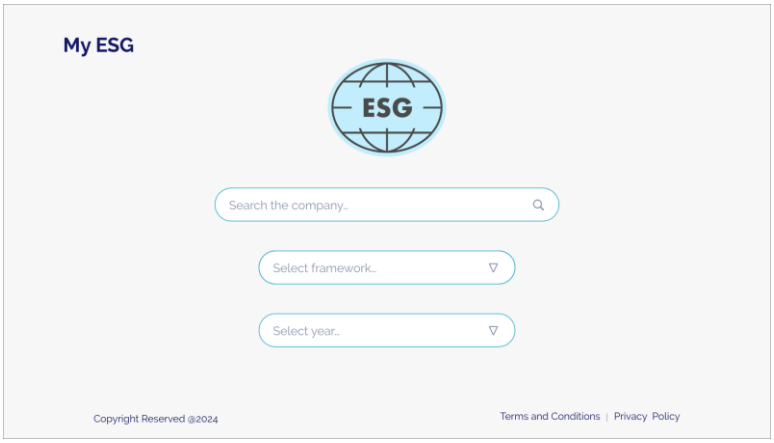






3.3 Search Page

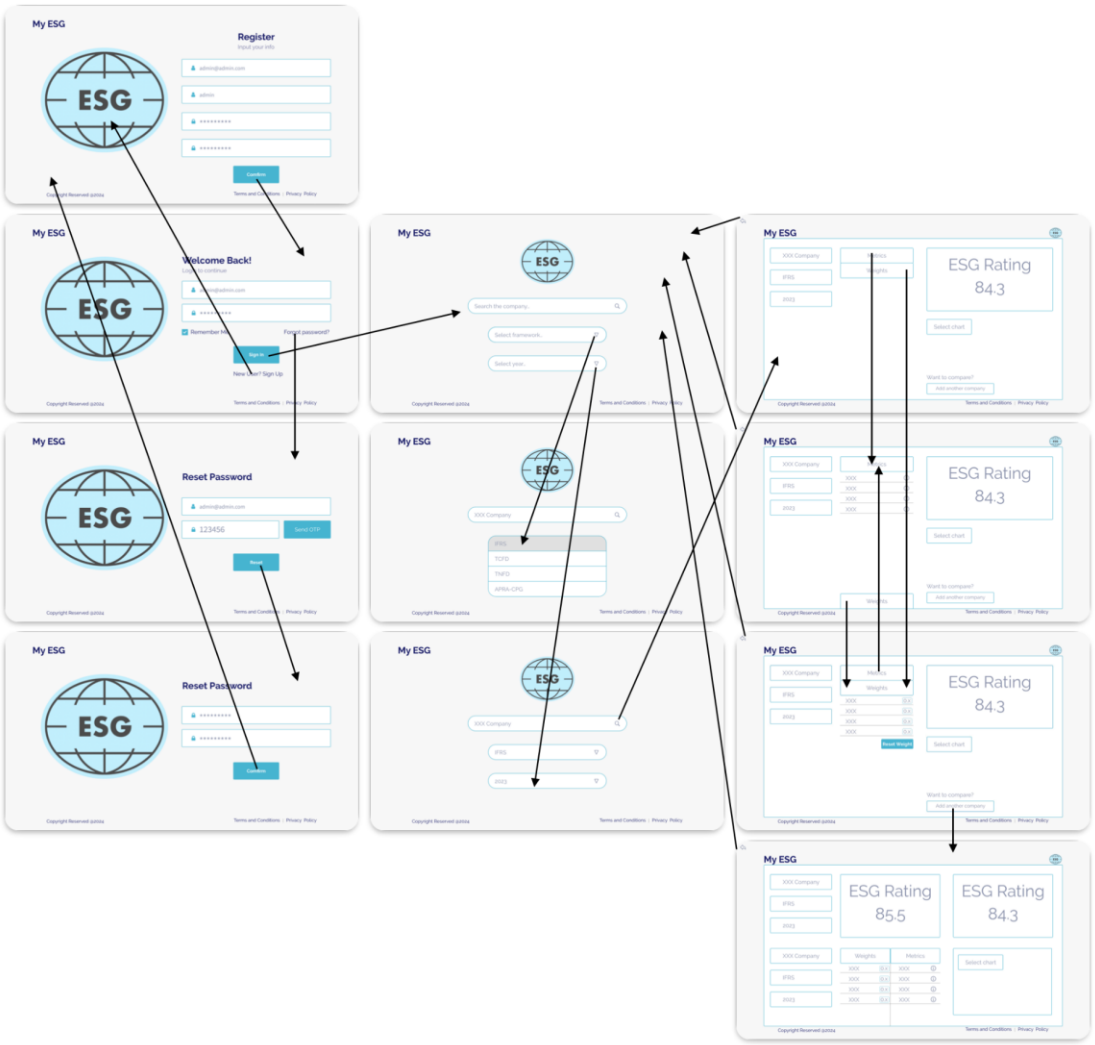
On the Search Page, a user can search specific properties based on their ideal conditions. After you select the search criteria, the system goes to Show Page.



3.4 Show Page and Compare Page

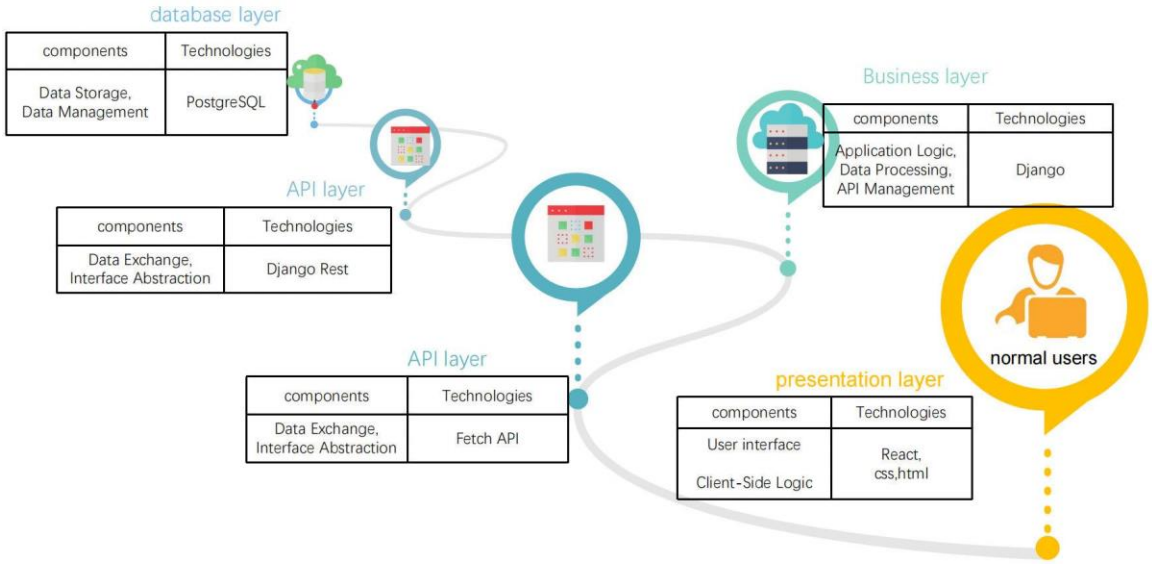
From this page you can set one or more sets of Metrics and Weights and Select the desired Select chart. Click the " Add another company " button to go to the compare page to add another company data for comparison.

3.5 Page Relations



4. System Architecture

4.1 System Architecture Diagram



4.2 External Actors and Their Interactions

In this project, we will only have one type of user, which is the general user. Users interact with the system through the front-end interface.

The ways users interact with the system include logging into the system, selecting different companies and frameworks to view ESG metrics, choosing different metrics according to preferences or adjusting the weight of metrics. At the same time, users can also compare the metrics of two companies or the metrics of the same company in different years. Additionally, users can select different types of charts to view the metrics.

4.3 Technologies and Third-party Functionality

Front-End: React
As a front-end library, React is used to build user interfaces, providing fast response and dynamic data rendering. It simplifies the creation of interactive and reusable UI components, optimizing performance and rendering speed through its virtual DOM mechanism, significantly enhancing the overall platform user experience.

Back-End: Django

This framework handles backend application logic and database interactions, simplifying data processing and HTTP request management, and making backend development more efficient and flexible.

API: Django REST framework
By creating RESTful APIs, this framework makes data exchange between the frontend built with React and the backend straightforward and fast, supporting seamless connections.

Database:PostgreSQL
As a storage solution, the PostgreSQL database securely stores user information and ESG-related data, ensuring efficient and safe data access.

ESG Data APIs: Integrating external ESG data APIs allows our system to provide the latest and authoritative company ESG performance data, enhancing the platform's data value and user trust.

Cloud Hosting Services: AWS
Choosing AWS cloud services provides our application with high availability, scalability, and security, ensuring stable operation and future growth potential.

Data Visualization Libraries:Chart.js
Utilizing the Chart.js library for ESG data visualization not only makes the data presentation more intuitive but also significantly improves the user interaction experience.

5. References