

MANAGEMENT SYSTEM OF CARBON ASSESSMENT FOR SUPPLY CHAINS

BACKGROUND OF THE INVENTION

Technical Field

[0001] The present invention relates generally to carbon assessment, and more particularly to a management system of carbon assessment for supply chains.

Description of Related Art

[0002] Carbon emissions have become one of the major factors affecting global climate change. To be sustainable and environmentally friendly, a company needs to have an in-depth understanding of the greenhouse gas emissions and carbon footprint of their production. As a result, carbon assessment is an essential element of operations for many companies.

[0003] As companies increasingly rely on global supply chains, carbon emissions at any stage in the supply chains could significantly impact companies' environmental responsibility. Meanwhile, governments are increasingly enforcing stricter regulations on carbon emissions, leading to increased compliance requirements for companies. Relying solely on carbon emissions data internally collected from companies for assessment may not fulfill the requirements, leading to compliance risks. Moreover, companies may encounter legal risks and damage to their reputation if they fail to provide information regarding the carbon assessment of their suppliers.

BRIEF SUMMARY OF THE INVENTION

[0004] In view of the above, the primary objective of the present invention is to provide a management system of carbon assessment for supply chains, which integrates carbon assessment results for multiple associated suppliers.

[0005] The present invention provides a management system of carbon assessment for supply chains that includes a supplier database, a project database, a preprocessing device, an invitation device, and a computing device. The supplier database is configured

to store a plurality of sets of supplier information of a plurality of suppliers, each set of the supplier information including a communication account. The project database is configured to store a master project and a plurality of assessment projects corresponding to the plurality of suppliers. The preprocessing device is signally connected to the supplier database, the preprocessing device selecting multiple sets of the supplier information from the supplier database to form a plurality of sets of associated supplier information. The invitation device is signally connected to the preprocessing device, the supplier database, and the project database. The invitation device transmits an invitation message to each of the communication accounts in the associated supplier information, each of the invitation messages including an invitation serial number. The invitation device sets each of the assessment projects in the project database corresponding to each set of the associated supplier information as an associated assessment project after the invitation device receives a reply message corresponding to the invitation serial number of each invitation message, and the invitation device associates each of the associated assessment projects with the master project. The computing device is signally connected to the project database, and the computing device calculates individual carbon emissions and total carbon emissions of the plurality of associated assessment projects associated with the master project.

[0006] With the aforementioned design, the associated assessment projects of the suppliers could be associated with the master project, and the individual carbon emissions and total carbon emissions of the associated assessment projects could be calculated. Thus, the master project could integrate the assessment results of the associated assessment projects for the associated suppliers in the supply chain, effectively reducing the time and cost of carbon assessment.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0007] The present invention will be best understood by referring to the following

detailed description of some illustrative embodiments in conjunction with the accompanying drawings, in which

[0008] FIG. 1 is a schematic view, illustrating a connection of management system of carbon assessment for supply chains according to a first embodiment of the present invention;

[0009] FIG. 2 is a schematic view of the management system of carbon assessment for supply chains according to the first embodiment of the present invention;

[0010] FIG. 3 is a flow chart illustrating an operation method of the management system of carbon assessment for supply chains according to the first embodiment of the present invention; and

[0011] FIG. 4 is a schematic view of a webpage illustrating an assessment result of the master project.

DETAILED DESCRIPTION OF THE INVENTION

[0012] A management system 1 of carbon assessment for supply chains according to a first embodiment of the present invention is illustrated in FIG. 1 and FIG. 2, wherein the management system 1 of carbon assessment for supply chains is for a plurality of electronic devices 40, which include at least one first electronic device 402 and a plurality of second electronic devices 404, to signally connect to. In the current embodiment, the plurality of electronic devices 40 signally connect to the management system 1 of carbon assessment for supply chains via the Internet 50. Each of the electronic devices 40 could be, for example, a computer, a mobile phone, a tablet, or any other device that could be connected to the Internet 50. The first electronic device 402 is operated by a user of a brand that produces one or more products while the plurality of second electronic devices 404 are respectively operated by users of a plurality of suppliers in the supply chain. In an embodiment, there could be a plurality of first electronic devices 402 that are respectively operated by users of various brands.

[0013] The management system 1 of carbon assessment for supply chains includes a supplier database 10, a project database 12, a preprocessing device 14, an invitation device 16, and a computing device 18. Optionally, the management system 1 of carbon assessment for supply chains could further include a data exchange device 20. In the current embodiment, the supplier database 10, the project database 12, the preprocessing device 14, the invitation device 16, and the computing device 18, and the data exchange device 20 are signally connected to each other via a communication interface 22 that may be, without limitation, a local area network or the Internet 50. The communication interface 22 is connected to the Internet 50 through a communication device 24 to be signally connected to the plurality of electronic devices 40. In this way, after each of the electronic devices 40 is connected to the management system 1 of carbon assessment for supply chains, each of the electronic devices 40 is signally connected to the supplier database 10, the project database 12, the preprocessing device 14, the invitation device 16, the computing device 18, and the data exchange device 20 through the communication device 24 for communication. In addition, the management system 1 of carbon assessment for supply chains is further signally connected to an external system 60 via the Internet 50 to exchange data with the external system 60, which is a management system of carbon assessment operated by another company.

[0014] The supplier database 10 is configured to store a plurality of sets of supplier information of a plurality of suppliers, each set of the supplier information including a communication account. In the current embodiment, the supplier information is created by the user of the brand through the first electronic device 402, and the user of the brand creates the supplier information for relevant upstream or downstream suppliers in the supply chain in the supplier database 10. In the current embodiment, the communication account is an email account as an example, but it is not limited thereto; the communication account could also be an account for other communication software. Each

set of supplier information could further include a supplier identifier (e.g., business ID number), name of business entity, plant, region, industry classification, address, and item number of supplied items.

[0015] The project database 12 is configured to store projects. Users of each electronic device 40 could create corresponding assessment projects (i.e., carbon assessment projects) in the project database 12 through each electronic device 40; for example, the user of the brand could create one or more master projects. The following takes one master project as an example. The user of each supplier could create an assessment project thereof and each assessment project has an assessment period (e.g., a specific assessment year, or a quarter of a specific assessment year). The assessment projects could be a greenhouse gas assessment project created in accordance with ISO 14064-1:2018 standard, or a product carbon footprint project created in accordance with ISO 14067:2018.

[0016] The preprocessing device 14 is signally connected to the supplier database 10. The invitation device 16 is signally connected to the preprocessing device 14, the supplier database 10, and the project database 12. The computing device 18 is signally connected to the project database 12 and the supplier database 10. The data exchange device 20 is signally connected to the project database 12.

[0017] An operation method of the management system 1 of carbon assessment for supply chains according to the current embodiment will be described with reference to FIG. 3.

[0018] Step S11: setting a master project.

[0019] The user of the brand operates the first electronic device 402 to connect to the management system 1 of carbon assessment for supply chains. In the current embodiment, the first electronic device 402 is logged into the management system 1 of carbon assessment for supply chains with an account for the brand. The first electronic

device 402 transmits a master project create command to the preprocessing device 14, and the preprocessing device 14 creates a master project required by the brand in the project database 12 based on the master project create command. The first electronic device 402 obtains all the supplier information of the brand from the supplier database 10 through the preprocessing device 14. The user of the brand could select multiple sets of the supplier information to be associated on the first electronic device 402 to form a select command. The first electronic device 402 transmits the select command to the preprocessing device 14, and the preprocessing device 14 receives the select command and selects multiple sets of the supplier information in the supplier database 10 based on the select command to form a plurality of sets of associated supplier information. The suppliers to which the sets of associated supplier information correspond become a plurality of associated suppliers of the master project.

[0020] In addition, the first electronic device 402 could further set a specified period of the master project and select a payment method, wherein the specified period is used to specify the assessment period, e.g., an entire year of a specific year, or a quarter of a specific year. The payment method is used to set fees for the master project, which will be paid by the brand owner or by the associated suppliers. This serves as a basis for a company of the management system 1 of carbon assessment for supply chains to charge the brand or the associated suppliers.

[0021] The preprocessing device 14 notifies the invitation device 16 that the preprocessing operation for creating the master project has been completed.

[0022] Step S12: inviting the associated suppliers.

[0023] The invitation device 16 transmits an invitation message to each of the communication accounts in the associated supplier information, each of the invitation messages including an invitation serial number. The invitation serial numbers are unique to the master project, and the invitation serial numbers of the invitation messages are

different from each other. For example, the invitation device 16 combines a master identifier of the brand, the supplier identifier of each associated supplier, and a project code of the master project in a character string and encrypts the character string to form one corresponding invitation serial number. The encryption technique used could be, for example, symmetric encryption or asymmetric encryption, and could be decrypted with a key.

[0024] Each of the invitation messages further includes the specified period to notify each associated supplier that the associated supplier is required to provide the assessment projects for the specified period. Each of the invitation messages further includes a hyperlink for each second electronic device 404 to connect to the management system 1 of carbon assessment for supply chains. The hyperlink could include the invitation serial number to be imported into the management system 1 of carbon assessment for supply chains when each of the second electronic devices 404 connects to the management system 1 of carbon assessment for supply chains. Each of the invitation messages could further specify whether the brand owner or the associated supplier pays the fee.

[0025] Step S13: replying, by each associated supplier, to each invitation message.

[0026] The user of each associated supplier receives each invitation message with the respective communication account using the respective second electronic device 404. The user of each associated supplier transmits a corresponding reply message to the management system 1 of carbon assessment for supply chains after acknowledging the invitation message, wherein the reply message is for the associated supplier to confirm whether the assessment project thereof is required to be associated with the master project.

[0027] Each of the reply messages includes one corresponding invitation serial number. After the invitation device 16 receives the reply message corresponding to the invitation serial number of each invitation message, the invitation device 16 decrypts the

invitation serial number in the reply message to obtain the master identifier of the brand, the supplier identifier of each associated supplier, and the project code of the master project. In this way, the invitation device 16 could confirm that the reply message received belongs to the master project of the brand and by which associated supplier the reply message received was replied, thereby achieving the purpose of associating with the master project and serving as a basis for charging. For example, the second electronic device 404 could use the hyperlink in the invitation message to link the management system 1 of carbon assessment for supply chains, with the user inputting the invitation serial number to form the reply message, or with the hyperlink automatically importing the invitation serial number to form the reply message.

[0028] Step S14: setting the associated assessment projects.

[0029] Then, the invitation device 16 sets each of the assessment projects in the project database 12 corresponding to each set of the associated supplier information as an associated assessment project, and the invitation device 16 associates each of the associated assessment projects with the master project for subsequent statistical purposes.

[0030] In the current embodiment, after the invitation device 16 receives the reply message corresponding to the invitation serial number of each invitation message, the invitation device 16 transmits a login request message to the second electronic device 404, the login request message requiring the second electronic device 404 to log in with an account for the management system 1 of carbon assessment for supply chains. When the associated supplier does not have an account for the management system 1 of carbon assessment for supply chains, the user could use the second electronic device 404 to register a new account. After the second electronic device 404 logs in with the account, the invitation device 16 determines whether any assessment project in the project database 12 corresponds to the associated supplier.

[0031] When there is one assessment project in the project database 12 corresponding to the associated supplier, the assessment project corresponding to the associated supplier is set as one of the associated assessment projects. That is, when the invitation device 16 determines that the account corresponds to one of the suppliers and the supplier has one corresponding assessment project in the project database, in which the corresponding assessment project has an assessment period complying with the specified period, the invitation device 16 sets the corresponding assessment project in the project database as one of the associated assessment projects.

[0032] When there is no assessment project in the project database 12 corresponding to the associated supplier, i.e., when the invitation device 16 determines that the account corresponds to one of the suppliers (associated suppliers) and the supplier does not have any corresponding assessment project, the invitation device 16 requires the associated supplier to create a new assessment project.

[0033] Here are some examples: first, although the associate supplier has conducted a carbon assessment for the specified period, the assessment result has not been stored in the project database 12 to form one assessment project; second, the assessment period of the assessment project of the associated supplier in the project database 12 does not comply with the specified period.

[0034] In both cases, the invitation device 16 transmits a project create page to the corresponding second electronic device 404, requesting the associated supplier to input the assessment result on the project create page via the second electronic device 404. The invitation device 16 creates a new assessment project based on the assessment result input and stores the new assessment project in the project database 12 to form one associated assessment project of the associated supplier.

[0035] Step S15: compiling an assessment results of the master project.

[0036] The computing device 18 generates the assessment results of the master project and an assessment report thereof. In the current embodiment, the computing device 18 is linked to the plurality of associated assessment projects through the master project for statistical purposes, but it is not limited thereto, the associated assessment projects could also be fully imported into the master project for statistical purposes.

[0037] The computing device 18 calculates individual carbon emissions and total carbon emissions of the plurality of associated assessment projects associated with the master project. The assessment results of the master project include the individual carbon emissions and total carbon emissions of the plurality of associated assessment projects and could be displayed on a webpage 30 (shown in FIG. 4). The user of the brand could use the first electronic device 402 to connect to the management system 1 of carbon assessment for supply chains to display the webpage 30 on a screen of the first electronic device 402. A hyperlink for each associated assessment project could be shown on the webpage 30, allowing the user to click on the hyperlink with the first electronic device 402 to access the content of each associated assessment project.

[0038] In the current embodiment, the computing device 18 further determines a percentage of assessment progress for each of the associated assessment projects. The percentage of assessment progress is used to determine whether each associated supplier has completed the content of each associated assessment project. Preferably, after each associated supplier replies to the reply message, the computing device 18 obtains each associated assessment project from the project database 12 every check cycle (e.g., daily, weekly, bi-weekly, or monthly) and automatically determines the completeness of the content of each associated assessment project, thereby generating the percentage of each assessment progress and displaying the percentage of total assessment progress for all the associated assessment projects on the webpage 30.

[0039] At each check cycle, when the computing device 18 determines that any of the percentages of assessment progress is less than a predetermined percentage, the computing device 18 transmits a notification message to the communication account in the associated supplier information that has the percentage of assessment progress less than the predetermined percentage. In this way, the associated supplier is notified that the content of the assessment project should be completed. The predetermined percentage for a first check cycle could be, for example, 80%, and the predetermined percentage increases with the number of check cycles. The predetermined percentage for each check cycle is the predetermined percentage for the previous check cycle plus an incremental percentage, e.g., an incremental percentage of 5%, so that the predetermined percentage for a second check cycle is 85% (80%+5%) and so on for the subsequent check cycles.

[0040] At each check cycle, the computing device 18 further determines whether each of the associated assessment projects is certified and has certification documentation. The computing device 18 calculates a certification proportion of the associated assessment projects with the certification documentation to a total number of the associated assessment projects and records the certification proportion in the master project, which will be displayed on the webpage. In this way, the user of the brand could keep track of the assessment progress and certification progress for each of the associated assessment projects.

[0041] At each check cycle, the computing device 18 updates the individual carbon emissions, the total carbon emissions, the percentage of each assessment progress, the percentage of total assessment progress, the state of each piece of certification documentation, and the certification proportion.

[0042] In addition, the webpage 30 has a button icon 32 for downloading the assessment report that includes the content displayed on the webpage as well as the content of the plurality of associated assessment projects.

[0043] Step S16: exchanging data.

[0044] After all the associated assessment projects have been completed, i.e., the percentage of total assessment progress is 100%, the user of the brand could operate the first electronic device 402 to transmit a data exchange command to the data exchange device 20.

[0045] After the data exchange device 20 receives the data exchange command, the data exchange device 20 compiles the master project into exchange data to transmit the exchange data to the external system 60. In the current embodiment, the data exchange device 20 compiles the master project into the exchange data based on Pathfinder Framework of guidance for the accounting and exchange of product life cycle emissions to ensure that the exchange data complies with a data format of the Pathfinder Framework of guidance for the accounting and exchange of product life cycle emissions. The data exchange device 20 is provided with an Application Programming Interface (API) for the external system 60 to obtain the exchange data via the API.

[0046] With the aforementioned design, the management system 1 of carbon assessment for supply chains according to the present invention could associate the associated assessment projects of the suppliers with the master project, and the individual carbon emissions and total carbon emissions of the associated assessment projects could be calculated. Thus, the master project could integrate the assessment results of the associated assessment projects for the associated suppliers in the supply chain, effectively reducing the time and cost of carbon assessment in the supply chain for the brand.

[0047] It must be pointed out that the embodiments described above are only some preferred embodiments of the present invention. All equivalent structures which employ the concepts disclosed in this specification and the appended claims should fall within the scope of the present invention.

WHAT IS CLAIMED IS:

1. A management system of carbon assessment for supply chains, comprising:

a supplier database configured to store a plurality of sets of supplier information of a plurality of suppliers, each set of the supplier information including a communication account;

a project database configured to store a master project and a plurality of assessment projects corresponding to the plurality of suppliers;

a preprocessing device signally connected to the supplier database, the preprocessing device selecting multiple sets of the supplier information from the supplier database to form a plurality of sets of associated supplier information;

an invitation device signally connected to the preprocessing device, the supplier database, and the project database, the invitation device transmitting an invitation message to each of the communication accounts in the associated supplier information, each of the invitation messages including an invitation serial number; the invitation device setting each of the assessment projects in the project database corresponding to each set of the associated supplier information as an associated assessment project after the invitation device receives a reply message corresponding to the invitation serial number of each invitation message, and the invitation device associating each of the associated assessment projects with the master project; and

a computing device signally connected to the project database, the computing device calculating individual carbon emissions and total carbon emissions of the plurality of associated assessment projects associated with the master project.

2. The management system of carbon assessment for supply chains as claimed in claim 1, comprising a data exchange device signally connected to the project database, the data exchange device compiling the master project into exchange data to transmit the exchange data to an external system.

3. The management system of carbon assessment for supply chains as claimed in claim 2, wherein the data exchange device compiles the master project into the exchange data based on Pathfinder Framework of guidance for the accounting and exchange of product life cycle emissions to ensure that the exchange data complies with a data format of the Pathfinder Framework of guidance for the accounting and exchange of product life cycle emissions.

4. The management system of carbon assessment for supply chains as claimed in claim 1, wherein the computing device is signally connected to the supplier database and determines a percentage of assessment progress for each of the associated assessment projects; the computing device transmits a notification message to the communication account in the associated supplier information that has the percentage of assessment progress less than a predetermined percentage.

5. The management system of carbon assessment for supply chains as claimed in claim 1, wherein the computing device determines whether each of the associated assessment projects has certification documentation; the computing device calculates a certification proportion of the associated assessment projects with the certification documentation to a total number of the associated assessment projects and records the certification proportion in the master project.

6. The management system of carbon assessment for supply chains as claimed in claim 1, wherein each assessment project in the project database has an assessment period; each invitation message transmitted by the invitation device includes a specified period; after the invitation device receives the reply message, the invitation device sets any of the assessment projects in the project database that have an assessment period complying with the specified period and correspond to one set of the associated supplier information as one of the associated assessment projects.

7. The management system of carbon assessment for supply chains as claimed in claim

1, wherein, after the invitation device receives the reply message corresponding to the invitation serial number of each invitation message, the invitation device transmits a login request message to an electronic device, the login request message requiring the electronic device to log in with an account; after the account is logged in, the invitation device determines that the account corresponds to one of the suppliers and the supplier has one corresponding assessment project in the project database, and then sets the corresponding assessment project in the project database as one of the associated assessment projects.

8. The management system of carbon assessment for supply chains as claimed in claim 1, wherein the invitation device determines that the account corresponds to one of the suppliers and the supplier does not have one corresponding assessment project in the project database, and creates a new assessment project; the new assessment project is saved in the project database to form one of the associated assessment projects.

9. The management system of carbon assessment for supply chains as claimed in claim 1, wherein the preprocessing device receives a master project create command and a select command from an electronic device; the preprocessing device creates the master project in the project database based on the master project create command; the preprocessing device selects multiple sets of the supplier information in the supplier database based on the select command to form the plurality of sets of associated supplier information.

10. The management system of carbon assessment for supply chains as claimed in claim 1, wherein the invitation serial numbers of the invitation messages are different; each set of the supplier information includes a supplier identifier; the invitation device combines a master identifier, each of the supplier identifiers, and a project code of the master project in a character string and encrypts the character string to form each of the invitation serial numbers; each of the reply messages includes one corresponding invitation serial number; the invitation device decrypts the invitation serial number in the reply message to obtain the master identifier, each of the supplier identifiers, and the

project code of the master project.