

Report on Knowledge Exchange (KE) Funding

Deliverables template for Strategic Impact

Note:

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n-Dimensional Blockchain for ESG Reporting

環境、社會及管治報告的多維區塊鏈平臺研發

by Ray Y. Zhong

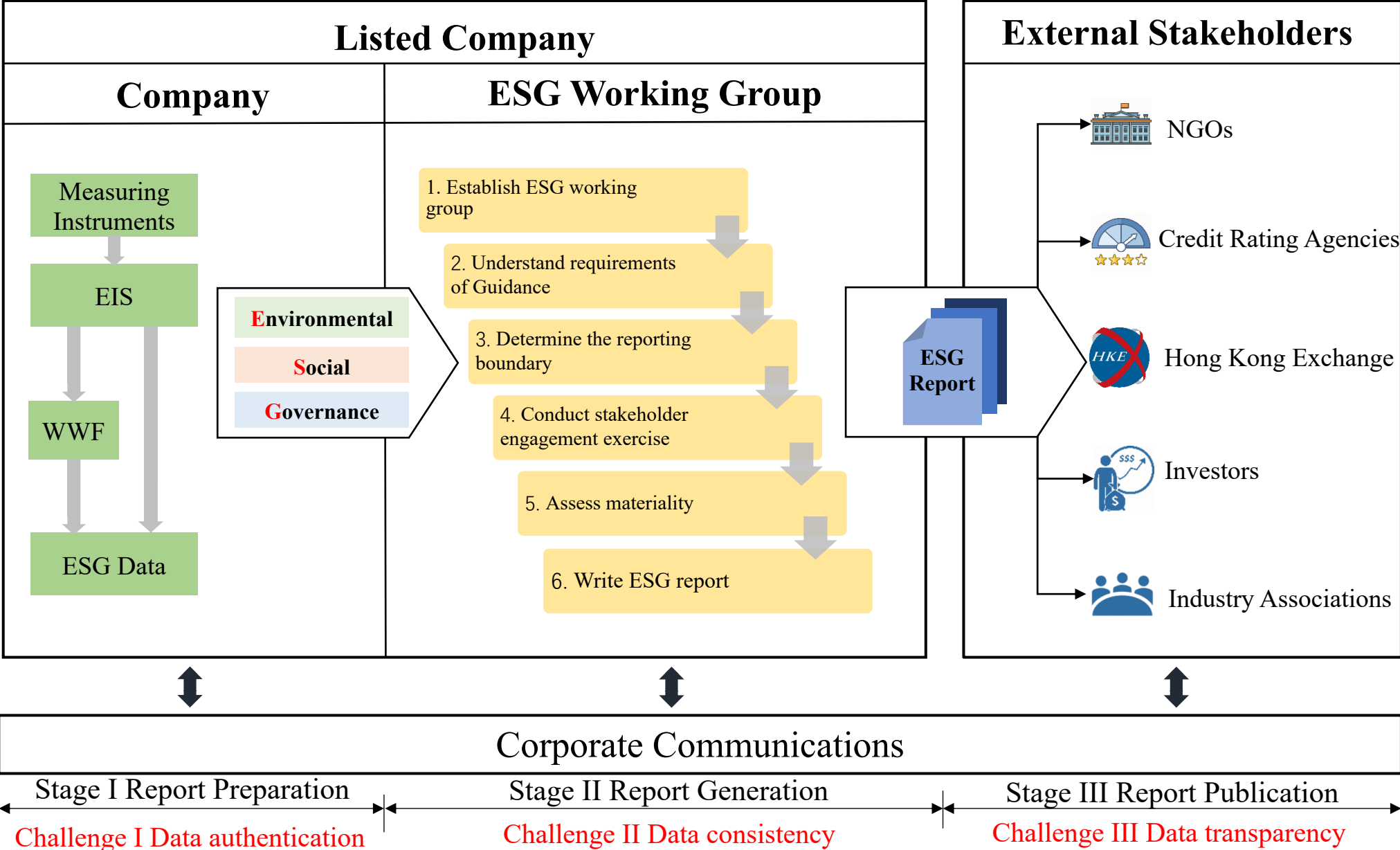
Department of IMSE, Faculty of Engineering

(Project No.: KE-SI-2022/23-35)

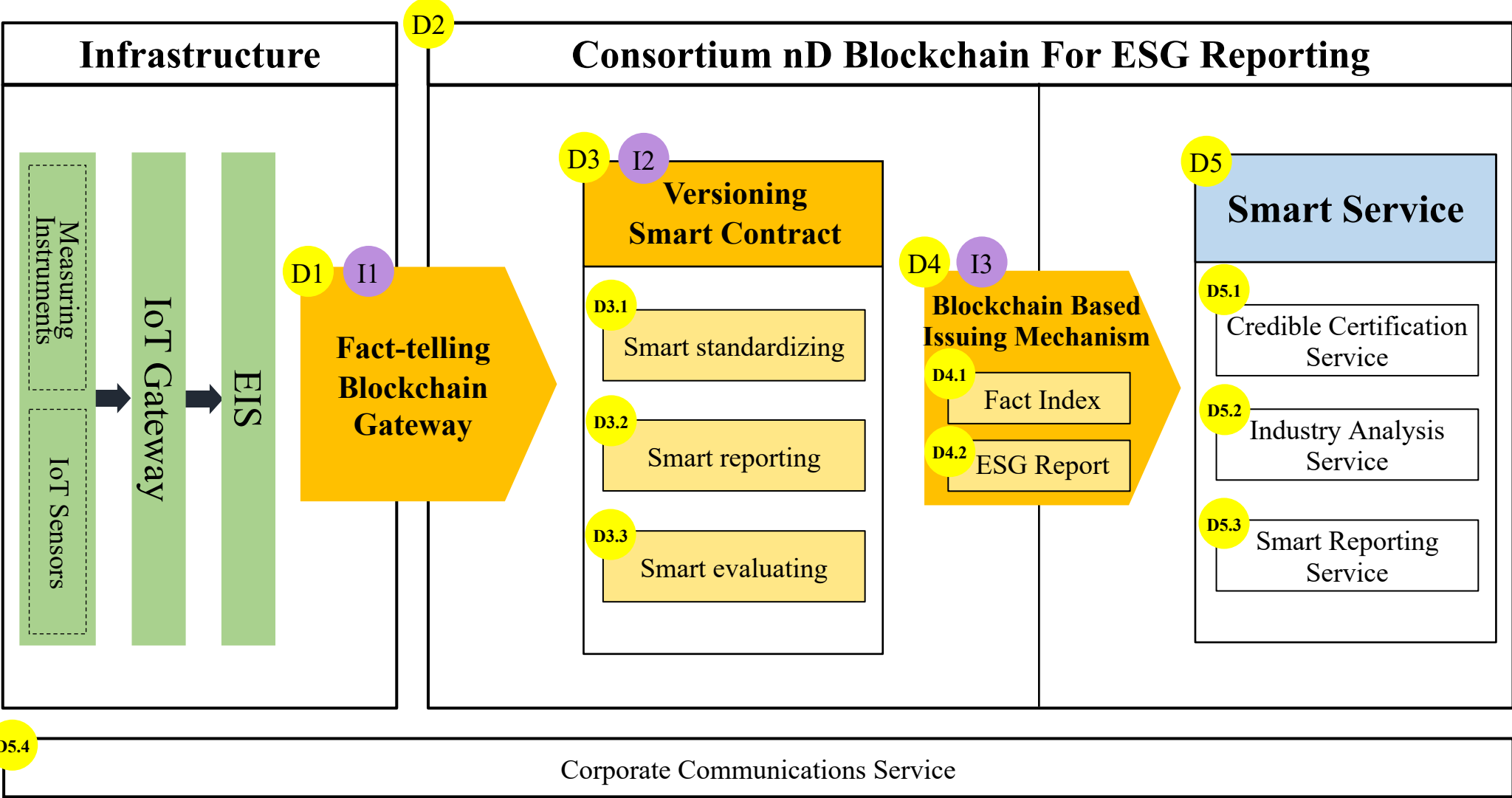
Strategic Theme(s):

Industry 4.0

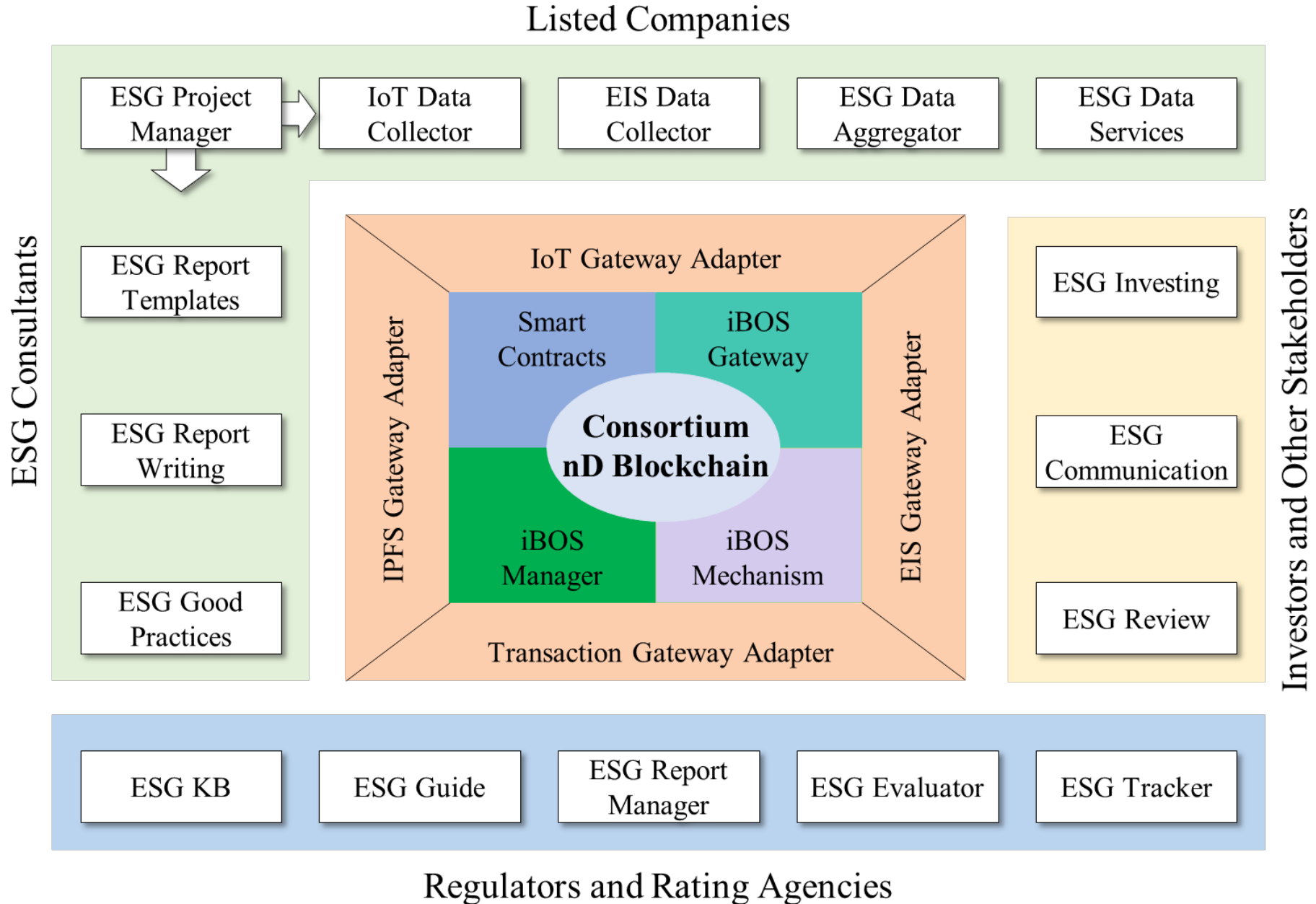
ESG Reporting Scenario



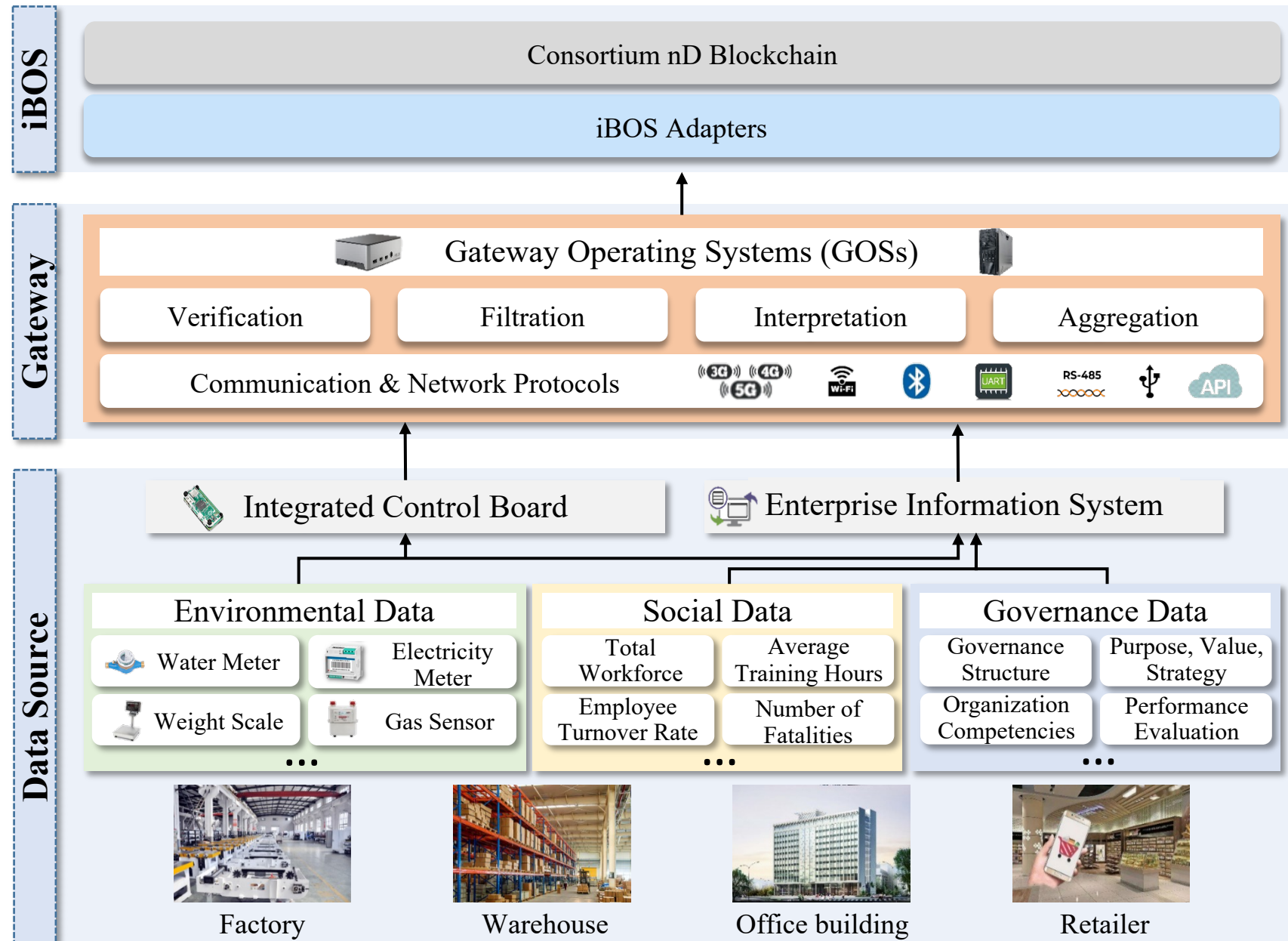
Deliverables & Innovations



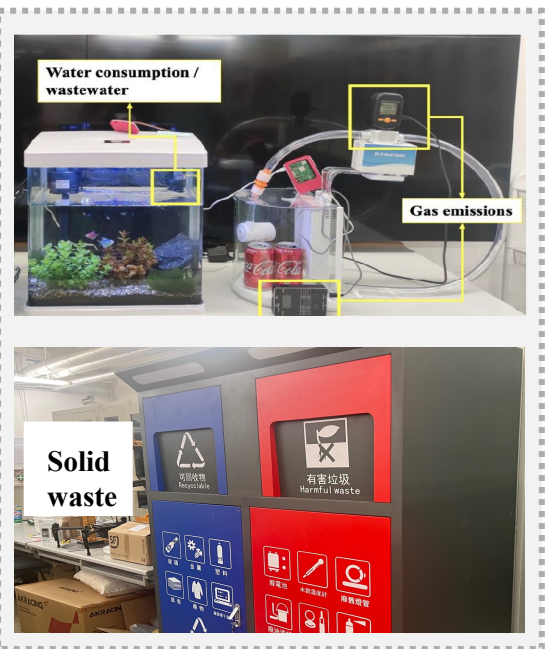
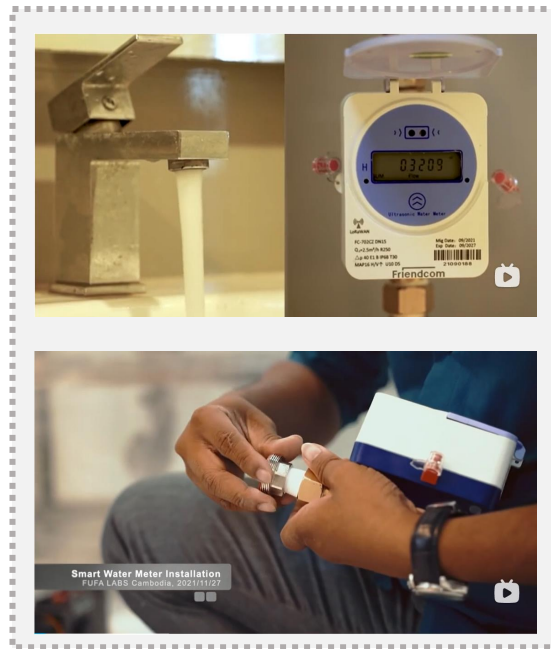
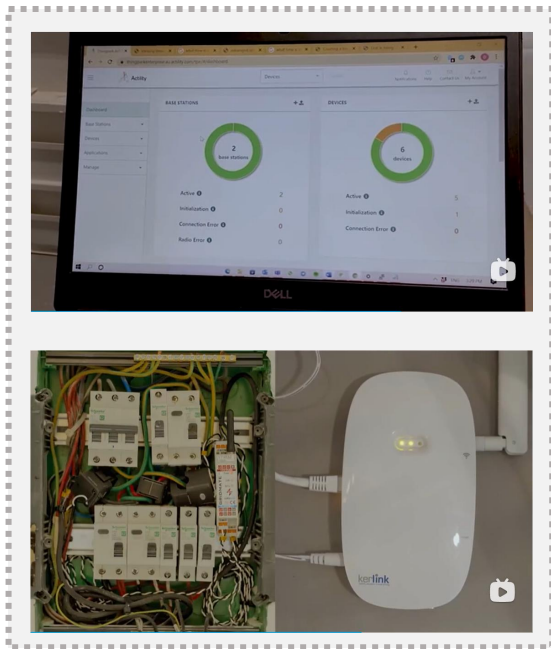
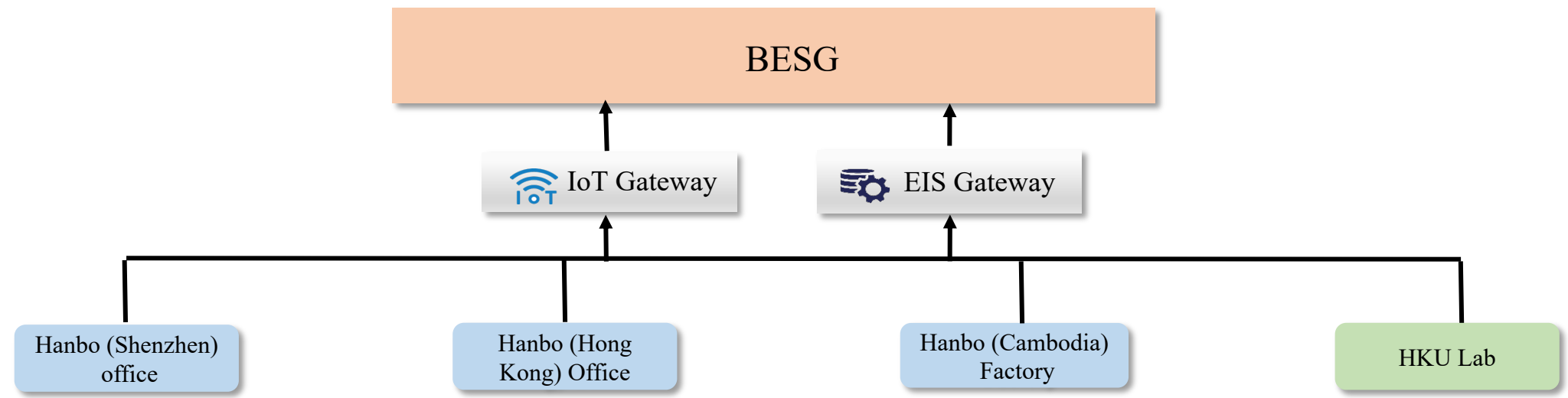
System Architecture



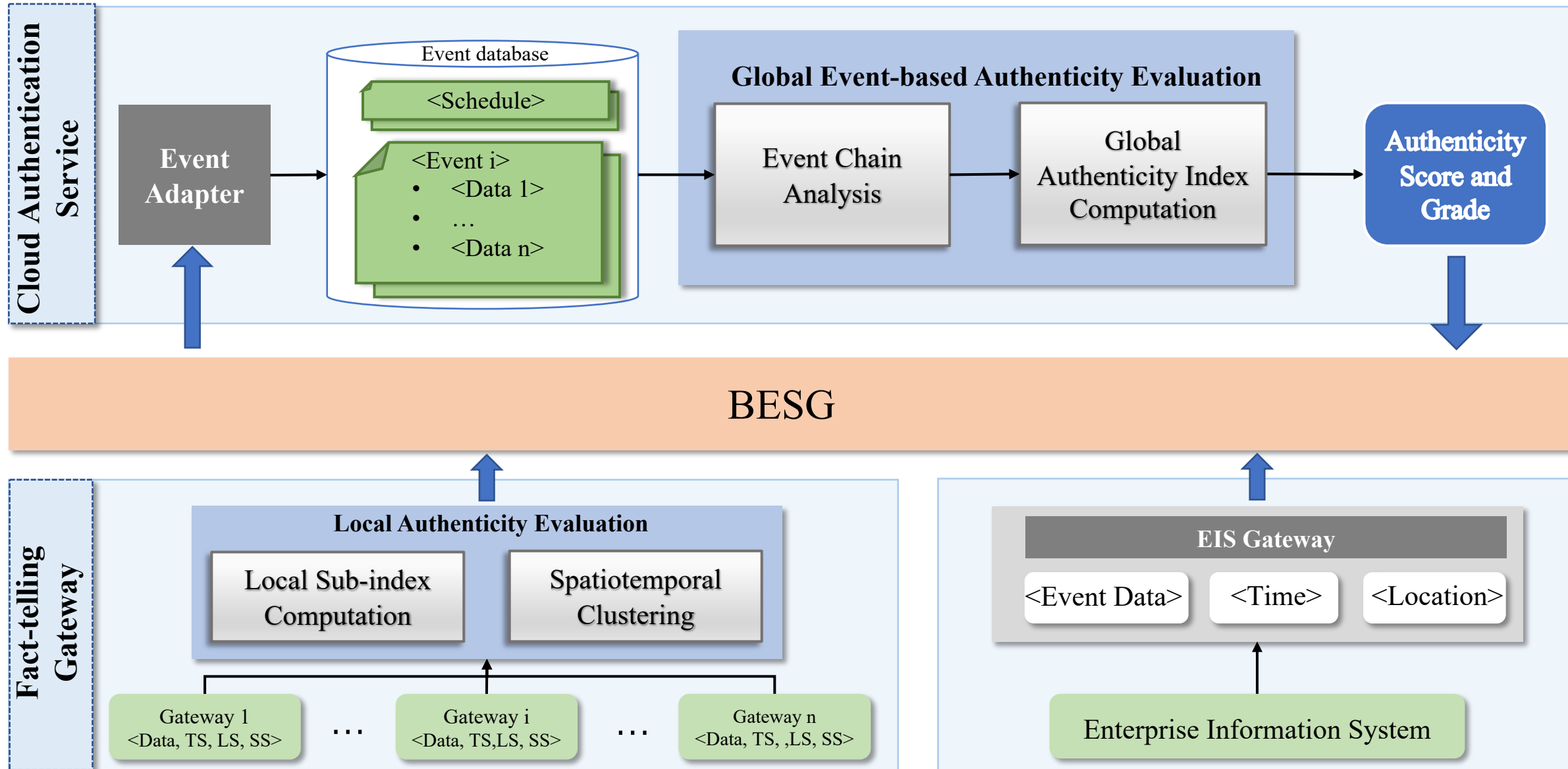
IoT-enabled ESG Data Collection Framework



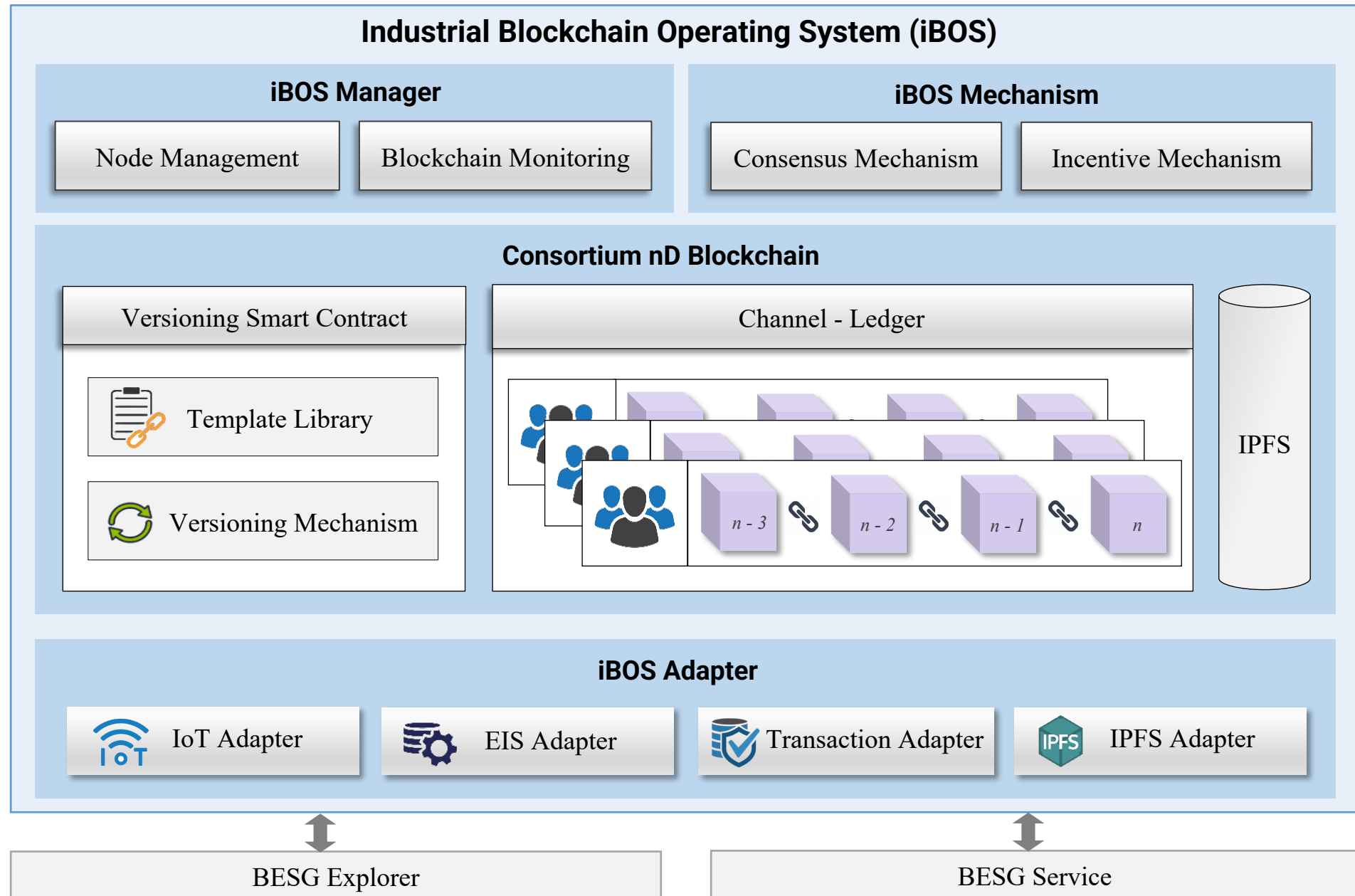
Pilots Configuration for ESG Data Collection



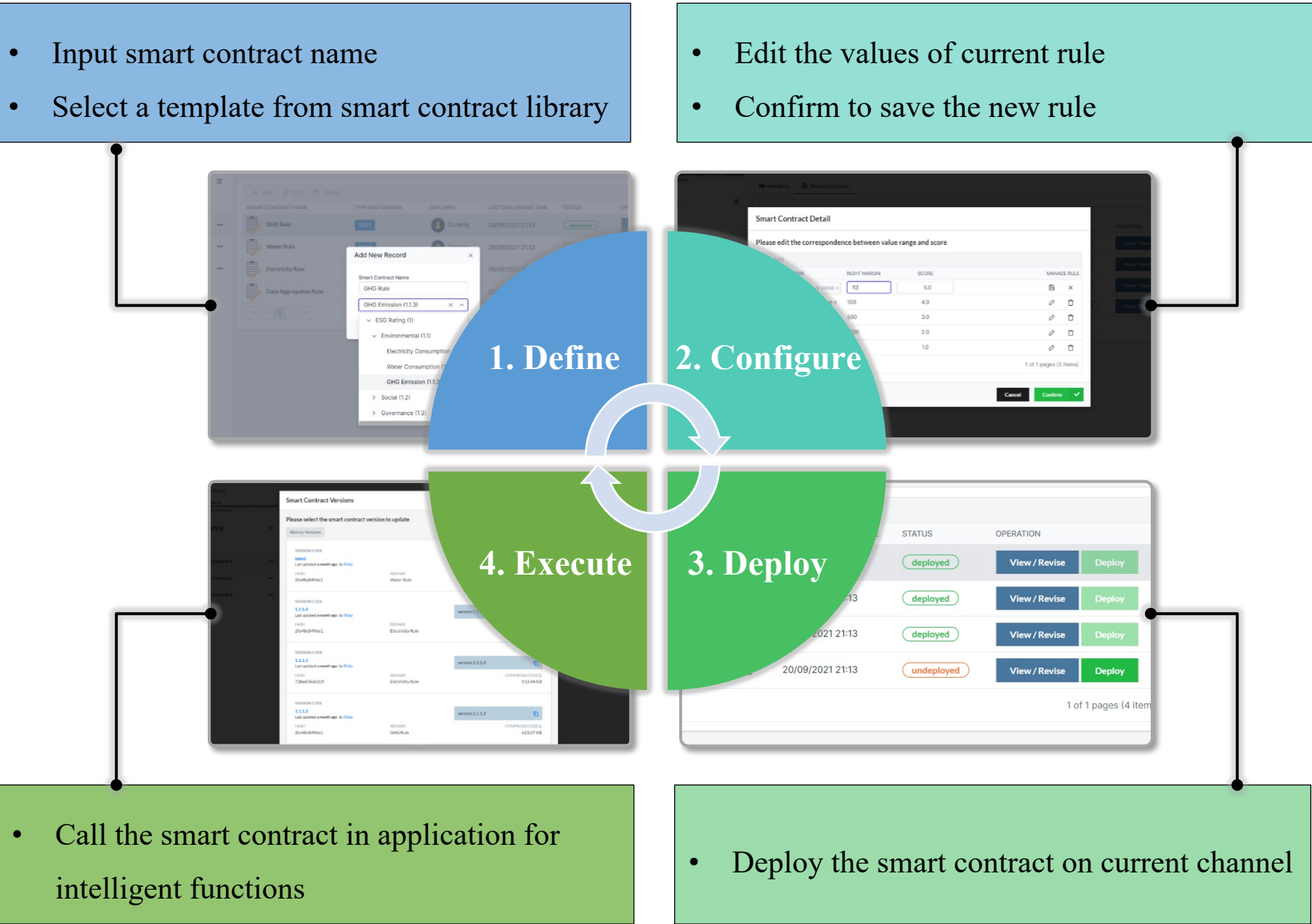
ESG Authenticity Analytics



Architecture of iBOS



Versioning Smart Contract



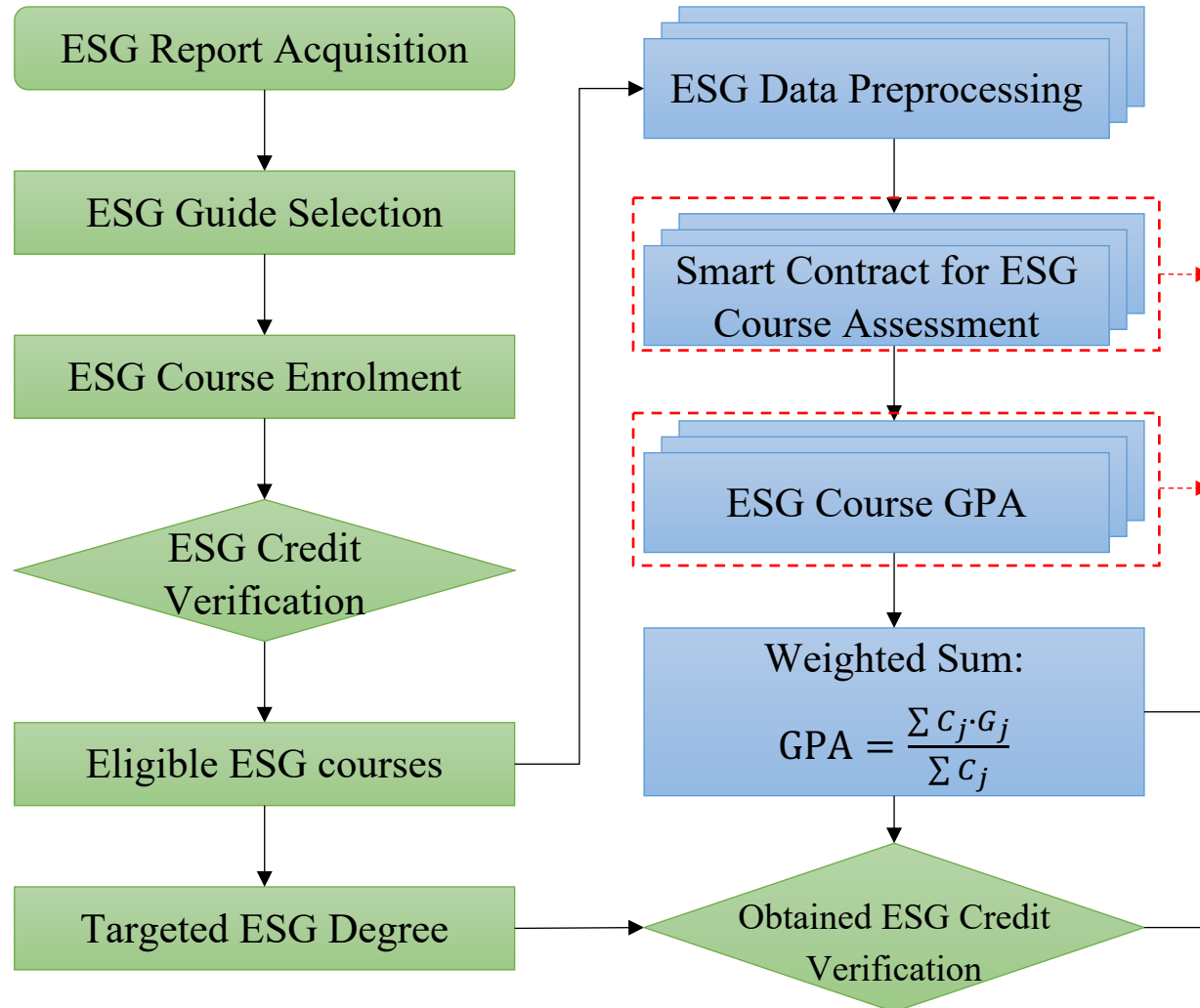
Rule-based DESGI using Versioning Smart Contract

Dual ESG Index (DESGI) Fusion Workflow through ESG Credit and GPA

ESG Credit Assessment



ESG-GPA Assessment



Consortium > ESG Reporting > 1367

Members Smart Contracts

SMART CONTRACT NAME	TYPE AND VERSION	DEPLOYER	LAST DEPLOYMENT TIME	STATUS	OPERATION
GHG Rule	1.1.1.1	Zicheng	18/04/2022 21:13	deployed	Configure Deploy
Water Rule	1.1.2.1	Zicheng	18/04/2022 21:13	deployed	Configure Deploy
Electricity Rule	1.1.3.1	Zicheng	18/04/2022 21:13	deployed	Configure Deploy
Data Aggregation Rule	2.1.1.1	Zicheng	18/04/2022 21:13	undeployed	Configure Deploy
Carbon Emission Calculating Rule	3.1.1.1	Zicheng	18/09/2022 15:45	deployed	Configure Deploy

1 of 1 pages (5 items)

```
// calculate Environmental GPA
companydata.eGPA = parseFloat(
  (e_arr.reduce((a, b) => a + b, 0) / e_arr.length).toFixed(2)
);
companydata.sGPA = parseFloat(
  (s_arr.reduce((a, b) => a + b, 0) / s_arr.length).toFixed(2)
);
companydata.gGPA = parseFloat(
  (g_arr.reduce((a, b) => a + b, 0) / g_arr.length).toFixed(2)
);
companydata.esgGPA = parseFloat(
  (
    (companydata.eGPA + companydata.sGPA + companydata.gGPA) /
    3
  ).toFixed(2)
);
companydata.esgCredit = 132;
companydata.dualESGIndex = parseFloat(
  (
    alpha * companydata.esgGPA +
    (beta * companydata.esgCredit) / 50
  ).toFixed(2)
);
```

Principal-Agent Incentive Model in ESG Disclosure



Aim: maximize the utilities from making investment decisions

Aim: maximize the utilities from providing ESG reports

Economic properties:

IR: Individual Rationality (utility is non-negative for each listed company)

IC: Incentive Compatible (compatible with the listed companies)

Incentive Procedure

Aim: Motivate listed companies to provide high-quality ESG reports

Step 1: Investor offers a wage contract $T(Q) = bQ + T_0$; listed companies accept or reject it

Step 2: Listed companies take effort a to generate the ESG report;

Step 3: The quality Q is determined by transparency x_1 , consistency x_2 , timeliness x_3 , and assurance x_4 .
 $Q = \sum_{i=1}^4 \theta_i x_i$ ($\sum_i \theta_i = 1$ and $\theta_i \geq 0$)

Step 4: Both parties observe Q ; listed companies are paid $T(Q)$, and the game ends

Financial Report

Item	Approved Budget Estimate (HK\$)	Actual Expenditure recorded by FEO as of the end of the funding year (HK\$)	Encumbrance recorded by FEO as of the end of the funding year (HK\$)	Invoices/Claims submitted to FEO but not yet reflected in the FEO system (HK\$)
Research Assistant	218,880	193,077.26	0	0
Student Research Assistant	131,940	109,060.07	0	0
Field Trip (including local and PRD region)	50,000	0	0	0
Dissemination and promotion events	50,000	0	0	0
Other expenses	49,180	0	0	0
Total	[a = 500,000]	[b=302,137.33]	[c=0]	[d=0]

Dissemination & Promotion



*Bi-weekly
Online meeting
with pilot
companies*



*2022-09-15
1st Training
Workshop*



*2021-11-11
Review Meeting*



*2022-09-22
2nd Training
Workshop*

Dissemination & Promotion



2022-08-10
to Hanbo (Hong Kong)

2022-09-24
to Hanbo (Shenzhen)

