Data For Development

——The Application and Typical Cases of Digital Technology in Economic and Trade Research

Reporter： Jun YANG   **Date: 5th November**

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PART 01

How to obtain large amounts of data and solve the problem of data island in the era of big data?

Conversion from "data" to "value"

Data grow explosively in the era of digital economy. How to organize and analyze the data effectively and accurately is critical to generate real value from data.

How to achieve the transformation from "data" to "value"?

Fast and efficient acquisition of massive multi-source heterogeneous data

Combining various data and systematically, analyzing data effectively and deeply

Capacity and suitable platforms to demonstrate the analyzing result and transform into value quickly

Digital technology + new liberal arts: changing the traditional economic analysis method

Tradition	The Era of Big Data
Inferred populations from the samples	Based on the whole-sample data analysis
Single dimension	Multi-dimensional and multi-source information integration & reconfirmation

Discover dramatic changes induced, solve the technical problems confronted, take great chances to create value in the era of digital economy

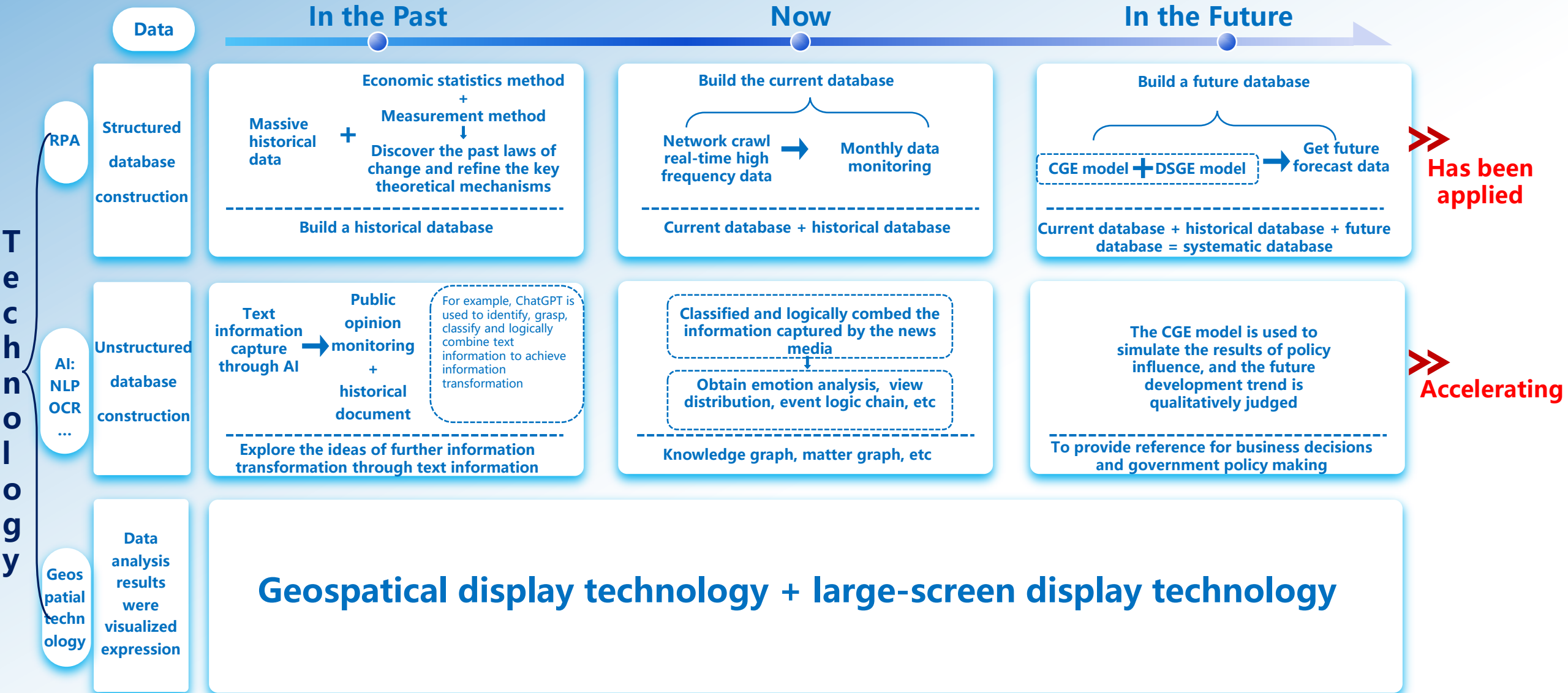# PART 02

University of International Business and Economics
UIBE 1951

数字经济实验室
DIGITAL ECONOMY LABORATORY

How does the Digital Economy Laboratory (UIBE) take advantage of the trend?

Development Path of the Digital Economy Laboratory

Data

In the Past — **Now** — **In the Future**

Technology

RPA

Structured database construction

Economic statistics method
+
Measurement method
↓
Discover the past laws of change and refine the key theoretical mechanisms

Massive historical data **+**

Build a historical database

Build the current database

Network crawl real-time high frequency data → **Monthly data monitoring**

Current database + historical database

Build a future database

CGE model + DSGE model → **Get future forecast data**

Current database + historical database + future database = systematic database

>> Has been applied

AI: NLP OCR ...

Unstructured database construction

Text information capture through AI → **Public opinion monitoring + historical document**

For example, ChatGPT is used to identify, grasp, classify and logically combine text information to achieve information transformation

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Explore the ideas of further information transformation through text information

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Classified and logically combed the information captured by the news media

↓

Obtain emotion analysis, view distribution, event logic chain, etc

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Knowledge graph, matter graph, etc

The CGE model is used to simulate the results of policy influence, and the future development trend is qualitatively judged

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To provide reference for business decisions and government policy making

>> Accelerating

Geospatial technology

Data analysis results were visualized expression

Geospatical display technology + large-screen display technology

Value Discovery and Achievement Transformation

Quickly Build a Systematic Database

Economic statistics method
+
Measurement method
↓
Discover the past laws of change and refine the key theoretical mechanisms

Massive historical data +

Build a historical database

Build the current database

Network crawl real-time high frequency data → Realize monthly data monitoring

Current database + historical database

Development Path of the Digital Economy Laboratory

Data | In the Past | Now | Coming

RPA | Structured database construction

Massive historical data + Economic statistics method + Measurement method ↓ Discover the past laws of change and refine the key theoretical mechanisms

Build a historical database

Build the current database

Network crawl real-time high frequency data → Realize monthly data monitoring

Current database + historical database

Build a future database

CGE model → DSGE model → Obtain the future prediction data

Current database + historical database + future database = systematic database

Has been applied

AI: NLP OCR ...

Unstructured database construction

Text information capture is realized through AI → Public opinion monitoring + historical document

For example, ChatGPT is used to identify, grasp, classify and logically combine text information to achieve information transformation

Explore the ideas of further information transformation through text information

Classified and logically combed the information captured by the news media

Obtain emotion analysis, emotion analysis, view distribution, event logic chain, etc
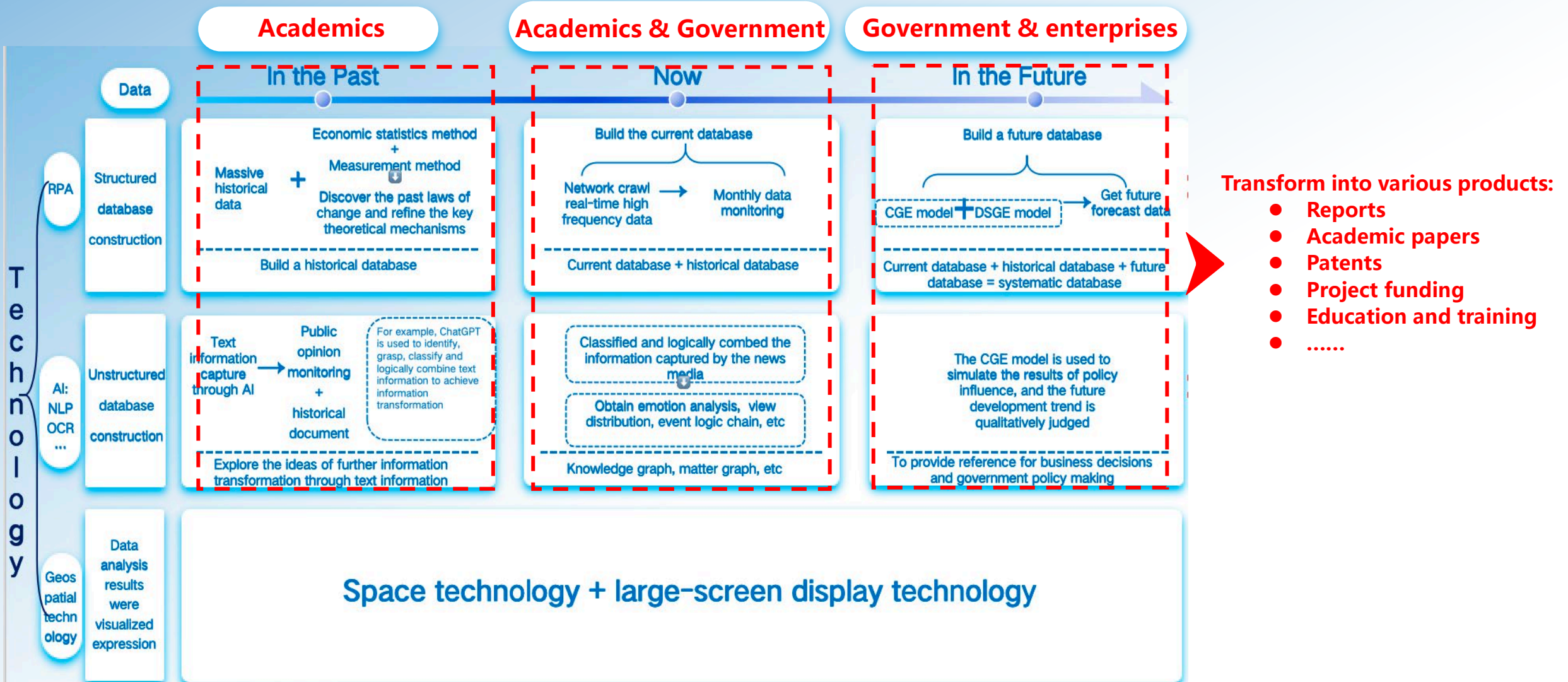
Knowledge graph, matter graph, etc

The CGE model simulates the policy influence results and makes a qualitative judgment on the future development trend

To provide reference for business decisions and government policy making

Accelerating

Technology

Geospatial technology

Data analysis results were visualized expression

Space technology + large-screen display technology

➢ **Simate manual operation to achieve process automation**: RPA realizes the whole process automation of repeated operation and standardized algorithm, significantly improving the efficiency of data collection and cleaning;

➢ **Rapid access to multi-source big data**: a relatively complete data capture, sorting, index calculation and large screen display of various data sources have been built, and RPA technology has been used to achieve automatic update of data and large screen display.
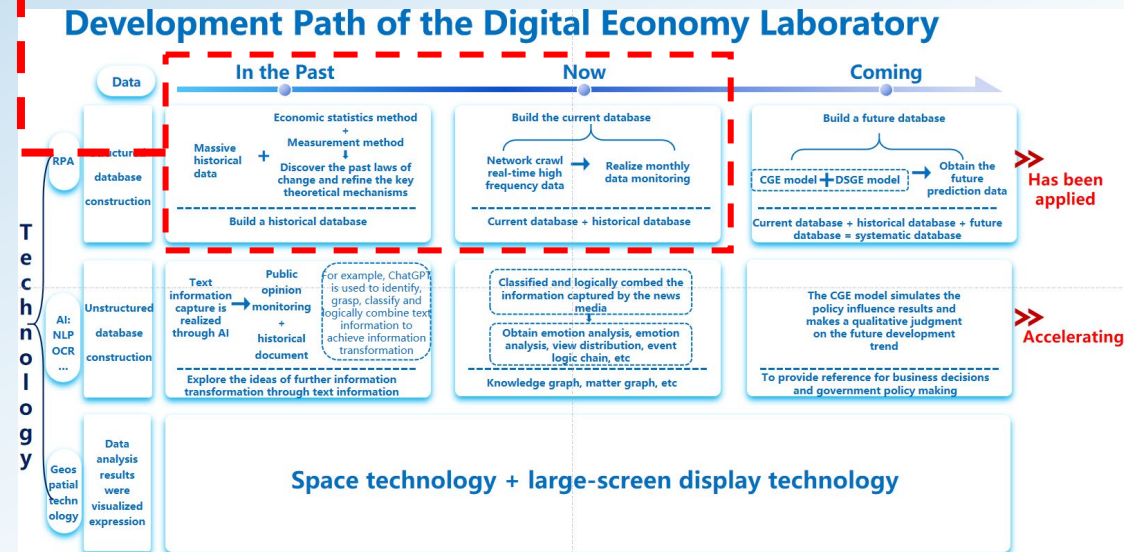
# National Family Farm Directory System Data

System Basic information

The national platform for collecting the basic information of family farms nationwide is an information tool for administrators at the ministry, province, city, county and township levels to carry out family farm directory management.

- **System indicators**: including the basic situation of farms, basic situation of farmers, land management, industry distribution, financial and financial conditions, a total of 43 indicators.
- **The way to fill in the report**: the farmers directly fill and the county and township administrator fill in the report.
- **Main functions**: Farm directory management, annual report statistics, sampling survey, "Yimatong" assignment code management.
- **Data volume**: At present, the information of more than 4 million family farms has been collected, including about demonstration farms above the county level 206,000 homes.

The Core Influence Logic of Agricultural Digitization and Its Future Change Trend
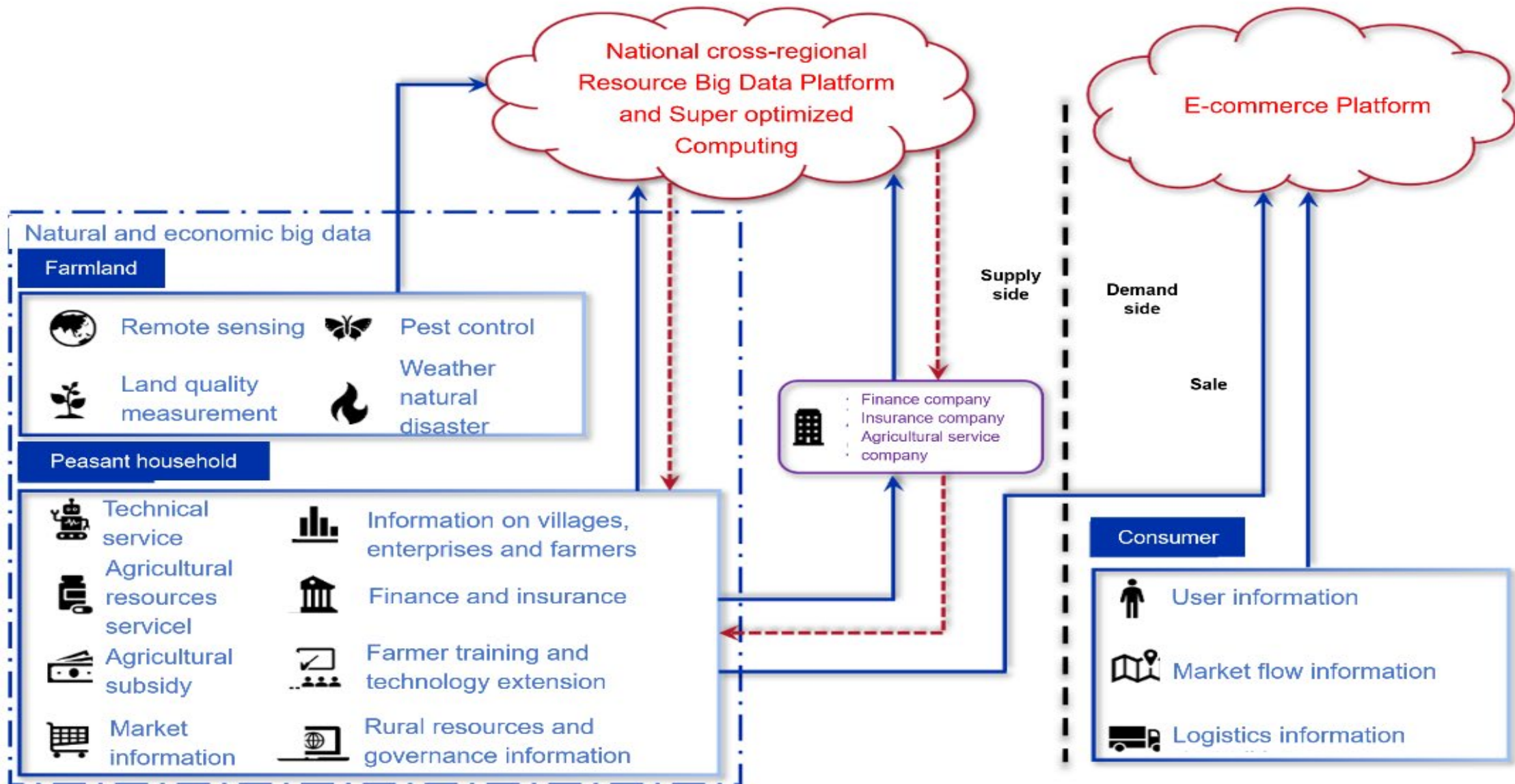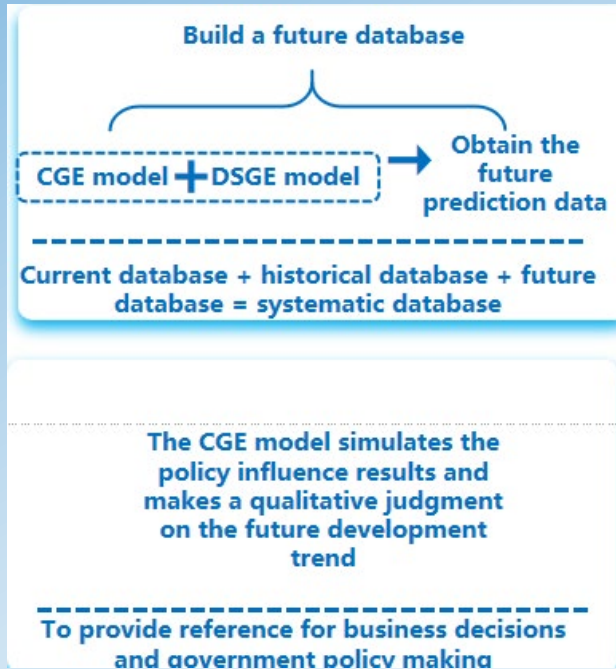
Monthly Trade Monitoring Report

➤ **Automatic Generation of Thematic Analysis Report:** Using RPA can quickly and automatically generate thematic analysis report according to the preset template，proving support for short-term monitoring and decision-making.

➤ Since August 2023, the Digital Economy Laboratory has released a series of monthly trade monitoring reports, aimed at dynamic monitoring of China's overall trade and key products such as agricultural products, wood and forest products, electronic products, chip products, new energy vehicles, as well as China's trade with countries along the "Belt and Road" and Russia and other key regions. In order to provide basic research products support for academic research, policy making and enterprise decision-making in related fields.

中国总体贸易月度监测报告

对外经济贸易大学 数字经济实验室
2023 年 08 月 31 日

中国与"一带一路"沿线国家货物
贸易月度监测报告

对外经济贸易大学 数字经济实验室
2023 年 08 月 31 日

中俄总体贸易月度监测报告

对外经济贸易大学 数字经济实验室
2023 年 08 月 31 日

中国新能源汽车贸易月度监测报告

对外经济贸易大学 数字经济实验室
2023 年 08 月 31 日

北京市货物贸易月度监测报告

对外经济贸易大学 数字经济实验室
2023 年 08 月 31 日

中国芯片产品贸易月度监测报告

对外经济贸易大学 数字经济实验室
2023 年 08 月 31 日

中国农产品贸易月度监测报告

对外经济贸易大学 数字经济实验室
2023 年 08 月 31 日

中国电子产品贸易月度监测报告

对外经济贸易大学 数字经济实验室
2023 年 08 月 31 日

中国木质林产品贸易月度监测报告
（2023 年 1-7 月）

对外经济贸易大学 数字经济实验室
北京林业大学 国家林草经贸研究院
2023 年 8 月 31 日

Large-scale Economic Simulation Model and Policy Decision Support

- ➤ Based on complete historical data, current dynamic monitoring data, advanced economic theories and detailed economic data, the decision analysis model system of global - national - provincial - county is constructed.

- ➤ Establish an integrated analysis system that gathered historical data, current changes, and future prediction, in order to realize monitoring and prediction, guide optimization decisions, and verify and improve the model system in time;

- ➤ Empower business and government decision-making with comprehensive forecasting, especially in the context of possible policy risks.
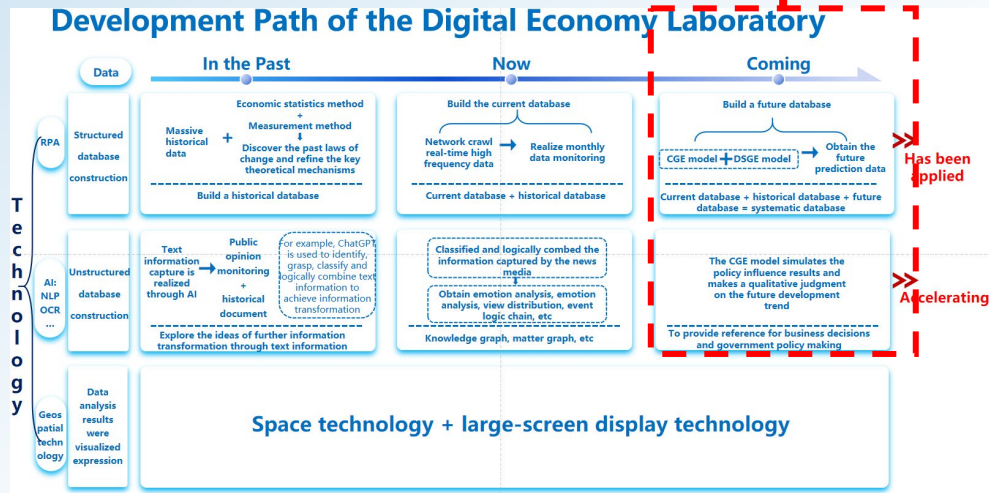
Large-scale economic simulation model and policy decision support

A general equilibrium model system with global-country-regional three levels is constructed

Global equilibrium model system:
1) Global static equilibrium model
2) Global dynamic equilibrium model
3) Global dynamic equilibrium model for global

Parameter passing

China's national dynamic equilibrium model:
It is mainly used to analyze the dynamic impact path of national economic and trade policy changes on economic and trade development, industrial structure and income distribution

Parameter passing

Parameter passing

Parameter passing

China's provincial equilibrium model:
It is mainly used to analyze the spatial impact of national or specific regional economic and trade policies

Build a global-national two-level sectoral equilibrium model system for the agricultural sector

Global agricultural sector equilibrium model

Parameter passing

Chinese Agricultural Policy Analysis and Forecasting Model（CAPSiM）

Parameter passing

Nutrient structure change and consumption prediction
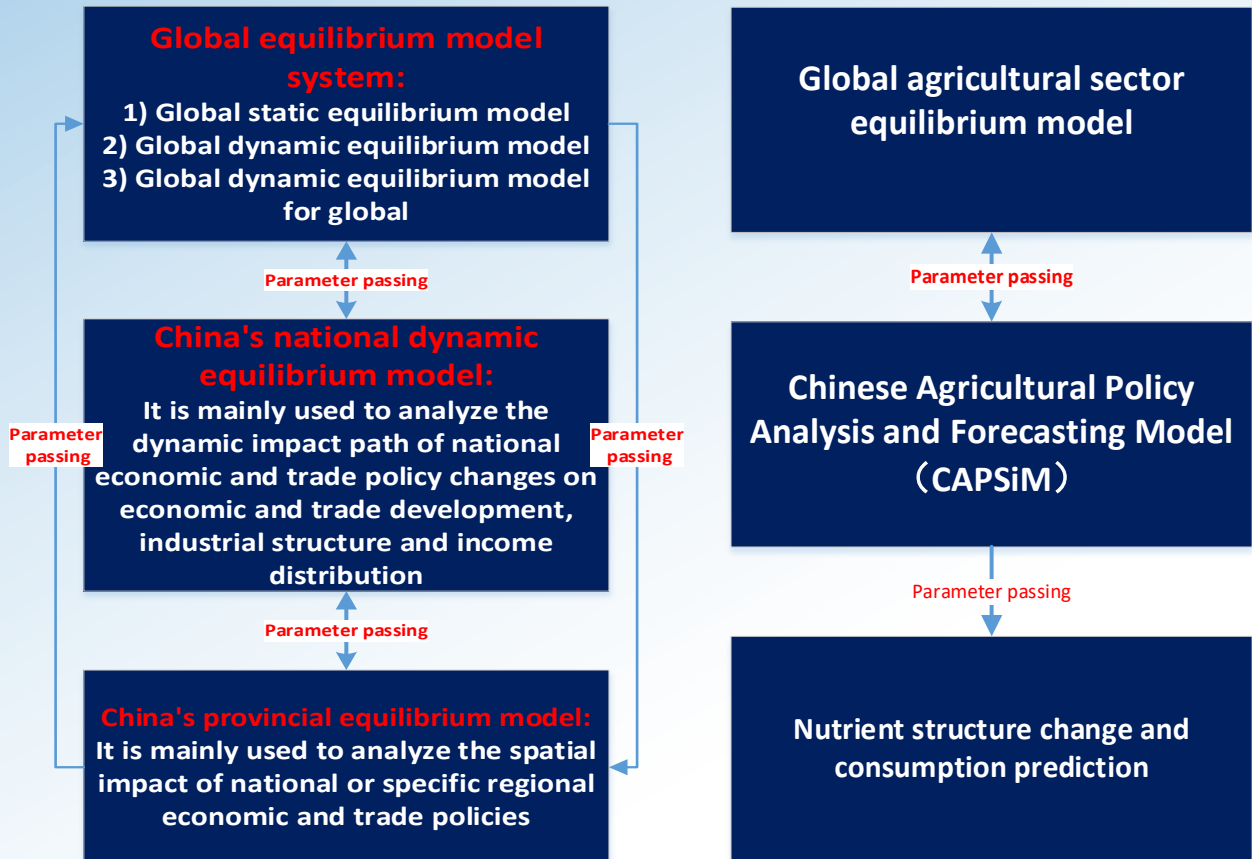
Application results:

Since 2002, the team has been unanimously committed to the development and application of CGE model, in order to fully have the ability to independently develop models and database, in the research methods in China, some methods leap into the front ranks of the world;

'Economic and trade policy virtual simulation experiment teaching project based on global trade equilibrium model' was approved as the second batch of China national first-class undergraduate courses in 2023; it is planning to apply for virtual simulation center;

Based on the equilibrium model, it has undertaken a large number of research topics and submitted dozens of research reports to Chinese Ministries and Commissions to provide support for national policy decisions:

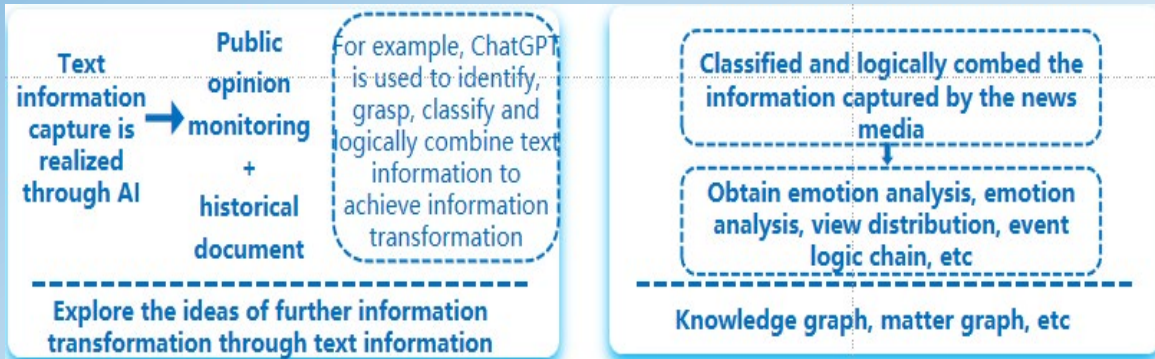'Analysis of the impact of US restriction on Iranian oil export on China and the world economy' in May 2019 has been approved by the Vice Minister of Ministry of Commerce People's Republic of China

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AI Deepening Empowerment to Promote Ideas

Text information capture is realized through AI → Public opinion monitoring + historical document

For example, ChatGPT is used to identify, grasp, classify and logically combine text information to achieve information transformation

Classified and logically combed the information captured by the news media

Obtain emotion analysis, emotion analysis, view distribution, event logic chain, etc

Knowledge graph, matter graph, etc

Explore the ideas of further information transformation through text information

Development Path of the Digital Economy Laboratory

| Technology		In the Past	Now	Coming	
Data					
RPA	Structured database construction	Massive historical data + Economic statistics method + Measurement method ↓ Discover the past laws of change and refine the key theoretical mechanisms / Build a historical database	Build the current database / Network crawl real-time high frequency data → Realize monthly data monitoring / Current database + historical database	Build a future database / CGE model + DSGE model → Obtain the future prediction data / Current database + historical database + future database = systematic database	Has been applied
AI: NLP OCR ...	Unstructured database construction	Text information capture is realized through AI → Public opinion monitoring + historical document / for example, ChatGPT is used to identify, grasp, classify and logically combine text information to achieve information transformation / Explore the ideas of further information transformation through text information	Classified and logically combed the information captured by the news media / Obtain emotion analysis, emotion analysis, view distribution, event logic chain, etc / Knowledge graph, matter graph, etc	The CGE model simulates the policy influence results and makes a qualitative judgment on the future development trend / To provide reference for business decisions and government policy making	Accelerating
Geospatial technology	Data analysis results were visualized expression	**Space technology + large-screen display technology**			

For example: Take the vinyl chloride leak incident in Ohio, USA as an example, we quickly obtain text information such as reports, views and evaluations of the incident from mainstream news media, academic institutions and government agencies at home and abroad, and realize key information extraction and classification.
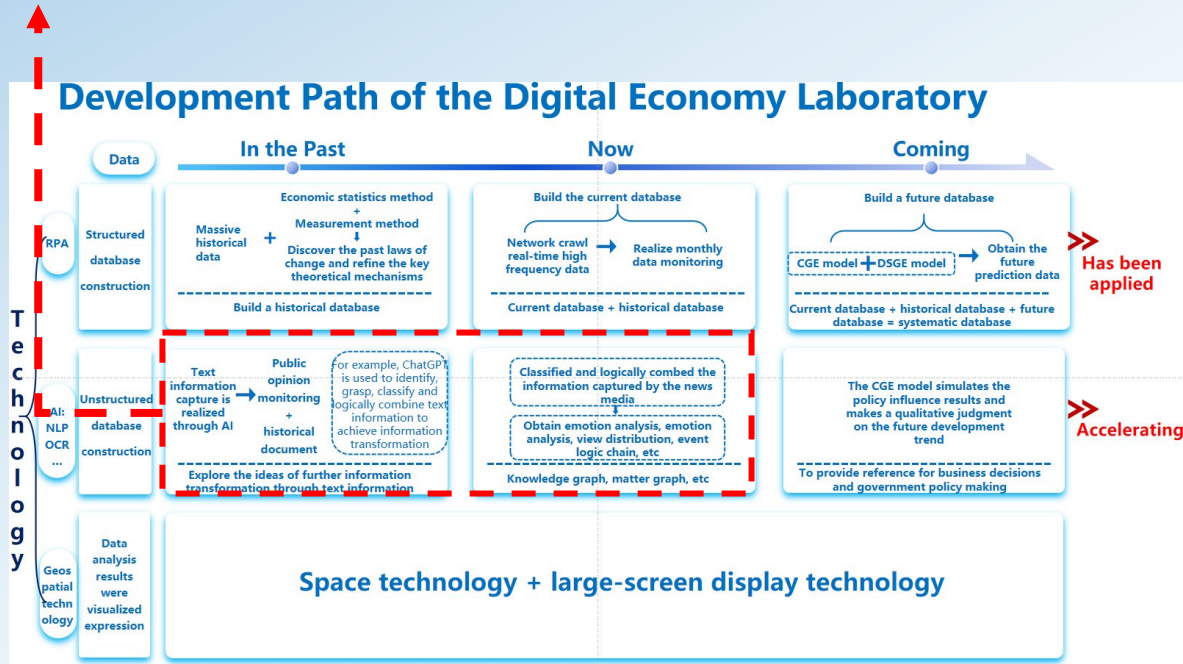
01 Quickly obtain the news and public opinion text information of vinyl chloride leakage in Ohio, USA
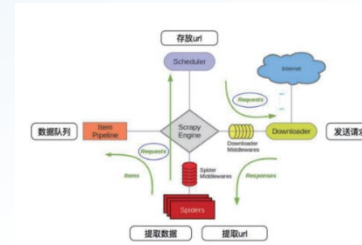
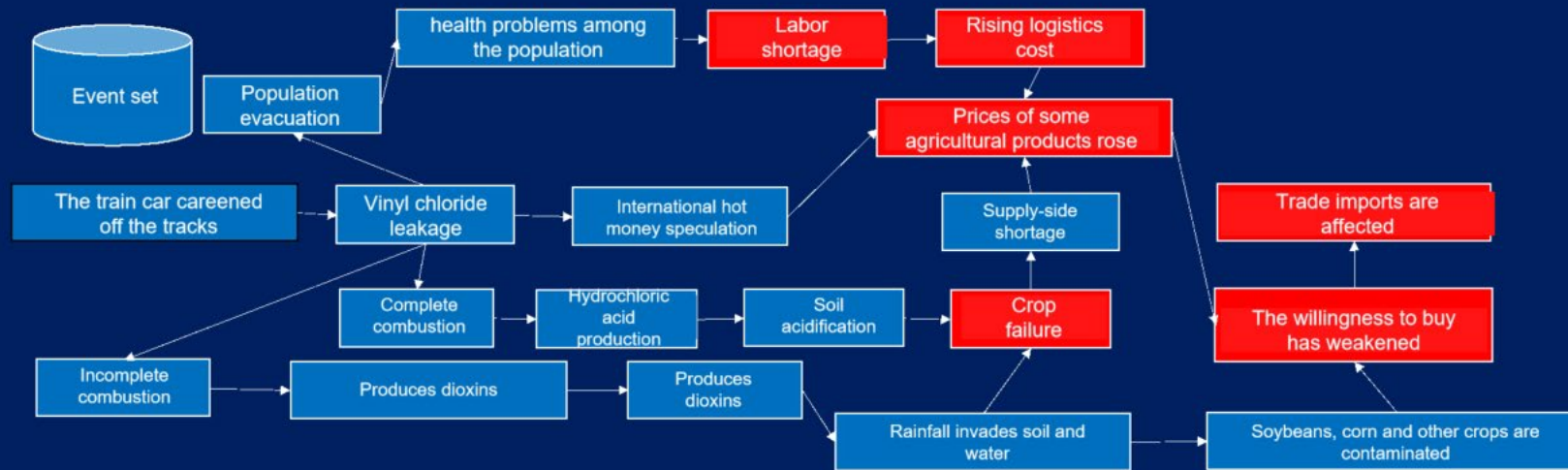**02 Using AI to identify, extract and classify the text information**
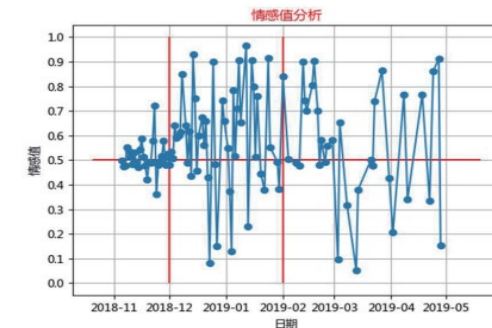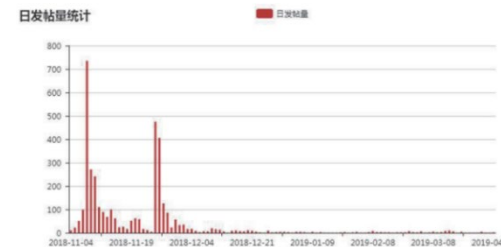
AI Deepening Empowerment to Promote Ideas

03 The logic chain of influence of text information is sorted out by means of the theory graph
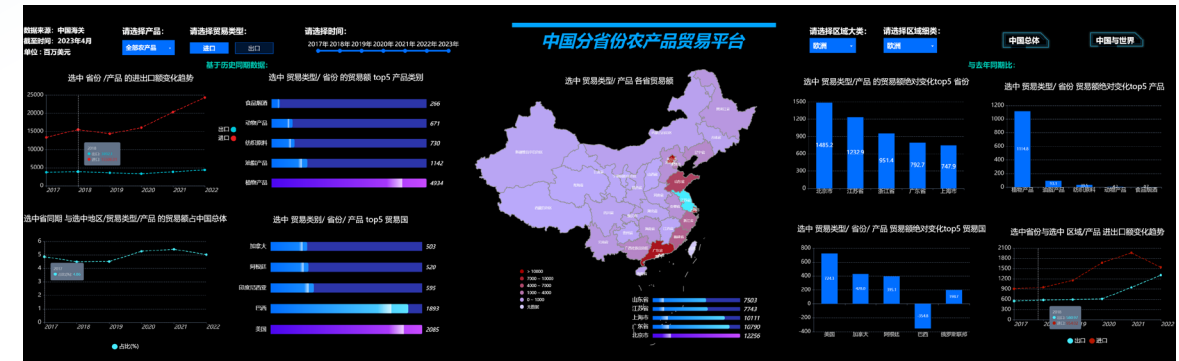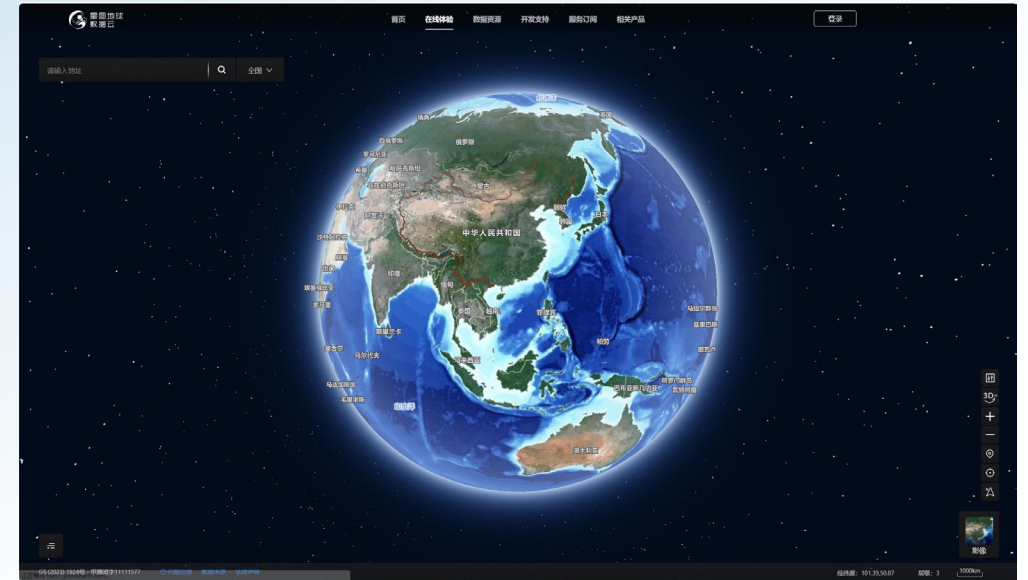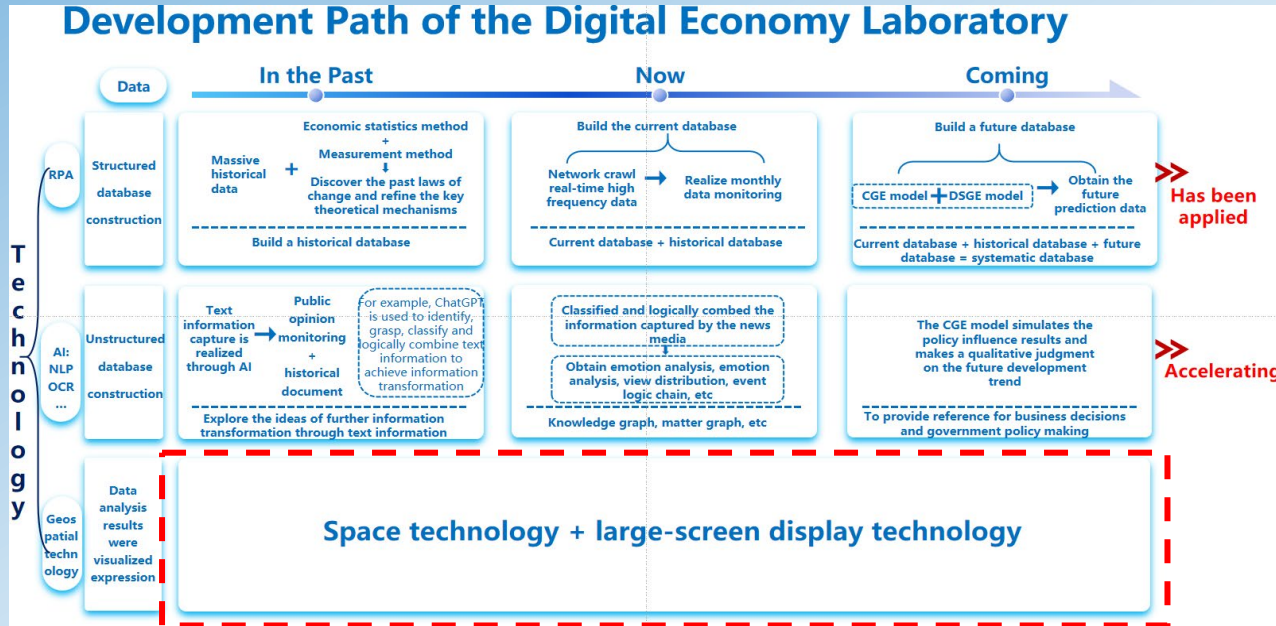

Construction of Event Rational Graph

Extract the events that have occurred in the emergence stage and the connections between them from the mass news text (blue nodes)

Inference with Event Reasoning Graphs

Make inferences about unknown things based on the built graph (red nodes)

Spatially-geographic Visual Expression of Economic Analysis Data

Development Path of the Digital Economy Laboratory