**I. Overview of the Data**

Here I publicly publish the data of the wastewater treatment network from the socio-technical perspective, a total of 10 documents. The file names contain two types: “PPNIM” and “PNSM”. Each type corresponds to five categories of files: “Attribute Settings of the node”, “Interlayer Network”, “Node name and code”, “Social Network”, and “Technical Network”.

**II. Purpose of the Data**

**1. Comparative Research**

These data are mainly used for comparative research on two wastewater treatment management models: PPNIM (Plant-Pipeline Network Integration Model) and PPNSM (Plant-Pipeline Network Separation Model), from the perspective of socio-technical network. By analyzing the node attributes, inter-layer network relationships, node names and codes, social network structures, and technical network architectures under different models, we can gain an in-depth understanding of the differences and characteristics of these two models in actual operation.

For the wastewater treatment industry, this comparative research helps to determine which model has more advantages in terms of treatment efficiency, resource management, and operation cost, thus providing decision-making basis for the optimization and development of the industry.

**2. Network Structure Analysis**

The data regarding social networks and technical networks can help analyze the collaboration relationships and information flow among different institutions and personnel in the wastewater treatment process. For example, in the social network data, the communication frequency and efficiency among different departments can be studied; in the technical network data, the connection and coordinated working conditions of technical equipment can be understood.

For the inter-layer network data, it can reveal the interaction patterns between different levels (such as management level, operation level, etc.), which is helpful for optimizing the organizational structure and management process.

**III. Data Collection Methods**

**1. Case Selection**

These data are sourced from actual wastewater treatment project cases in Nanjing. When selecting cases, we considered wastewater treatment plants of different regions and scales to ensure the representativeness of the data. However, due to confidentiality requirements, I cannot disclose the name of the specific sewage treatment project.

**2. Field Investigation**

Field visits were carried out, including on-site visits to wastewater treatment plants. On-site, we carefully examined the plant layout, treatment process, local topography, and the setup of factories within the drainage area. This helps us to fully understand the actual environment and operation process of wastewater treatment, providing a practical scenario basis for data collection.

**3. Interviews and Questionnaires**

We designed and carried out semi-structured interviews. The interviewees include experts related to wastewater treatment, such as the managers of wastewater treatment plants, general managers of sewage companies, and personnel of government regulatory departments. Each interview lasts about one to two hours, and through these interviews, a large amount of qualitative data regarding the operation and management of wastewater treatment was obtained.

At the same time, questionnaires were distributed to personnel related to wastewater treatment (including technicians, managers, etc.), aiming to obtain network relationship data, such as the collaboration relationships among staff and the flow direction of technical data. In some cases, a snowball-sampling survey method was adopted, that is, more relevant personnel were interviewed through the recommendation of interviewees to ensure the comprehensiveness of the data.

**4. Data Organization and File Generation**

After collecting a large amount of field investigation data, interview data, and questionnaire data, we systematically organized these data, and transformed into the above-mentioned ten types of network data files.

**IV. Reliability and Limitations of the Data**

**1. Reliability**

During the data collection process, we adopted a combination of multiple methods to ensure the diversity and reliability of data sources. The field investigations were carried out by professional teams, and the design of interviews and questionnaires also referred to relevant research results, and were implemented and analyzed by professional personnel.

During the data processing process, we followed strict data management and analysis procedures to avoid misjudgment and incorrect data entry.

**2. Limitations**

Although we tried our best to ensure the comprehensiveness of the data, in actual operation, there may be cases of partial data loss. For example, during the interview process, some personnel may refuse to be interviewed or cannot be contacted due to other reasons. For these situations, we adopted reasonable processing methods (such as setting personnel who could not be interviewed after multiple contacts as marginal nodes, etc.), but this may have a certain impact on the integrity of the data.

These data are mainly sourced from a limited number of case projects. Although we considered representativeness when selecting cases, it may not be able to fully cover all types and scales of wastewater treatment scenarios. Therefore, when promoting and applying the analysis results of these data, the differences in actual situations need to be considered.

Sincerely,

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