Construction of power data products based on STP theory

Cai Bing 1, Chen Peng1*
1 State Grid Ningxia Electric Power Co. LTD, Yinchuan, NingXia, 750001, China
*Corresponding author’s e-mail: 12211800_wxf@ncepu.edu.cn

Abstract. Under the background of digital revolution, the level of power grid intelligence and automation has been improved, and a large number of data of various types have been gathered. Through the analysis of multi-source data of power grid, the new profit growth point of power grid enterprises can be mined. In this paper, the "STP theory" is introduced into the power data commodity market. Through the in-depth analysis of the three elements of power data market segmentation, target market selection and market positioning, the power data product types facing different data trading objects, such as government, power grid itself, third-party enterprises and ordinary users, are constructed. This study will provide a basis for grid companies to explore new data business model.

1. Introduction
At present, a new round of scientific and technological revolution and industrial revolution has been accelerated. Big data, cloud computing, Internet of things, artificial intelligence, mobile Internet, blockchain and other digital technologies are organically integrated with the energy industry, and the pattern of energy digitization has gradually formed [1, 2]. In 2016, the National Development and Reform Commission and other departments jointly issued "about promoting the" Internet + al energy development guidance, wisdom, the applications of digital technology to energy production, transportation, trade, consumption, and supervision and so on each link, for the energy industry to provide technology, experience and valuable information, greatly improve the efficiency of the energy field of each link, improve the competitiveness of the energy industry. [3]. With the comprehensive development of smart grid construction, a large number of smart grid technologies are applied in various fields of the city, and smart grid has become an indispensable part of smart city construction. Smart grid covers the large-scale application of measurement and analysis system from power generation to power consumption, and accumulates multi-source, massive and heterogeneous data, which can be widely used in power grid operation, customer service, equipment management and other fields. How to build power data products with market prospects for different types of transaction users is the basis of power data commercialization. This is of great significance for mining the value of power data and forming a new value growth point of power grid enterprises.

On the basis of Wendell Smith's "market segmentation theory", Philip Kotler, an American management marketing scientist, has developed and perfected the core theory of commodity Construction: STP theory. It includes segmentation, targeting and positioning. Through the analysis of these three dimensions, it is also called "competitive positioning" to determine the competitive position of their products or services in the target market.
Market segmentation

Determine the segment of the variable segment

Outline market segments

Evaluate segment attractiveness

Select target market segments

Market segmentation to determine possible positioning concepts

The orientation of choice, development and communication

Figure 1 three dimensions of STP theory analysis

Power grid enterprises are state-owned assets with strong financial support and R & D capabilities. However, the characteristics of power data are different from other data assets and have not been put into large-scale trading as virtual digital commodity commerce [6, 7]. In order to ensure that power data products can create new value growth for power grid enterprises, the commercialization of power data should fully investigate the market, clarify the demand and users of power data, accurately position the market of power data products, and give full play to the characteristics and value of power data assets.

2. STP analysis of power data products

To be exact, on the basis of market demand investigation, the owner of electric power commodity should divide the market subjects into government, power grid itself, third-party enterprises, users and other sub markets with similar transaction demand of power data commodity, so as to complete the market segmentation of power data commodity. In addition, under different market segments, the demand of each user for power data commodity is "thousands of people, thousands of areas". Power grid enterprises should integrate their own development direction, data acquisition, data processing and other capabilities, and select the power data transaction demand with large user base, development potential and urgent needs, and regard it as the target market for the development of power data commodity. Finally, according to different sources and different system data, power grid enterprises choose the appropriate power data trading mode to complete the market positioning of power data commodity. Based on market segmentation, target market selection and market positioning, the corresponding power data commodity database is constructed.

Based on the "STP theory", this paper analyses the demand of the government, the power grid itself, the third-party enterprises or individuals of financial banks for power data products, the choice of target market and market positioning. Thus, the product types of electricity market are constructed. It provides support for the commercial development of power data products.

2.1. Market demand segmentation of power data products

For a long time, the application of power data in power grid has achieved good results. Limited by the lack of operational rules and regulations on the opening and sharing of power data at the national level, the application of power data has not reached the stage of product development. At present, the main objects of electricity data commodity trading are public security system, market supervision and management, industry and information technology, environmental protection and other government departments and institutions. Secondly, with the maturity of information technology and transaction mode, the trading objects of power data are gradually derived to third-party enterprises such as banks.

2.1.1 demand of government departments and institutions for power products.

Energy and power big data can be analysed from different perspectives of economy, environment, population, transportation and city, reflecting all aspects of social production and life from the side, and playing the potential value of serving economic development, social governance and improvement of people's livelihood. Government departments and institutions can analyse the change of energy structure, understand the social and economic vitality, and assist the government to make accurate decisions through the power data of the whole society or a certain industry. The demand of government departments for electric power data is mainly reflected in the following aspects: "power
looks at the economy", explores the relationship between power data and economic data, studies and analyses the impact of electricity on the economy, so as to provide data reference and prediction for the government to grasp the economic development trend of various industries in society; "power looks at poverty alleviation", and analyses the social poverty alleviation situation over the years from the perspective of photovoltaic poverty alleviation projects and power consumption in poverty-stricken areas. The situation and progress can provide data reference for the government to grasp the progress of poverty alleviation work, evaluate the effectiveness of poverty alleviation work, and help the government to overcome poverty. From the perspective of distribution of polluting enterprises, pollution types and power consumption, the relationship between power energy consumption and pollution emission of enterprises is studied, and the production and emission of polluting enterprises are dynamically presented, which provides data for the government to formulate environmental protection policies According to reference.

2.1.2 Application demand of power data commodity in power grid enterprises
It is widely used in various business types, such as power grid, power grid, power grid, power grid, power grid, power grid. Taking the outage planning optimization of power data service distribution network as an example, a multi-objective optimization model considering social benefits, economic benefits and enterprise benefits is established. Taking major activities, weather and climate, project operation and maintenance plan as boundary conditions, and based on grid topology, power supply quality, customer complaints, outage maintenance time, etc., the power supply capacity model and customers of distribution network are established. It can provide scientific basis for power grid maintenance and maintenance model to improve customer satisfaction.

2.1.3 Third party enterprises or individuals such as finance, bank and real estate demand for power data products.
For the third-party enterprises, power grid enterprises can explore the business innovation of power data in finance and other fields, change from the traditional provision of energy commodities to the provision of energy big data services, connect the upstream and downstream of the industrial chain, expand the ecological boundary, and create new growth points. For example, power grid enterprises make use of information such as enterprise electricity consumption data, default electricity consumption and electricity fee collection and payment to carry out enterprise credit evaluation from the perspective of electric power, actively meet the needs of various financial institutions, explore the establishment of business cooperation mode, and carry out enterprise credit rating and quota evaluation; analyse the enterprise operation wind based on the enterprise capacity status, power consumption, default power consumption, upstream and downstream power consumption, etc. Insurance, service financial institutions to loan customers after the loan warning.

For residential users, power grid enterprises can mine the power consumption information of users, construct multi-dimensional labels of customers, and provide comprehensive energy services such as energy diagnosis and energy-saving suggestions for users. Such power data users include buildings, communities, residents, industrial enterprises, parks, scenic spots, communities, electric vehicles, etc. In terms of information mastering user energy consumption equipment information (energy consumption equipment and load characteristics), customer energy consumption information (energy consumption structure, energy consumption trend, etc.), customer energy demand information (comprehensive energy efficiency service, cooling, heating and power supply multi energy service, distributed clean energy service, exclusive electric vehicle service), customer energy life cycle (flow customer, incremental customer, energy consumption trend, etc.), customer energy consumption demand information (comprehensive energy efficiency service, cooling, heating and power supply multi energy service, distributed clean energy service and exclusive electric vehicle service) Stock customers). According to the power supply scheme + smart energy service product combination mode, the typical overall scheme of smart energy service is configured.
2.2. Target market selection of power data products
Under different market segmentation, the demand of each user for power data commodity is "thousands of people, thousands of areas". Power grid enterprises should integrate their own development direction, data acquisition, data processing and other capabilities, and select the power data transaction demand with large user base, development potential and urgent needs, and regard it as the target market for the development of power data commodity.

2.2.1 The choice of target market corresponding to government departments and institutions.
In combination with the state of local energy supply and demand and economic development, it will submit analysis reports, statistical data and relevant suggestions in the field of smart energy to government departments, so as to build a high-end think tank in the field of smart energy. It mainly includes the prosperity analysis of key industries, the distribution of residents' economic level, urban energy consumption map and environmental protection warning analysis.

2.2.2 Power grid enterprises themselves
Automatic identification and early warning of substation equipment defects and anomalies: Based on the equipment status automatic sensing technology, give full play to the cooperative work effect of existing intelligent sensing equipment (such as high-definition intelligent video) in the substation, combined with edge computing and cloud learning technology, predict the equipment operation risk, timely discover the fault hidden danger and give decision-making suggestions, which is the command decision of field operators and leadership. We should provide professional reference basis to improve the pertinence and specialization of transportation inspection.

Rapid fault disposal and accurate active repair: give full play to the high quality of local calculation and disposal at the edge end, quickly deal with regional faults, and judge whether the fault treatment is successful through the real-time tracking analysis of the edge cloud cooperation, and improve the intelligent disposal and self-healing ability of the distribution network. Combining with the topological relationship and geographic information of power grid, the cloud carries out fault outage analysis, displays the geographical distribution of fault points and blackouts, comprehensively considers the constraints of personnel skills and material availability, and formulates emergency repair plan through intelligent optimization algorithm, so as to change passive repair into active service.

2.2.3 Third party and users
Household electrical appliances itemized bill service: use load identification technology to analyse the total port measurement data of each monitoring point, and decompose the operation conditions of electrical appliances at each monitoring point, including operation records, electricity consumption, etc. It can provide customers with itemized bills of all kinds of electrical appliances, let customers know which electrical appliances are spent on, and the details of electricity consumption are "clear at a glance".

Energy efficiency analysis and diagnosis. Provide energy efficiency analysis services such as energy saving potential assessment, energy-saving objectives and energy-saving scheme formulation for users. According to the daily, monthly, annual or specified cycle time scale, the energy consumption of each electrical appliance within the user can be ranked in the community to further determine which kinds of electrical energy consumption exceeds the average level, and provide the basis for the subsequent energy-saving potential assessment, energy-saving objectives and scheme formulation.

2.3. Positioning of power data products
According to different sources and system data, power grid enterprises choose the appropriate power data trading mode to complete the market positioning of power data commodity. For different data transaction requirements, there are five product positioning.
2.3.1 Data terminal products
It refers to a kind of data product form developed by data provider for users to use, providing data information or related data services for users. The buyer and the seller conduct transactions through online interactive operation, and the transaction and use process is closed and real-time, so the user's interactive experience is better.

2.3.2 Data file products
It refers to a product form in which data providers collect data through legal channels and generate data set files for users to download. Data file formats include CSV, xls, TXT, etc. Through the metadata information displayed in the web page through the data file, the data demander selects the data and downloads the dataset file through personalized tailoring. This kind of data products can meet the user's requirements for simple or small amount of data because it can realize personalized tailoring. This data product has a certain universality after generation, which is suitable for trading on standardized and large-scale data trading platform.

2.3.3 Data source service
Application programming interface (API) Interface, referred to as API, is a set of subroutine definitions, protocols and tools used to build application software. It is a well-defined communication method between various software components. It is a standardized data output port. It has the advantages of security, high efficiency and convenience in the big data trading market. The basic unit of price is the number of calls. For example, most of the data products of Guiyang big data exchange are traded through API.

2.3.4 Information authentication service
It refers to a product form in which the data provider provides data authenticity service based on reliable data, that is, it only feeds back the results confirmed by data. The data provider obtains the data to be confirmed through online interaction or API, and returns the authenticity authentication results of data information for the buyer, such as "true" or "false". Information authentication service is applicable to the business that only needs to confirm the authenticity of the information to complete the data service requirements of the buyer's own business process.

2.3.5 Data processing services
First: data report products. This kind of product is to design report template according to user's demand, and realize the automation of report production. Second, analytical data products. This kind of product is born out of the underlying data. It is often a visual product formed by integrating different data from several channels through certain processing methods. Users can obtain the data analysis results at a glance and save a lot of time and cost. Third, decision-making data commodity. Decision products integrate algorithms into data products to provide decision-making basis for users or directly help users make decisions and implement them. For example, credit information products, risk control products, power user portraits and so on are decision-making data products.

3. The formation of power data commodity database
Based on the above analysis of power data product market demand analysis, target market selection and market positioning. As shown in Fig. 2, a commodity database of power data products can be formed. The data products of government departments and institutions include: power consumption index, Beijing electric power index, regional development index, etc.; the data products of power grid itself include plug-in micro application data sharing and analysis platform represented by Ningxia electric power company, power grid inspection and maintenance, equipment upgrading and transformation; data products of third-party Enterprises: power data credit model, accurate investment of power data products of residential users include: energy consumption diagnosis report, energy saving scheme design and comprehensive energy efficiency scheme.
4. Conclusion

The power system is producing a lot of data every moment. The value of power system data can be brought into full play through power data mining. In this paper, the "STP theory" is introduced into the power data commodity market. Through the in-depth analysis of the three elements of power data market segmentation, target market selection and market positioning, the power data product types facing different data trading objects, such as government, power grid itself, third-party enterprises and ordinary users, are constructed. Based on the above research, this paper will explore new power data transaction mode and new power data application scenarios.

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