Exploring the promotion method and pathway of energy big data service business

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Abstract. In the wave of China’s new energy revolution and digital revolution, advanced information technologies such as big data, cloud computing, Internet of Things, mobile Internet, and artificial intelligence have been deeply integrated with the energy industry, and energy big data has emerged as the times require. Energy big data promotes new models and new formats in the energy sector. The vigorous rise of energy big data has injected new impetus into the energy transition. With the explosive growth of energy data and the continuous improvement of data processing capabilities, energy big data has become a new element of social production, and different social entities have corresponding business needs. Therefore, this article is based on the three basic business promotion theories of growth cycle, growth framework and growth strategy with growth hacking theory as the core, and considers the different characteristics of government, enterprises and residents in terms of customer acquisition cost and life value. Finally, this article puts forward energy big data service business promotion models for governments, enterprises and residents which are based on the five stages of the user life cycle.

1. Introduction
Energy is the foundation for human survival and development. Energy transformation and development is an important guarantee for solving resource and ecological crises, promoting industrial reforms, and achieving sustainable economic development. The energy revolution and the digital revolution go hand in hand, laying the foundation for the development of energy big data and accelerating the arrival of the era of energy big data. Energy big data is not only the in-depth application of big data technology in the energy field, but also the in-depth integration of energy production, consumption and related technological revolutions with big data concepts. Energy big data will accelerate the development of the energy industry and innovation of business models.

Driven by the industrial revolution and technological revolution, energy big data has developed rapidly, and a number of application demonstration sites of energy big data value-added services have emerged in China, providing certain practices for big data value-added service providers to innovate business models and design profit methods. In addition, from the perspective of application scenarios of big data value-added services for parks, different entities have different application requirements. The government-oriented application requirements can be positioned to explore the establishment of a new model of energy planning based on big data precision demand orientation; the enterprise-oriented application requirements can be positioned to provide support for precise scheduling production and
refined equipment management; the residents-oriented application requirements can be positioned in order to realize remote, friendly and interactive intelligent energy control. According to the development status of energy big data value-added services, the current energy big data development model is relatively limited, and its important role in energy planning and energy consumption forecasting has not been played out in the two main bodies of the government and residents, which is not conducive to the development of energy big data value-added services. Therefore, actively exploring the development model of energy big data value-added services suitable for different entities and applying them to the construction of big data value-added service application demonstrations is an urgent work for big data value-added service providers.

2. Literature review

First of all, energy big data plays an important role in the fields of intelligent energy management, energy consumption forecasting, and internet of things solution development. Research on the application status of energy big data and technology development is extensive and in-depth. Hui Jiang et al. (2016) emphasized the important role of big data in the smart grid, such as improving the efficiency of demand response by enhancing the accessibility of customer electricity data, and four types of technologies: data collection and storage, data association analysis, longitudinal data control and data visualization will improve the utilization efficiency of energy big data [1]. Marinakis Vangelis et al. (2020) developed a network-based decision support system, using energy big data to provide city authorities, local administrative departments, energy service companies, and public utilities with feasible business insights [2]. In addition, Marinakis Vangelis (2020) also proposed a high-level data-driven building data exchange, management and real-time processing architecture, which supports the development of energy efficiency services [3]. Chao-Tung Yang et al. (2020) combined cloud computing and big data processing technology to establish a real-time energy monitoring system for a smart campus. The monitoring platform collects the electricity consumption of campus buildings through smart meters and environmental sensors [4]. Shuaiyin Ma et al. (2020) established a cube-based energy consumption model and a long-term memory-based energy prediction model. This model carries out corresponding data preprocessing and mining to improve the energy and resource utilization of energy-intensive manufacturing [5].

However, scholars currently have little research on energy big data business models. Wengfeng Li (2020) and others emphasized that the full utilization of energy big data is the key to improving the country’s energy utilization efficiency, and proposed the E-BDBC (Energy Big Data Business Canvas) operation model analysis tool, which provides an analysis of the provincial energy big data market situation, The profit model, ecological strategy and operation model selection are analyzed to provide reference for the operation plan of the provincial energy big data center [6]. Based on the business canvas theory, Na Li et al. (2020) discussed the energy big data business model suitable for the new situation from nine aspects such as market entities, customer relationships, value propositions, key businesses, propaganda and other aspects [7].

The above studies did not differentiate and discuss the business promotion objects of energy big data. In fact, there are significant differences in the promotion model and path of energy big data service business for different business objects. Therefore, it is innovative to specifically discuss the promotion methods and paths of energy big data service business for governments, enterprises and residents. It is helpful to assist the government in scientific decision-making, improve the energy efficiency of enterprises, improve the energy consumption experience of residents. It facilitates the intelligent upgrading of the energy system and promote the development of the industrial chain integration.
3. Business promotion pattern basic theory

3.1. Growth cycle

Growth hackers are a group of new marketing talents who achieve explosive growth in business indicators. They take "growth" as the sole purpose, follow the growth process, use data to drive marketing, use iterative experiments to verify strategies, and promote changes in customer behavior through technical means, thereby promoting customer growth and profit growth with lower public relations and advertising costs. According to the growth hacking theory, the growth cycle of an enterprise is generally divided into five important stages:

The first phase is a problem and solution matching period. This phase mainly investigates the needs of our customers, discovers user pain points, clarity, and solutions.

The second stage is the minimum feasibility product period, seeking a number of minimum feasibility products (Minimum Viable Product, MVP). Through MVP sample research, you can quickly enter the market, contact customer and get feedback. By continuous iteration development, it is greatly reduced at the test error.

The third stage is a product and market matching period, enhance the user's viscosity and experience. The best fit point for products and markets allows products to provide users with real value, enhance user viscosity, form a word-of-mouth effect, and lay the foundation for the large-scale growth of users.

The fourth stage is a large-scale investment in the channel and product matching period. By selecting high-quality and high marketing efficiency, it is possible to clear the order in which channel delivery, can improve the promotion speed of the product in the market, and achieve large-scale expansion of the market.

The fifth stage is mature. At this stage, the company will choose M&A, international or localization to achieve continuous growth of users.

3.2. Growth frame

Growth hacking Theory framework includes user lifecycle funnel model (AARRR model), including analysis framework tools for the entire customer lifecycle, can help teams better analyze user conversion processes to develop user growth strategies. AARRR represents five phases of the user's lifecycle: obtain user (Acquisition), activate user (Activation), users stay (Retention), user revenue (Revenue), and user Recommend (Referral). As the user's growth phase continues to deepen, the user leaking in the next stage gradually decreases. Therefore, every closed loop in the user's life cycle is critical. The AARRR funnel model combines the user's Acquisition, transformation to profitable content, forming a complete user analysis method and management system to play an advantage in user growth.

3.3. Growth strategy

There are two main types of growth strategies, the first is to obtain customers from third-party channels through some marketing strategies, resulting in growth; the second way is to achieve growth on the basis of operating the company's existing customer resources. Based on the growth hacking theory, the first growth strategy can test the customer acquisition capabilities of various channels and marketing strategies through experiments to find the best channels and methods to achieve effective growth; the second growth strategy is to maintain existing customers. To achieve effective growth based on existing customers, the key to this strategy is to obtain customer support. The second strategy can also use multimedia and other tools to guide customers to consciously help disseminate product information to acquire new customers. In addition, it can also use material or psychological incentives to encourage old customers to consciously recommend products and win the reputation of products or services.
4. Business promotion object and mode selection

The boundary of effective promotion can be judged from two indicators: customer acquisition cost and customer life value. Companies should follow the rule that the value of customer life is higher than the cost of customer acquisition, and carry out effective product promotion. For different types of user groups such as governments, enterprises, residents, etc., the acquisition cost and life value of customers should be considered, and different promotion methods should be adopted.

4.1. Government users

For government users, companies should take the promotion of complex sales. Complex sales refer to the high-level leadership by high-level leaders, and achieve the promotion of products and the establishment of the product. Through the establishment of a proper cooperative relationship with government units, the radiation of multiple customer groups can be realized, bringing multiple gain sources, enhancing brand influence, producing brand effect. However, due to the special role of government customers, it plays an extremely important role in social life, usually in the status of managers or leaders, so there is a feature of high cost. Therefore, for government users, companies need to adopt "high-to-high" complex sales promotion methods, communicate with high-level leaders to negotiate, establish a task team leading to lead to improve the promotion effect. Government users mainly include Government units such as the National Development and Reform Commission, the Monitoring Office, Poverty Alleviation Office.

4.2. Enterprise users

For enterprise users, companies should take the promotion method of staff sales. Staff sales refers to the process of selling products or services directly to customers and customers. Enterprise users, with high lifetime values, especially large enterprise users can bring high profitability for companies. And compared with government users, its customer acquisition cost is relatively low. Therefore, for enterprise users, companies can take advantage of staff sales, rather than adopting complex sales promotion methods. Companies can start from large business needs of service needs, targeted personnel sales promotion, providing comprehensive business solutions and professional overall service capabilities, and establish long-term cooperative relations, thereby achieving effective marketing promotion. Enterprise users mainly include different types of enterprises such as equipment manufacturing enterprises, commercial circles, financial institutions, and high-energy enterprises.

4.3. Resident users

For resident users, companies can take the promotion method of viral marketing. Viral marketing refers to the use of the public's enthusiasm and interpersonal context, allowing marketing information to spread quickly like viruses, and transmit information in a short time to more audiences, low cost and fast speed. Compared with government users and enterprise users, the lifetime value of residential users is relatively small, but due to their low cost of customer acquisition and large scale, they can bring economic profits and brand influence that cannot be ignored to the company. For resident users, companies can use a large amount of channel media to drainly promote, such as living software, social software, etc., and create environmental conditions for viral marketing. By establishing a reasonable recommendation mechanism, users encourage users to invite other friends to become user, experience product service functions, and conduct a pair of fast propagation, enabling a chain reaction of exponential growth, occupying resident users. Resident users mainly include different types of public users such as general residents, tenants.

5. Business promotion mode

Based on the related theoretical analysis of the promotion mode, facing the three types of objects of government, enterprises and residents, combining the specific characteristics of different subjects, respectively affect the five stages of the user's life cycle, proposing differentiated energy large data business promotion models.
5.1. Promotion mode for government

- **Acquisition:** As shown in Figure 1, the government-oriented application requirements can be positioned to explore the establishment of a new model of energy planning based on the precise demand-oriented big data. Through high-level referrals, door-to-door marketing, meeting interviews, etc., senior managers with the position of CEO or deputy general manager and above will negotiate with government officials and sign cooperation intentions. It is necessary to provide government-oriented planning plans and demonstration projects such as urban energy brains and smart energy towns.

- **Activation:** As shown in Figure 1, the government-oriented energy big data business provides the government with accurate reporting of special analysis reports and government affairs reports, supporting the government's precise policy implementation, and serving as a reference for the municipal party committee and government's important decision-making. The government-oriented energy big data products mainly include power to look at business circle vitality, power to look at industrial transformation, pillar industry transformation index, financial credit testing, etc.

- **Retention:** As shown in Figure 1, the government-oriented energy big data business needs to establish a large and medium-sized team that contains various functions and can independently and quickly realize business needs. In the early stage of the project, the professional team actively communicated with government departments, clarified current needs and mid- to long-term iterative optimization goals, made top-level design and architecture solutions, and

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**Figure 1.** Government-oriented energy big data business promotion model.
provided the government with stable, safe, and reliable integrated solutions. In the middle of the project, the problems reported by the government should be quickly followed up and optimized in time, followed up, overhauled, and optimized on a regular basis to establish a good long-term relationship.

- **Revenue**: As shown in Figure 1, the revenue of government-oriented energy big data business includes government subsidies and potential benefits from cooperation with the government. The government subsidies obtained through the deployment of display platforms and analysis systems in the two-level energy management department can support the daily maintenance and operation of the energy big data center. The potential benefits of cooperation with the government include: when the first intention to cooperate with the government is reached, use official reports, government endorsements and other channels to establish a good corporate image and excellent brand effect. After the initial cooperation with the government, under the premise of ensuring data security, companies request the government to open the use of urban energy data resources, which will help reduce the cost of screening potential customers. After establishing a long-term stable cooperative relationship with the government, the publicity effect of the government demonstration project will be used to radiate more user groups and consolidate the brand effect.

- **Referral**: By maintaining a good partnership with the government, creating advanced demonstration projects to attract other governments to cooperate, and using the government's credibility to encourage regional key enterprises to develop energy big data products and services.

### 5.2. Promotion mode for enterprises

**Figure 2.** Enterprise-oriented energy big data business promotion model.
● Acquisition: As shown in Figure 2, the enterprise-oriented application requirements can be positioned to provide support for precise scheduling production and refined equipment management. Project managers, sales representatives, and professional and technical personnel will have door-to-door marketing interviews, supporting display of product service plans, minimum viable product display, demonstration projects, etc. In addition, it is necessary to do a good job in enterprise research, explore the pain points and difficulties of enterprises, visit key enterprises in a targeted manner, and vigorously promote demonstration and application products.

● Activation: As shown in Figure 2, the enterprise-oriented energy big data business guides enterprise users to discover product value through products that are both visual, convenient and easy to use, and provide preferential conditions for cooperation when necessary. Combining with characteristic companies, develop customized solutions for specialized programs, push them periodically and push updated product information point-to-point to support healthy operations of the company. In addition, consider free use for certain public welfare and scientific research purposes to fulfill social responsibilities and establish a good public image. Enterprise-oriented energy big data products mainly include the construction of application scenarios for energy consumption by electric power companies, public security risk monitoring, and life prediction of distribution network equipment.

● Retention: As shown in Figure 2, the enterprise-oriented energy big data business generally requires small and medium-sized teams. The composition of the team and the specific number of people are determined at the beginning of the project based on the scale of the enterprise and the needs of the enterprise. The professional team combines the characteristics and needs of the company to improve product functions, design a personalized professional platform, do regular return visits, maintenance, and optimization, and gradually form a long-term cooperative relationship for relationship marketing.

● Revenue: As shown in Figure 2, the revenue of enterprise-oriented energy big data includes the service fees paid by the enterprise and the potential benefits of cooperation with the enterprise. The service fee paid by the enterprise includes the cost of providing data services and business functions. The potential benefits of cooperation with companies include channel resource sharing, product business innovation, and so on.

● Referral: The project manager will come forward to communicate with the company, expressing the hope that there will be more opportunities for cooperation with the upstream and downstream companies, parent and subsidiary companies of the company, and request the company to recommend. At the same time, focus on improving the quality of products and services to form a word-of-mouth effect.

5.3. Promotion mode for residents

● Acquisition: As shown in Figure 3, the resident-oriented application requirements can be positioned to realize remote, friendly, and interactive intelligent energy control. Acquire customers from four channels: key opinion leader promotion, ground promotion, user fission, and advertising drainage. Supporting resources include mature mini programs or apps, marketing materials (gifts, brochures, etc.), official platform websites, official WeChat accounts, etc.

● Activation: As shown in Figure 3, the resident-oriented energy big data business includes online activation and offline activation, and the online customer service and marketing planning teams are responsible. Online activation activities should take into account the convenience of users and the process should not be complicated. For example, completing energy-saving knowledge services can get cash red envelopes; offline activation activities are mainly targeted at communities with a large base of elderly groups, such as regular health lectures.
Retention: As shown in Figure 3, the number of monthly active users is the North Star indicator. When the indicator changes, the team’s product managers, data analysts, and operations staff need to quickly follow up, analyze the data, find the reasons, and iteratively optimize. Through local community operations, official content operations, enhanced product perception, attention to residents’ feedback, and analysis of the reasons for user churn, the user retention rate is improved. Supporting resources include service function optimization, upgrading and expansion, preferential activities, and the development of interesting functions.

Revenue: As shown in Figure 3, the revenue of resident-oriented energy big data mainly includes product fees paid by users, the monetization of advertising space traffic in local community operations and official content operations, and the monetization of commercial scenarios that are matched with energy big data for residents.

Referral: Establish a recommendation mechanism for resident users, such as sharing recommendation, Weibo sweepstakes, etc.

Figure 3. Resident-oriented energy big data business promotion model.

6. Conclusions
This article is based on the three basic theories of growth cycle, growth framework and growth strategy with growth hacking theory as the core, and considers the different characteristics of government, enterprises and residents in terms of customer acquisition cost and life value. It is believed that facing government users, enterprise users and resident users should adopt the promotion methods of complex sales, personnel sales and viral sales respectively, and propose differentiated energy big data business promotion around the five stages of customer acquisition, activation,
retention, monetization and recommendation of the user life cycle model. However, because the energy big data business is still in the initial stage of development, it is difficult to obtain research cases and actual data, so it is difficult to quantitatively analyze and research. This is the shortcoming of this article.

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