

New Business Models in the Energy Sector

Subjects: Management

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The relevance of the problem of improving business models in the energy industry has become especially acute in recent years due to the energy transition, the emergence of new energy production and consumption technologies, and the increase in environmental requirements for energy companies' performance.

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1. Genesis of the Business Model Concept

A business model is a client-centered concept: it is generally used to describe a company's prompt and precise response to any change in customers' needs; companies' efforts to foster enduring relationships with their customers, not only in the process of product design and manufacturing but also by providing after-sales services, e.g., support at the later stages of the product's (or project's) lifecycle. In fact, a business model is one of the key competencies which helps a company distinguish itself from the rivalling firms, create innovations, and quickly bring them to markets, as well as determine the strategic priorities and relationships between business processes.

In economics, the concept of a business model came to the fore in the 1980s and 1990s ^{[1][2][3][4]}. Initially, business models were mostly used in such spheres as the services sector, IT industry, media business, automotive industry, and electronics, that is, the spheres with a large number of products with various modifications intended for the mass market ^[3]. At this time, the most fundamental studies in the field of business models were published. Among them are the publications of D.F. Abell ^{[5][6]}, P. Vervest ^{[7][8]}, G. Hamel ^[9], H. Chesbrough ^{[10][11]}, A. Osterwalder and Y. Pigneur ^{[12][13][14]}, A. Slywotzky ^[15], and C. Zott and R. Amit ^{[1][16]}. In the classical interpretation of these authors, the business model, as a rule, was considered as the process of creating and delivering values to the client with effective costs, that is, essentially answering the question of how the company earns money. Thus, the financial, economic, and marketing components were the basis of the business model concept.

Among recent studies, the most prominent works include the monographs by T. Clark and B. Hazen ^[17], C. Linz, G. Müller-Stewens, and A. Zimmermann ^[18]. The typology proposed by the latest authors integrates both traditional and advanced ideas about the concept (for example, platform or project business models) and includes four types, which can be used by companies when developing the customized products and services (**Figure 1**).

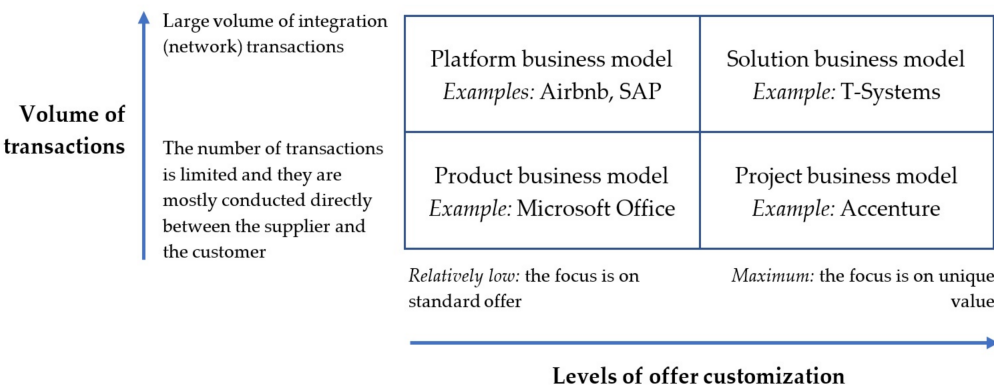


Figure 1. Modern typology of business models (based on ^[18]).

Platform business models today are of increased interest, which is due to the spread of platform markets (mainly in the high-tech segment of the tertiary sector of the economy) ^{[19][20]}. It is noted that the main advantage of such a business model is to reduce the role of the institution of traditional mediation and, accordingly, transactional, operating rooms, temporary, and other costs for all subjects of economic interaction—the manufacturer of the service, its consumers, and the owner of the platform ^{[21][22]}. In addition, the “everything-as-a-service” approach and convenient forms of payment

(pay-as-you-go) used as part of platform business models contribute to the expansion of the assortment and the quality of the products and services provided to consumers [23][24].

In modern notations, the business model is also considered as an integral component of technological entrepreneurship [25], strategic (proactive) management [26], and crisis management [27]. Specialized areas of business modeling are developing, for example, business continuity management (BCM)—a systematic intelligent process of identifying potential threats, analyzing their impact on business, and developing proactive solutions to effectively respond to crisis situations in order to protect the interests of stakeholders, reputation, and the most significant business areas of the company [28][29][30]. Therefore, it can be stated that the boundaries of the business model concept are becoming wider, and today, the business model is perceived not only as a marketing tool that increases the competitiveness of the company but also as an integral element of the strategy, based on the use of advanced IT-tools and scientific and technical achievements.

2. Factors Determining the Spread of Business Models in the Electric Power Industry

In the electric power industry, which is one of the most complex infrastructural sectors and which is the object of the current study, the topic of business models has started to gain ground only comparatively recently [31]. The liberalization of energy markets and intensifying competition between energy companies, renewable energy development, and cascading innovation in the energy sector have been conducive to the transition from the single-product model (supply of electricity and/or heat) to the model based on a diversified portfolio of various energy services [32][33]. The latter, in turn, requires an adjustment of business modeling tools to the unique technological specifics of the industry, as well as its social function—ensuring reliable and sufficient energy production for all economic entities. However, in the opinion of a number of experts [31][34], the problems of business modeling in such a complex industry as the electric power industry have not yet found proper lighting in the literature. There is a serious deficiency of both theoretical and practical knowledge in this field. For example, it is critical to include technological features of energy production to the business model structure and to analyze their impact on the financial results of energy companies. These issues are often ignored by researchers, and therefore it is an important motive for writing and the subject of theoretical discourse of this article.

An Important role in the transformation of business models is played by the unfolding energy crisis, which makes the energy transition more complicated (in this article, the energy transition is understood as a set of profound technical and economic transformations in energy production, supply, and consumption aimed at minimizing the environmental impact of the energy industry [35][36][37][38]).

The transformations in the business models of energy companies are determined by the general logic of the energy transition and, in particular, by the number of factors. These factors include far-reaching revisions of the eco- and energy efficiency requirements for manufacturing processes; the development of 'green' energy technologies—the main goal of the energy transition [39][37]; advancements in smart energy infrastructure through the extensive use of smart grids, small-scale renewable energy systems, microgrids, cutting-edge diagnostics, and repair tools for energy equipment [39][40][41]; a new stage in electrification, encompassing smart cities, homes, industrial production, transport, and commercial and utilities sectors [42][43]; and the transition from the product-based business logic (energy is sold as a product) to the service-based logic, which means that energy companies not only supply electricity and heat but also offer a whole range of services for energy efficiency/energy consumption management [44][45][46]. The latter to a certain extent leads to the emergence of active energy consumers or prosumers, who become rightful participants in the bilateral relationships on the energy market [47][48].

One more factor that should be added to this list is the integral feature of energy supply—its stability, which is gaining a particular social significance in the period of the global energy crisis. This characteristic corresponds to the demand for energy and capacity in terms of their amount, parameters, time, and place; continuity of energy supply; affordable prices for all consumers, i.e., prices reflect the actual costs of services; and environmental friendliness and safety in all elements of the energy supply process.

As a result of the above-described changes, the line between energy producers and consumers is getting increasingly blurred. Energy services are now becoming more personalized, corresponding to individual consumption models. Energy users are now offered more and more new services provided by companies from different spheres—information and telecommunications (Google and Apple), automotive industry (General Motors, Tesla, and Volkswagen), software and digital solutions (SAP and Siemens), electronics (Samsung and Philips), and e-commerce platforms (Amazon) (Table 1).

Table 1. Examples of tech companies entering the energy sector (developed by the authors on the basis of systematization of the data given in [49][50][51][52]).

Sector of Economy	Main Strategic Focus	Examples of Integrated Solutions	Examples of Companies
Original equipment manufacturers	All the services where devices play the key role	• Smart home • Energy supply management systems based on preinstalled software • Closed protocol systems	Schneider Electric, Google, Siemens, Semtech, and General Electric
Information and communication technologies	Comprehensive solutions of data collection and processing	• Maintenance of energy generating assets and optimization of energy consumption with the help of software • Event data management and data accumulation • Consumer data, personalization, and analytics	Oracle, Accenture, IBM, and Cisco
Car industry	Rebuilding operating models and entering new markets	• Industrial solar panels • Wind generators and solar cells for EV charging • Use their own RES plants to reduce CO₂ emissions	Seat, Honda, Volkswagen, and General Motors

As these companies are competing successfully with traditional participants in the energy market, the latter are forced to innovate to stay afloat. Thus, the nature of market relations in such a very conservative industry as electric power is fundamentally changing. Some energy companies have begun to use the elements of multiservice and platform business models, however, these attempts naturally face barriers caused by the unwillingness of energy market infrastructure, individual consumers, and utilities' management.

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