Client orientation of central power generation companies

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Abstract

Purpose – This paper aims to identify the effects of client orientation on the business models of central power generation companies.

Design/methodology/approach – Five major Russian wholesale electricity market players have been selected for the analysis conducted by applying the "business model canvas". To identify the changes induced by client orientation, the progress of companies' business models has been traced over six years, from 2009 to 2015.

Findings – Five major trends in business model changes because of client orientation have been identified: declaration of the movement toward client orientation and adoption of client service standards; emergence of business diversification in favour of engineering, construction, service, operation and maintenance of power-generating facilities; increase in vertical integration; increase in the diversity of communication channels with consumers; and increase in the diversity of customer relationships. The results have been compared with those obtained from international studies. The conclusions about international and local characters of the trends are presented.

Originality/value – The study contributes to the knowledge of the current and upcoming changes in the business of central power generation companies triggered by the advent of electricity prosumers. The results are valuable for both management decision makers and theorists.

Keywords Business model, Electricity generation, Business model canvas, Sampling, Client orientation, Electric utilities, Electricity prosumers

Paper type Research paper

1. Introduction

Client orientation is a relatively new trend in the electric power industry that, traditionally, is product-oriented. This approach can be defined as the placement of customers' demands, requirements and utility at the core of industry development, so the entire value chain prioritizes these. The concept of client orientation has been developed for the customer service and product sectors (Nwankwo, 1995), and the recent shift to client orientation of the electric power industry was circumstanced by several major changes (Fratzcher, 2015; Hutt and Ferveur, 2008):

- *Growing concern about environmental problems and the necessity of a transition to clean energy*: The global society requires the electric power industry to become more environmentally friendly, and this requirement is expressed in both state politics and customer expectations.
- *Declining demand for electricity as a result of improvements in energy efficiency*: This phenomenon takes place in developed countries of the European Union and in the USA. It is also relevant to Russia owing to the current economic recession in the

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country. The decrease in demand increases the competition between electricity suppliers and makes them more attentive to their clients' needs.

- *Technological development of electricity generation and grids*: Modern distributed co-generation technologies are highly efficient and can be easily integrated in industrial processes (Van der Veen and Kasmire, 2015). Renewables are becoming competitive with conventional generation, and smart grid technologies provide opportunities for two-way electricity transmission. This stimulates consumers to become producers, thereby obtaining alternatives to the central electric supply.
- *High levels of power generating and grid equipment amortization*: According to the International Energy Agency (IEA) evaluations, necessary investments in transmission and distribution infrastructure over 2014-2035 worldwide will amount to $6.8tn, and the costs of maintenance and replacement will be 40 per cent of this sum. The accumulated investments in generation will be even higher – $9.6tn (IEA, 2014). Because such significant investments will be a major burden for consumers' bills, the states incentivise distributed generation, owned by consumers, to integrate it into the energy system. It increases competition in the electricity generation sector, which encourages companies to find ways to attract clients.
- With progress in consumers' involvement in the electricity market, their requirements for a central electricity supply are changing, becoming more personalized.

The drivers listed above are altering the business environment in the electric power industry, and the companies have to adapt to it. It is agreed in the management theory that the primary way of innovative adaptation for commercial companies is to change their business models (Chesbrough, 2007; Zott *et al.*, 2011). In light of this, major changes in electric companies' business models are expected, and in our article, we are trying to capture their signs in the existing power-generating companies in Russia. To accomplish this, we applied the analysis framework "business model canvas" (Osterwalder and Pigneur, 2010) to major Russian electricity market players in the period 2009-2015.

Before proceeding to the main part of the article, we would like to give a brief introduction to the Russian energy system. In 2016, this system relied primarily on fossil fuels (gas and coal); renewables represented virtually solely by hydrogeneration (Figure 1).

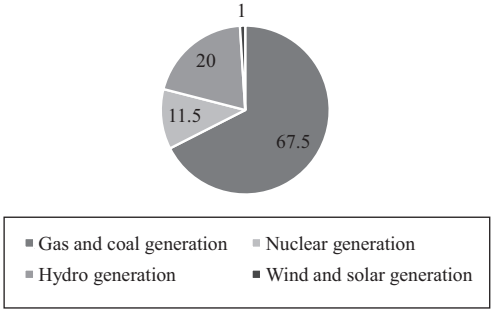

Figure 1.
Russian generation mix

Source: The Ministry of Energy of the Russian Federation (2016)

The energy system in Russia is controlled by the state to a high extent (Gore *et al.*, 2012): it owns all nuclear generation, and it controls the majority of fossil fuel generation and hydrogeneration plants. The state also regulates a significant portion of the electricity market, which, in Russia, is divided into electricity and capacity trading:

- in the retail sector of the market, the state establishes the electricity tariffs for all residential consumers and their suppliers; and
- in the wholesale sector of the market, the state excludes a large number of generation sources from capacity price bidding (all hydro- and nuclear generation, and a significant part of fossil fuel generation), so only about 50 per cent of all generation sources get market price for their capacity. The exclusion of thermal power plants from the competition takes place for a variety of reasons: costs of shutting down, unavailability of other sources in the area and incentivising of investment. In addition, about 10 per cent of power plants are excluded from electricity price bidding, being located in isolated areas: they sell their electricity at a price set by the state.

Industrial and commercial consumers have a relatively high flexibility in terms of supply sources; a privilege that came at an inflated cost. Bulk industrial consumers can buy electricity directly from the high-voltage grid, and commercial consumers can choose an electricity supplier. At the same time, they have to pay high market prices because of the inefficient and redundant power-generating sources protected by the state policy. As a result, more and more industrial and commercial consumers in Russia are switching to owning distributed gas generation. This trend is the most important driver of client orientation of centralized generation – which is losing the most lucrative clients.

As far as residential consumers are concerned, they are outside of the competitive electricity market: they receive electricity for regulated prices and cannot choose an electricity supplier (Gitelman, 2014). All residential consumers are served by a "guaranteeing supplier", i.e. an electricity supplier which is obliged to sign a contract with every consumer who has applied for it and who is located in the territory served by the supplier. A "guaranteeing supplier" is chosen on a competitive basis, and its business is controlled by the state.

We believe that our approach and findings are relevant to other countries experiencing the effects of the aforementioned drivers. To identify the trends having either local or international attributes, a comparison of the results – with those obtained in international studies – is made. It allows us to discern the features conditioned by the history of the power industry deregulation in Russia, in particular, its immaturity and significant state regulation.

The article is structured as follows. We will provide a brief review of the existing works on business model transformations in general and in the power industry in particular in Section 2. Then, the methodology of our research and sampling is described in Section 3. Finally, we will present and discuss our analysis of the results in Sections 4, 5 and 6.

2. State of the art

It is believed (Tretyak and Klimanov, 2016) that the idea of business models as an analytical tool was introduced to managerial studies around the end of 1990 by Timmers (1998); it was applied to analyse IT companies. However, there was an earlier work of Slywotzky (1996) that proposed an idea that companies whose business designs (or business models) meet customers' priorities in the most efficient way win the competition, and offered a method to identify one's business design. He also emphasized that the business design is more

important than the technology for success, as the modern era has fewer technological breakthroughs than the industrial age.

Among many other works, several approaches to business model analysis have become the most popular. Following Tretyak and Klimanov (2016), we would like to note the "business model canvas" (Osterwalder and Pigneur, 2010), the "business model navigator" (Gassmann *et al.*, 2013) and the "4w business model decision pattern" (Girotra and Netessine, 2014). These analysis frameworks are the most recent, and they comprise previous achievements in this field.

According to the "business model canvas", a business model can be presented as nine building blocks, namely:

(1) *Customer segments*: The different groups of people or organizations an enterprise aims to reach and serve.

(2) *Value propositions*: The bundle of products and services that create value for a specific customer segment.

(3) *Channels*: How a company communicates with and reaches its customer segments to deliver a value proposition.

(4) *Customer relationships*: The types of relationships a company establishes with specific customer segments.

(5) *Revenue streams*: The income a company generates from each customer segment;

(6) *Key resources*: The most important assets required to make a business model work.

(7) *Key activities*: The most important things a company must do to make its business model work.

(8) *Key partnerships*: The network of suppliers and partners that make the business model work.

(9) *Cost structure*: All costs incurred to operate a business model.

The "business model navigator" focuses on four key questions to make a business model of a company tangible:

Q1. Who is your target customer?

Q2. What do you offer to the customer?

Q3. How is the value proposition created?

Q4. How is the revenue created?

Applying this analytical framework to 250 business models, the Gassmann *et al.* have identified 55 of the most successful patterns.

The "4w business model decision pattern" states that answering the following four questions can make it clear what components of a business model should be changed:

(1) What key decisions are made in the business?

(2) When are they made?

(3) Who makes them?

(4) Why do those individuals make the decisions they do?

For the purpose of the current work, we have chosen the "business model canvas" (Osterwalder and Pigneur, 2010) as the analytical framework, for the following reasons:

- It is applicable to the electric power industry companies (Meier, 2014).
- Its focus on the business model building blocks lets us analyse the business models in detail and trace the changes caused by the movement of the companies towards client orientation.
- It does not offer ready solutions like the "business model navigator".
- It does not have an exclusively problem-solving orientation like the "4w pattern".

There are few available studies of business models in the electric power industry for several major reasons. First, most countries deregulated the industry not long ago, and the competition between companies is often limited. For example, in Germany in 2013, four vertically integrated companies owned 56 per cent of installed generation capacity, and these were the biggest retail suppliers (Bayer, 2015). Next, till recently, the electric companies have not had technical options to diversify their value propositions and revenue models, so their business models have been quite similar. The traditional energy supply model is discussed by Hall and Roelich (2016), and they have stated that it is aimed exclusively at the increase in electricity sales. The current decline in electricity demand in developed countries makes this business model disadvantageous for the companies. In addition, the recent advent of new technologies in the power system management, grids and on the consumer side provides new opportunities for electric companies' value propositions and revenue models.

These trends in business of electrical utilities have been captured by the 14th PwC Global Power & Utilities Survey. Over half of its participants report that their market is undergoing a medium degree of disruption now, and a further 16 per cent report high levels of disruption. The disruption will take place in five key areas: policy and regulation, customer behaviour, competition, production service model (the infrastructure, products and services provided by the sector) and distribution channels (how the sector reaches and delivers to customers). As a reaction to the upcoming changes in the market environment, companies anticipate transformations in their business models. The majority of the respondents globally (66 per cent) think that the current power sector company business models will not be sustainable, and the need for change is becoming urgent. Most of the companies are going to build their future operational strategies on large-scale centralized renewable generation (77 per cent of the respondents), 62 per cent of the experts responded that their companies will focus on smart infrastructure and 55 per cent are going to develop in the field of local energy systems and infrastructure.

Expected changes in the business models of electric companies because of the advent of prosumers have been systematized by Rodríguez-Molina *et al.* (2014). According to their work, the prosumer becomes a key element of the new electricity value chain, which causes changes in electric companies' business models to answer prosumers' needs. As the authors assert, "when combining smart grid technologies and the new role taken by prosumers, a much more dynamic electricity market is created". They identify seven new value propositions for prosumers:

(1) money saving;

(2) time saving;

(3) buyer/supplier – the prosumer who both purchases and sells energy;

(4) energy stalwart – the prosumer who adopts and appreciates the benefits of new technologies;

(5) pragmatist user – the prosumer who is interested in new technologies in energy usage, but is constrained by risks and improvements;

(6) environmentally conscious user – the prosumer who wants eco-friendly and efficient options; and

(7) passive user – the prosumer who demands consistent classical service.

The changes in the value chain and the new value propositions for prosumers will likely alter business relations in the electric power industry and create new services, which will stimulate the advent of new business models. Rodríguez-Molina *et al.*, discern the following new prosumer-oriented business models: the energy service companies (ESCOs), virtual power plants, aggregators/retailers and the distributed system operator prosumer-oriented business model. The study provides important insight into possible future business models of companies in the electric power industry; however, it does not analyse existing innovative business practices, although they can be multifarious.

The International Energy Agency (Meier, 2014), by means of case studies applying the "Business Model Canvas", identified successful business models of the companies that install and maintain photovoltaic panels. This work is particularly pertinent to studying client-oriented power-generating companies, as the outlined business models respond to the needs of low-income clients who would like to buy photovoltaic (PV) panels. IEA researchers described the following existing business models, noting that they can be further advanced:

- *Pay-as-you-go business model*: The company installs a PV panel together with a special controller that allows a power supply to the dwelling only when the system is unlocked by entering a code. The code is sent by SMS, and to obtain it, the customers can buy a special card for cash or pay from their mobile phone account.
- *Combination of PV panels with water pumps selling water*: This integrated model is especially appealing for African off-grid areas. Users obtain tap water from the dispenser by using a WaterCard with prepaid credits.
- *Optimal use of existing grid and generation resources*: This is not a breakthrough business model; however, this opportunity is rarely used. Its value proposition will demand that the company have monopolistic power in a certain territory, so it could optimize the mix of generation and backup systems within it to make the power cheaper.
- *A virtual renewable energy investment bank for crowd funding*: A company with this business model works as an intermediary between multiple private investors and renewable energy projects. The investors get their costs plus interest back after the projects become operational.
- *Leasing of microgrids with PV and diesel installations to commercial consumers*: This business model has been developed in areas with low supply reliability, where commercial organizations have to have expensive diesel backup generators. The company with this model develops a microgrid to unite the consumers, and it finances PV installation and maintenance. The consumers are usually offered lease-to-own models, so they can purchase the system at the end of the lease period.
- *Selling a PV park in blocks to consumers*: The park, constructed and operated by an investor, is divided into a certain number of blocks which can be sold separately. Therefore, consumers who want to be supplied from self-generation – but do not

want to operate it – benefit from the service, and the investor benefits from renewable generation incentives from the state.

The analysis conducted by the IEA is focused on a particular practical problem, and it refers exclusively to distributed renewable generation. However, some general conclusions about the effects of client orientation on generation companies' business models can be derived from it.

A broader perspective is provided by a recent Navigant Research study of microgrid business models (Asmus and Lawrence, 2016). Because microgrids can be considered as a concept that integrates distributed consumer-owned generation on a small scale to optimize the supply, its business models should be client-oriented. The business model is defined by the authors as "the way in which a microgrid project or business is planned, implemented, and executed to meet strategic objectives". Ten existing microgrid business models are distinguished by Navigant Research:

(1) *Facility owner financing and maintenance*: The microgrid owner develops and maintains it to gain efficiency improvement.

(2) *Utility rate base*: The microgrid is deployed by a utility company, and its costs are included in end-use tariffs.

(3) *Pure hardware component sales*: Technology vendors sell their products (generators, smart meters) to microgrid developers.

(4) *Software as a Service*: Technology vendors can also offer to customers a software service agreement to control and optimize the microgrid functioning.

(5) *Government energy service contracts*: This business model is shaped by contract terms on government entity microgrid deployment.

(6) *Power purchase agreements* (PPA): The PPA contracts are usually signed by utilities and independent power producers, or ancillary services providers.

(7) *Non-synchronous direct current*: This model presumes the development of DC microgrids that do not violate the utility AC monopoly right.

(8) *Operations and maintenance contracts*: These contracts help to maintain generation and grid assets of microgrids not owned by a utility or a single investor.

(9) *Pay-as-you-go*: Microgrid users pay for the electricity as they consume it.

(10) *Design, build, operate, own, and maintain (DBOOM)*: An investor develops the microgrid completely, capturing all revenue streams, and consumers pay for the complete service.

The above described systematizations of innovative business models in the electric power industry are oriented practically, in the sense that they guide companies in their strategic decisions. However, there is a lack of works that focus on the evolution of business models in the electric power industry towards customer orientation. Furthermore, the reviewed studies focus on distributed generation, aiming at deployment of renewables, and the perspective of central generation is omitted. It is important to eliminate this knowledge gap, as existing power-generating companies are still major market players, and our work is intended to contribute to this area of study.

3. Methodology

For our analysis, we used only open sources of information available on the internet: annual reports, official documents, news, articles, websites and published expert interviews. The

search was done manually, specifically choosing the information required by the "business model canvas". To reach clear comparability, special attention was paid to the consistency of the information systematization procedure and harmonization of wording. Thus, for example, information about key partnerships was derived from annual reports of all the companies, and the relations were divided into "partnerships" and "contracts". The former contains reciprocal long-term relationships (with the state, investors, etc.), and the latter presumes paid services (with fuel suppliers, construction companies, etc.).

In such a way, we have compiled the information for each business model building block for 2009 and 2015 for each analysed company (Appendix). Owing to the limitations in information about purely state companies (for example, the nuclear generation company Rosatom), we have chosen public companies, which publish annual reports and are sufficiently transparent.

To identify the changes induced by client orientation, we analysed the progress of companies' business models over six years, from 2009 to 2015. The first year of this period was chosen, as all the companies under consideration had by then become market players, and since after 2009, the tendency of consumers' distributed generation development accelerated significantly. Therefore, by 2015, the last report year, the companies' business models had undergone certain changes that can be captured by analysis.

To separate the business model changes due to client orientation from the ones caused by other factors, we focused on the "building blocks" referring to customer relations: customer segments, value propositions, channels and customer relationships. We assume that these aspects of a business model reflect client orientation of a company; therefore, changes in them are conjugated with the shifts towards or from client orientation. We also tried to capture the changes triggered by a number of factors, including client orientation. However, it is not possible to approximate the extent to which shifts in client orientation affect the changes.

In this way, to select generation companies for the analysis, we developed a set of sampling requirements:

- leader of the industry in terms of installed capacity (top-five companies);
- participant in the wholesale electricity market (we expect such companies to be more sensitive to consumer needs); and
- information required for the analysis is available.

As a result, five companies were selected; their characteristics are listed in Table I.

Table I shows that the companies differ in size and ownership structure and insignificantly in generation mix. Inter RAO PJSC has assets outside of Russia; however, as their business models are likely to be heavily influenced by internal markets, we considered only the assets located in Russia in our analysis.

4. Results

The tables with the detailed results for each company are presented in the Appendix. In the current section, generalization and analysis of all results are provided, and in the next section, they are compared with findings from other countries.

Our analysis shows that all companies except Enel Russia PJSC have experienced significant business model changes in the considered time span. Regarding Enel Russia PJSC, the only change that has been determined is the development of an ash and slag waste selling business. For this company, it led to the appearance of a new customer segment – construction companies that use ash and slag waste. For all the other companies, we have

Generation company	Year of foundation	Installed electric capacity, GW	Share in the unified energy system of Russia (%)	Generation mix	Ownership	Subsidiaries
Gazprom Energoholding LLC	2009	38	16	100% thermal generation	100% subsidiary of Gazprom PJSC	4 100% subsidiaries
Inter RAO PJSC	2008	29 (on Russian territory)	12	99% – thermal generation; 1% – renewables (hydro and wind)	51.09% – the state and state-owned companies; 20.09% – Inter RAO capital JSC; 28.79% – free-float	22 100% subsidiaries in Russia
T+ group (formerly KES holding)	2002	16.1	7	99.6% – thermal generation; 0.4% – renewables (hydro and solar)	100% private	28 100% subsidiaries
Unipro PJSC (formerly E.ON Russia)	2007	11	5	100% thermal generation (gas and coal)	100% private	3 100% subsidiaries
Enel Russia PJSC	2004	9.5	4	100% thermal generation (gas and coal)	100% private	2 100% subsidiaries

Table I. The companies analysed

identified several major tendencies in business models, which we deduced to be caused by an increase in client orientation of generation companies in Russia. These trends are interrelated, and all of them were absent in 2009.

4.1 The declaration of movement towards client orientation and adoption of client service standards

Three analysed companies (Inter RAO PJSC, T+ group and Unipro PJSC) in their annual reports and to the media officially declared themselves as client-oriented. These claims have been made primarily to improve the companies' image; they do not mean a breakthrough in client service. From these companies, only Inter RAO PJSC has adopted corporate standards of client service. These three companies have mostly invested in CRM (customer relationship management) systems and communication. The T+ group in one of the regions adopted an original approach to dealing with debts from residential consumers: they waived all the fines for debtors for three months, which let them recover about €2m in outstanding balances.

4.2 The advent of business diversification in favour of engineering, construction, service and operation and maintenance of power-generating facilities

This change has taken place in the companies that claimed movement towards client orientation: Inter RAO PJSC, T+ group and Unipro PJSC. The subsidiaries delivering the

listed services are not only serving the facilities of their parent companies but are also oriented at other generation companies and bulk prosumers. The latter mostly include industrial consumers that own distributed gas co-generation. Orientation towards these client segments is explicitly stated on the companies' websites, and we consider it the paramount outcome of progress towards client orientation. This business diversification has caused an expansion of Key Resources of the companies, from only physical in 2009 to physical and human in 2015. It happened, first, because highly skilled workers are vital for engineering services. Second, there are companies, like T+ group and Inter RAO PJSC, which are also developing their own technological production. The diversification has also actuated new revenue streams from various services (engineering, energy efficiency, etc.), making the companies more stable and independent from the electricity market situation. Therefore, the deployment of generation provides opportunities for progress for power-generating companies in the service sector.

4.3 An increase in vertical integration

In 2009, only Gazprom Energoholding LLC was vertically integrated both upstream (with gas fuel supplier Gazprom) and downstream (with retail electricity and heat suppliers). In 2015, only Enel Russia PJSC was not vertically integrated. It is important to emphasize that vertical integration *per se* does not stem from only client orientation of the industry, but rather from a range of factors. Nevertheless, as a result of integration processes, power-generating companies have become much closer to electricity and heat consumers. Because all analysed companies own CHP, they had to deal with heat retail from the start; however, only Gazprom Energoholding LLC owned heat supply assets. The others had contracts with retail heat suppliers, and sold produced heat to them. By 2015, Inter RAO PJSC, T+ group and Unipro PJSC had entered the heat supply business. Furthermore, all the companies except Enel Russia PJSC had acquired electricity retail supply assets and invested in their development. Inter RAO PJSC had also integrated upstream, buying fuel sources. These changes contributed to the companies' stability in the face of declining electricity demand, opening new revenue streams and enabling economies of scope.

4.4 An increase in diversity of communication channels with consumers

This trend is taking place in the companies that were vertically integrated with electricity retail supply in 2009 (Gazprom Energoholding LLC), as well as the organisations that entered the retail supply business later (Inter RAO PJSC, T+ group and Unipro PJSC). In all cases new communication channels include companies' client offices and social network pages. The client offices work as means of personal interaction with customers – consulting and problem resolving. Their work is sometimes supported by call centres. The companies' websites have also been significantly improved, thereby advancing customer relationships.

4.5 An increase in the diversity of customer relationships

Initially all the companies adhered to self-service of their clients, i.e. maintained no direct relationship with customers. Those companies which operated only in a wholesale electricity market interacted with buyers by means of market institutions. Vertically integrated companies that owned electricity supply assets dealt with end-users only by means of the postal service, sending them monthly bills. However, in 2009, a few of the companies highlighted the necessity of individualizing the work with clients, and by 2015, virtually all of them had implemented it. Personal assistance for key bulk consumers has been introduced at Inter RAO PJSC, T+ group and Unipro PJSC; these companies seek to make individual offers for such clients. Such a policy has not yet been extended to retail end-

users, as their electricity price is regulated by the state. Automated online services have also been implemented, primarily for bill payments, using internet banking.

5. Discussion

Some of the obtained results coincide with changes in electricity-generating companies' business models worldwide, highlighted by the reviewed works, and some of them are unique to Russia. In this section, first, common tendencies will be discussed, and, next, local phenomena will be identified.

To begin with, the development of construction and service of prosumers' generators seems to be a major global trend. As shown above, in Russia, central power-generating companies are diversifying their businesses to enter energy service market. In the reviewed international studies this trend was first noted by Rodríguez-Molina *et al.* (2014) in "buyer/supplier" value proposition and energy service company business model. Second, it was described by Asmus and Lawrence (2016) in operations and maintenance contracts business model and in design, build, operate, own, and maintain business model. Finally, it was reflected to some extent by Meier (2014) in the business model selling a PV park in blocks to consumers. Therefore, in this respect, the identified trend aligns closely with previous findings.

Next, the increase in vertical integration of power-generating and retail electricity supply companies is also a common response to the changing business environment. In Russia it has taken place in virtually all analysed companies. Abroad, this tendency was partially captured by PwC (2015) global survey, wherein 55 per cent of the respondents declared strategic orientation towards local energy systems and infrastructure. Rodríguez-Molina *et al.* (2014) mentioned that the aggregator/retailer business model can be adopted by a utility company, which presumes vertical integration. Likewise, Asmus and Lawrence (2016) do not exclude the development of microgrids by vertically integrated utilities (Utility Rate Base business model).

The increase in the diversity of consumer communication channels is another effect of global IT development and the electric power industry client orientation. However, Russian power-generating companies are only in the incipient stage of communication technology deployment. The considered companies have implemented strategies for direct customer relations via client offices and social network pages. Interaction on the internet between electric utilities and consumers in Russia is currently very limited, and common postal service is still in use. At the same time, 62 per cent of PwC (2015) respondents globally asserted the priority of a smart grid infrastructure, which offers a much more advanced level of communication with consumers.

Finally, diverse customer relationships are characteristic of modern generating companies' business models both in Russia and abroad. Distribution channels (how the sector reaches and delivers to customers) are one of the five key areas of disruption, according to the PwC (2015) global survey. The increasing role of personal assistance and automated services can be seen in the new value propositions identified by Rodríguez-Molina *et al.* (2014), and the pay-as-you-go business models outlined by both the IEA (Meier, 2014) and Navigant Research (Asmus and Lawrence, 2016). However, in Russia, personal assistance and individualized offers are mostly provided for key industrial consumers, whereas residential consumers buy electricity at state regulated prices.

The official declaration of movement towards client orientation and recent adoption of client service standards are considered to be local phenomena, as foreign electric utilities passed this stage much earlier, and it is not mentioned in the reviewed contemporary works. In Russia, these actions are aimed at the improvement of the companies' image and stock

price, when in developed markets, they would now be considered outdated. International energy companies, like Enel and E.On, have already developed and introduced staff training programs in client orientation. As far as the EU is concerned, international harmonization of multiple adopted service standards is now relevant – not the establishment of said standards.

Another local peculiarity of Russian generating companies' business models is a complete reliance on conventional generation sources. Intermittent renewables (wind and solar) currently constitute less than 1 per cent of total installed generation capacity in Russia. They are commercially unattractive for both generating companies and prosumers, mostly because of the low price of natural gas in the internal market and the absence of consistent state support for renewables. For this reason, generating companies' business models in Russia are not influenced by the diversification of the generation mix towards renewable sources and the development of energy services related to them. These trends, however, are very important worldwide, as the state-of-the-art analysis has shown.

All the outlined changes in business models with conclusions about their international or local character are summarized in Table II.

6. Conclusion

Current research focuses on the effect of client orientation on the electric power industry business models using the example of Russian market. The top-five generating companies participating in the national wholesale electricity market were selected, and their business models were analysed using the "business model canvas".

The conducted analysis has proven that the Russian power-generating companies' business models experienced significant changes from 2009, when the industry deregulation had just happened, to 2015. Five major trends in changes to their business model owing to client orientation have been identified:

(1) declaration of movement toward client orientation and adoption of client service standards;

(2) emergence of business diversification in favour of engineering, construction, service, operation and maintenance of generating facilities;

(3) increase in vertical integration;

(4) increase in diversity of communication channels with consumers; and

(5) increase in diversity of customer relationships.

Table II. Trends in Russian power-generating companies' business models related to client orientation

Trends	International/local
Declaration of client orientation and adoption of client service standards	Local
Advent of business diversification in favour of engineering, construction, service, operation and maintenance of generating facilities	International
Increase in vertical integration	International
Increase in diversity of communication channels with consumers	International with local features
Increase in diversity of customer relationships	International with local features
* Reliance on conventional generation, ignoring the development of renewable generation technologies	Local

The comparison of the results with the recent international studies focused on client-oriented business models in the electric power industry has shown that the revealed trends in Russia mostly coincide with the international ones. We hypothesise that it is due to the global character of client orientation factors: technological development, distributed generation, commercial viability, a decrease in demand, etc. The business models' characteristics which are more or less individual for Russia are: declarations of movement toward client orientation and adoption of client service standards (developed countries have passed this stage long ago) and disregarding of the development of renewable generation technologies.

Without any doubt, further studies in this area are necessary. In particular, research in other countries, and especially comparative studies of business models' evolution in different countries, would reveal important differences in pace and quality of changes. Quantitative studies, for example, applying factor analysis, would also contribute to our understanding of current and future changes in the electric power industry business models.

References

Asmus, P. and Lawrence, M. (2016), "Emerging microgrid business models", Navigant Research Report, available at: www.navigantresearch.com/research/emerging-microgrid-business-models (accessed 7 November 2017).

Bayer, E. (2015), "Report on the German power system. Version 1.0", Agora Energiewende, available at: www.agora-energiewende.de/fileadmin/downloads/publikationen/CountryProfiles/Agora_CP_Germany_web.pdf (accessed 7 November 2017).

Chesbrough, H. (2007), "Business model innovation: it's not just about technology anymore", *Strategy & Leadership*, Vol. 35 No. 6, pp. 12-17.

Fratzcher, S. (2015), *The Future of Utilities: Extinction or Re-Invention? A Transatlantic Perspective*, Heinrich Böll Stiftung, Washington, DC.

Gassmann, O., Frankenberger, K. and Csik, M. (2013), *Geschäftsmodelle entwickeln: 55 innovative Konzepte mit dem St. Galler Business Model Navigator*, Hanser Verlag.

Girotra, K. and Netessine, S. (2014), *The Risk-Driven Business Model: Four Questions That Will Define Your Company*, Harvard Business Review Press, Boston, MA.

Gitelman, L.D. (2014), "Russian power sector reform: lessons for developing countries", *WIT Transactions on Ecology and the Environment*, Vol. 190, available at: www.witpress.com/Secure/elibrary/papers/EQ14/EQ14003FU1.pdf (accessed 7 November 2017).

Gore, O., Viljainen, S., Makkonen, M. and Kuleshov, D. (2012), "Russian electricity market reform: Deregulation or re-regulation?", *Energy Policy*, Vol. 41, pp. 676-685.

Hall, S. and Roelich, K.E. (2016), "Business model innovation in electricity supply markets: the role of complex value in the United Kingdom", *Energy Policy*, Vol. 92, pp. 286 -298.

Hutt, J.-C. and Ferveur, C. (2008), "Services-oriented platform provides new approach to residential energy sector", SHOPS Innovation report, available at: https://itea3.org/project/result/download/5580 (accessed 7 November 2017).

International Energy Agency (IEA) (2014), *World Energy Investment Outlook 2014*, OECD/IEA, Paris.

Meier, T. (2014), "Innovative business models and financing mechanisms for PV deployment in emerging regions", IEA PVPS Task 9, Subtask 5, Report IEA-PVPS T9-14, December 2014, available at: http://iea-pvps.org/index.php?id=311&eID=dam_frontend_push&docID=2350 (accessed 7 November 2017).

Nwankwo, S. (1995), *Developing a Consumer Orientation*, 2nd ed., Oxford University Press, New York, NY.

Osterwalder, A. and Pigneur, Y. (2010), *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*, John Wiley and Sons, Hoboken, New Jersey.

PwC (2015), "A different energy future. Where energy transformation is leading us", available at: www.pwc.com/ca/en/industries/power-utilities/publications/global-power-and-utilities-survey-2015.html (accessed 7 November 2017)

Rodríguez-Molina, J., Martínez-Núñez, M., Martínez, J.-F. and Pérez-Aguiar, W. (2014), "Business models in the smart grid: challenges, opportunities and proposals for prosumer profitability", *Energies*, Vol. 7 No. 9, pp. 6142-6171.

Slywotzky, A.J. (1996), *Value Migration: How to Think Several Moves Ahead of the Competition*, Harvard Business Review Press, Boston, MA.

The Ministry of Energy of the Russian Federation (2016), *Main Indices of the Electric Power Industry*, available at: https://minenergo.gov.ru/node/1161 (accessed 7 November 2017).

Timmers, P. (1998), "Business models for electronic markets", *Electronic Markets*, Vol. 8 No. 2, pp. 3-8.

Tretyak, O.A. and Klimanov, D.E. (2016), "New approach to business model analysis", *Russian Management Journal*, Vol. 14 No. 1, pp. 115-130.

Van der Veen, R.A.C. and Kasmire, J. (2015), "Combined heat and power in Dutch greenhouses: a case study of technology diffusion", *Energy Policy*, Vol. 87, pp. 8-16.

Zott, C., Amit, R. and Massa, L. (2011), "The business model: recent developments and future research", *Journal of Management*, Vol. 37 No. 4, pp. 1019-1042.

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Appendix: Analysis of companies' business models

Building blocks	2009	2015
Customer segments	Wholesale electricity market agents Retail heat and electricity market consumers	Wholesale electricity market agents Retail heat and electricity market consumers System operator
Value propositions	Electricity at a price lower than average in the wholesale market, capacity Retail heat and electricity supply	Electricity at a price lower than average at the wholesale market, capacity Retail heat and electricity supply System services
Channels	*Own:* web-sites *Partner:* postal service wholesale electricity market media (printed and TV) expositions and conferences	*Own*: web-sites social network pages client offices *Partner*: postal service wholesale electricity market media (printed and TV) expositions and conferences
Customer relationships	Self-Service	Self-service Personal assistance. A standard of client service has been adopted Automated services (online payment);
Revenue streams	Sale of electricity Sale of heat	Sale of electricity Sale of heat Sale of system services
Key resources	Physical: electricity generation, CHPs, buildings, transport	Physical: electricity generation, CHPs, buildings, transport
Key activities	Production of electricity and heat Retail supply of electricity and heat	Production of electricity and heat Retail supply of electricity and heat Provision of system services
Key partnerships	Strategic alliance with fuel supplier Gazprom; Partnership with the state; Commercial contract with Fortum in Finland and Inter RAO for export of electricity Contracts with companies that own heat networks Contracts with security, construction, and maintenance companies Outsourcing of auxiliary functions in the power plants	Strategic alliance with fuel supplier Gazprom Partnership with the state Commercial contract with Fortum in Finland and Inter RAO for export of electricity Contracts with companies that own heat networks Contracts with security, construction and maintenance companies Outsourcing of auxiliary functions in the power plants
Cost structure	Cost-driven business model with economies of scope due to vertical integration	Cost-driven business model with economies of scope due to vertical integration

Table AI.
Gazprom Energoholding LLC

Building blocks	2009	2015
Customer segments	Wholesale electricity market agents in Russia and abroad Retail heat consumers Retail electricity supply companies	Wholesale electricity market agents in Russia and abroad Retail heat and electricity market end-users Consumers of generating technologies, O&M and engineering services Consumers of energy efficiency services
Value propositions	Electricity at the price lower than average at the wholesale market, capacity Retail heat supply International electricity trading services	Electricity at the price lower than average at the wholesale market, capacity Retail heat and electricity supply International electricity trading services Engineering and sells of technologies: construction of generating objects, O&M services Energy saving and energy efficiency services Electricity transmission services (abroad)
Channels	*Own*: web-sites *Partner*: wholesale electricity exchanges in Russia and abroad media (printed and TV) expositions and conferences	*Own*: web-sites social network pages client offices *Partner*: postal service wholesale electricity exchanges in Russia and abroad media (printed and TV) expositions and conferences
Customer relationships	Self-Service	Client orientation has been declared, a standard of client service has been adopted Self-service Personal assistance for key clients, personalized offers Automated online services
Revenue streams	Sale of produced electricity Re-sale of electricity, bought in Russian wholesale market, abroad Sale of produced heat	Sale of produced electricity Re-sale of electricity, bought in Russian wholesale market, abroad Sale of produced heat Sale of generating technologies Sale of engineering, construction and O&M services Sale of energy efficiency services Sale of transmission services (abroad)
Key resources	Physical: electricity generation, CHPs, buildings, transport	Physical: electricity generation, CHPs, buildings, transport, fuel supply assets Human: projecting and technology engineers
Key activities	Production of electricity and heat International electricity trading	International electricity trading Construction and O&M of generating objects Production of machines and equipment for generation Fuel supply Production of electricity and heat Retail supply of electricity and heat Provision of energy efficiency services Provision of transmission services

Table AII.
Inter RAO PJSC

(*continued*)

Building blocks	2009	2015
Key partnerships	Partnership with the state Partnerships with Russian companies that want to sell electricity abroad Partnerships with foreign international trading companies Contracts with fuel suppliers Contracts with retail heat and electricity suppliers Contracts with security, construction and maintenance companies	Partnership with numerous technology suppliers; Partnership with the state Partnerships with co-investors abroad Partnerships with Russian companies that want to sell electricity abroad Partnerships with foreign international trading companies Contracts with fuel suppliers Contracts with retail heat and electricity suppliers; Contracts with security, construction and maintenance companies
Cost structure	Cost-driven business model with economies of scope due to vertical integration	Cost-driven business model with economies of scope due to vertical integration

Table AII.

Building blocks	2009 (Volzhskaya TGC)	2015
Customer segments	Wholesale electricity market agents; *Heat consumers*: industrial utilities	Wholesale electricity market agents Retail heat and electricity market consumers Consumers of O&M and engineering services
Value propositions	Electricity at the price lower than average at the wholesale market, capacity, heat	Electricity at the price lower than average at the wholesale market, capacity, Retail heat and electricity supply O&M and engineering services for generators, applying self-produced duplicates of machine parts
Channels	*Own*: web-site *Partner*: wholesale electricity market media (printed and TV)	*Own*: web-sites social network pages client offices, call-centres *Partner*: postal service wholesale electricity market media (printed and TV) expositions and conferences
Customer relationships	Self-Service	Client orientation has been declared Self-service Personal assistance for key clients Automated online services
Revenue streams	Sale of electricity on the wholesale market Sale of heat	Sale of electricity on the wholesale and retail markets Sale of heat Provision of O&M and engineering services for generators
Key resources	Physical: electricity generation, CHPs, buildings, transport	Physical: electricity generation, CHPs, buildings, transport Human: projecting and technology engineers
Key activities	Production of electricity and heat Heat supply	Production of electricity and heat Retail supply of electricity and heat Engineering, operation and maintenance
Key partnerships	Contracts with fuel suppliers; Contracts with transport, security, construction and maintenance companies, and technology suppliers	Partnership with public utilities in heat network development Contracts with fuel suppliers Contracts with transport, security, construction and maintenance companies Contracts with IT companies Contracts with billing companies
Cost structure	Cost-driven business model with economies of scope due to vertical integration	Cost-driven business model with economies of scope due to vertical integration

Table AIII.
T+ group (former KES holding)

Building blocks	2009 (OGC-4 JSC)	2015
Customer segments	Wholesale electricity market agents Retail heat consumers	Wholesale electricity market agents Retail heat and electricity market consumers Consumers of O&M and engineering services; Energy system operator
Value propositions	Electricity at the price lower than average at the wholesale market, capacity Retail heat supply	Electricity at the price lower than average at the wholesale market, capacity, Retail heat and electricity supply O&M and engineering services for generators; System services (frequency regulation)
Channels	*Own*: web-site *Partner*: wholesale electricity market media (printed and TV)	*Own*: web-sites social network pages client offices, call-centres *Partner*: postal service wholesale electricity market media (printed and TV) expositions and conferences
Customer relationships	Self-Service	Client orientation has been declared Self-Service Personal assistance for key clients Automated online services
Revenue streams	Sale of electricity on the wholesale market Sale of heat	Sale of electricity on the wholesale and retail markets Sale of heat Provision of O&M and engineering services for generators
Key resources	Physical: electricity generation, CHPs, buildings, transport	Physical: electricity generation, CHPs, buildings, transport Human: projecting and technology engineers
Key activities	Production of electricity and heat Heat supply	Production of electricity and heat Retail supply of electricity and heat Engineering, operation and maintenance
Key partnerships	Partnership with fuel suppliers; Partnership with utilities; Contracts with transport, security, construction and maintenance companies, and technology suppliers	Partnership with the state grid company and utilities in technological modernization and smart meters deployment Partnership with fuel suppliers International partnership with other companies in E.on holding
Cost structure	Cost-driven business model with economies of scope due to vertical integration	Cost-driven business model with economies of scope due to vertical integration

Table AIV.
Unipro PJSC (former E.ON Russia)

Building blocks	2009	2015
Customer segments	Wholesale electricity market agents Retail heat consumers	Wholesale electricity market agents Retail heat consumers Consumers of ash and slag waste
Value propositions	Electricity at the price lower than average at the wholesale market, capacity Heat	Electricity at the price lower than average at the wholesale market, capacity, Heat; Ash and slag waste
Channels	*Own*: web-site *Partner*: wholesale electricity market media (printed and TV)	*Own*: web-site *Partner*: wholesale electricity market media (printed and TV)
Customer relationships	Self-service	Self-service
Revenue streams	Sale of electricity on the wholesale market Sale of heat	Sale of electricity on the wholesale market Sale of heat
Key resources	Physical: electricity generation, CHPs, buildings, transport	Physical: electricity generation, CHPs, buildings, transport
Key activities	Production of electricity and heat	Production of electricity and heat
Key partnerships	Partnership with fuel suppliers; International partnership with other companies in Enel holding Partnership with energy utilities Contracts with transport, security, construction and maintenance companies, and technology suppliers	Partnership with fuel suppliers International partnership with other companies in Enel holding Partnership with energy utilities Contracts with transport, security, construction and maintenance companies, and technology suppliers
Cost structure	Cost-driven business model	Cost-driven business model

Table AV.
Enel Russia PJSC