

VALUE CREATION AND VALUE CAPTURE IN ENERGY SECTOR ORGANIZATIONS: EVIDENCE FROM POLAND

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Abstract: Turbulences in the world economies translate into the vibrant organizational environments. Specifically, energy sector companies face dynamic challenges, as the energy markets are disturbed. Our paper seeks to demonstrate the core of strategic value creation and value capture in energy sector companies operating in the difficult times. The results suggest that to create value effectively, energy companies should offer attracting value proposition that will compensate for increases in prices; benefit from cash cows as well as reduce costs. To capture more value, on the other hand, the energy sector companies need to benefit from strong bargaining power and sound cooperation with stakeholders as well as protecting their solutions against imitation while introducing best practices from the competitors. Based on the results, we offer a framework with strategic recommendations for increasing the value creation in energy sector companies.

Key words: value creation; value capture; firm performance; energy sector

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Introduction

The turbulences in the world economy result in high-level inflation, disturbed energy markets, political uncertainty, and climate-induced challenges. These in turn shape the vibrant organizational environment and affect the challenges and opportunities for firm growth. The short-term anomalies, coupled with one of the major and long-term challenges that societies, organisations and individuals face is climate change, which requires developing specific leadership skills necessary to reconcile various needs and expectations with adapting to the external environment changes.

Assuming that the main task of contemporary strategic management is to seek sources of value and help organisations perform better (Tapaninaho and Heikkinen, 2022a), strategy is seen as the dynamics of the relationship between an organisation and its environment (Ronda-Pupo and Guerras-Martin, 2012), in which resources

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and activities are used to achieve sustainable competitive advantage (Hitt et al., 2011).

To-date research in strategic management suggests that there are different sources of value creation for organizations (Gans and Ryall, 2017; Panico, 2023). First, firms can make capital-related decisions based on simple pricing strategies, and cost-cutting measures to identify places in the value chain that require careful cost planning for innovation (Eicke and Weko, 2022; Leviäkangas and Öörni, 2020). Second, they can prepare innovative goods or services, either by introducing novel solutions or by imitating competitive moves (Dunn, 2022). Third, by offering unique selling propositions and idiosyncratic value to customers, they can redesign original business models where value is not only created but also co-created (Schoemaker and Schramade, 2023). Fourth, companies can make money from goods or services that, once introduced, can serve as cash cows. Fifth, by joining market coalitions, companies can access the complementary resources needed to prepare and launch breakthrough technologies and innovative solutions that could not be introduced without joining a network. Finally, value can be created through strategic moves such as identifying and seizing opportunities, developing dynamic capabilities to better interact with the environment, orchestrating resources for efficient exploitation of opportunities, and developing strategic support for unique competencies or resources. The latter requires the development of a certain strategic potential, which may include valuable resources, unique competencies, strategic processes that support creativity and innovation, the search for and exploitation of opportunities, and the development of dynamic capabilities (Garrido et al., 2020).

The processes of environmental changes mean that the mechanisms previously and extensively used by companies in the energy sector to create and capture value are no longer effective. The increasing dynamism of the environment (Das and Malakar, 2021; Yamaka et al., 2022), the scarcity of resources combined with the reorientation of the importance of ecology (Schaeffer, 2015), the requirements related to the development of green and smart organisations (Grimm et al., 2020) and the increasing pressure from customers, competitors and other stakeholders (Heinen and Richards, 2020; Latapi Agudelo et al., 2020) make the issue of value creation and capture a critical for the further development of companies in the energy sector.

Although value creation and capture in energy companies has been the subject of research for quite some time, research to date has focused on shared value creation during plant decommissioning (Arena et al., 2020), the impact of forms of interdependence emerging in the network of energy companies on changes in the value proposition and value capture; and value creation and delivery (Rossignoli and Lionzo, 2018) the capabilities of blockchain in business value creation (Sestino et al., 2022), determinants in the chains of final energy value creation (Kucęba et al., 2010), value creation as a basis for decision-making (Ćwięk et al., 2023), value creation in circular economy business (Tapaninaho and Heikkinen, 2022b), the impact of digital transformation on value creation, delivery and appropriation

mechanisms (Franzo et al., 2023) or value creation through innovation (Esposito and Brahmi, 2023).

Our study explores energy sector organizations in Poland, as a strong representative of the Central and East-European (CEE) region, where the energy sector is undergoing dynamic structural and processual changes (Nowakowska-Grunt and Kot, 2005). Poland, an EU member since 2004, with opportunity-based economy that ranks sixth in Europe (Tarnawa et al., 2015) is a country with strong entrepreneurial spirit. We found it interesting to explore how traditional energy companies, based in the region since the WWII are coping with the pressure for higher performance, which processes they focus on to create value, and how they interact with the task environment to capture more value. Capturing value, i.e. ensuring that the majority of the value created will be retained by the company and distributed properly among the organization stakeholders who participated in creating part of the value, in the energy sector companies can be realized by (a) protecting innovative solutions from imitation or copying by competitors, usually through patents, licenses or contracts, (b) benefiting from first-move income, i.e. by introducing solutions unavailable on the market, with competitive responses appearing late, (c) proper division of the pie, i.e. distributing the value created among stakeholders who contributed to its creation, and (d) strong purchasing power that allows value in the task environment to be captured (Küfeoğlu et al., 2019).

The purpose of this paper is threefold. First, it presents some common concepts of value creation and value capture in strategic management and places them in the context of companies operating in the energy sector, focusing on how energy companies can create and capture value. Second, we present the results of a survey of 49 companies operating in the energy sector in Poland. A questionnaire on value creation and value capture was sent to the management teams of energy producers and distributors, fuel distributors and organisations operating in the chemical industry. The data received were analysed and as a result we present assessments of the most developed value creation and value capture processes. Using ordered logistic regression, we show how certain value creation and value capture processes influence the performance of companies operating in the energy sector. Third, based on the results, we offer a simple framework that suggests what activities energy sector companies can undertake to improve their value creation and firm performance.

Value creation and value capture in strategic management

In the management studies, value can be defined as the difference between the propensity to pay (the highest value the end user is ready to pay for a product or service) and the cost of opportunity taken (the lowest price the deliverer can sell necessary resources, see (Brandenburger and Stuart, 1996)) or as the difference between the promptness to pay and the use or exchange of value (Bowman and Ambrosini, 2000). An increase in the use of value (i.e., the consumer enhancing the perceived value) translates into value creation for the organization; while an increase

in value exchange (decreasing structural costs, using power to increase bargaining power) influences value capture.

Various theoretical perspectives can be applied to answer the question why some organizations in the energy sector create more value than others, and why some of them reach higher performance than others. For example, transaction cost theory (Williamson, 1981) puts an emphasis on minimizing costs as a source of creating value. However, minimizing costs is not the sole source of value, as accepting value creation as a long-term strategic process can translate into higher firm performance. Organizations can therefore minimize costs when necessary, while trying at the same time to make strategic choices that create value in the long run (Zajac and Olsen, 1993). Previously, company strategy addressed the issue of organization-environment dynamics, while strategic management focused on strategic planning, and decisions were taken based on strategic analysis. The sources of value were thus information about products and markets, and the strategies implemented the result of strategic analysis (Chandler, 1976). Along with the premise of value created through various functional activities that determined a firm's position in the sector, the concept of the value chain attempted to define, identify and demonstrate the potential sources of value in organizations, both in the production sequence (from in-bound logistics to post-operations services) as well as in activities that supported the production sequence (The Competitive Advantage, 1985).

To date, value creation has most often been analysed from a resource-based view, where developing economic viability occurs through scarcity, complementarity and the appropriability of resources (Bowman and Ambrosini, 2000). Strategic investments in superior resources that have low mobility and to which the competition have limited access can therefore enhance value creation. The challenge of value creation is naturally also analysed from the perspective of the innovation capability of organizations. Indeed, when creative ideas that are discovered or generated, are diligently prepared as commercialized innovations, they can serve as an important source of value creation (Bilton and Cummings, 2010). In particular, holistic innovations, which concern whole organizations not just its value proposition, can be a better strategic choice for creating and capturing value (Venkatraman and Henderson, 2008). Additionally, correct strategic orientation, organizational innovation capability and strategic planning all influence value creation processes (Rizan et al., 2019). However, even the most valuable and useful innovation does not translate into performance unless the innovative organizations are able to capture most of the value created.

Some firms can capture more value than others, even though they do not create value, or create a small portion of it. Thus possessing or controlling valuable, scarce and inimitable resources is not the only condition to creating value, rather it is the ability to use resources for higher value propositions, and the ability to capture the value generated (Barney, 2015). These abilities, known as dynamic capabilities, work together with managerial competences to bundle, transform and orchestrate resources so as to quickly and flexibly respond to opportunities that emerge in the

environment (Holcomb et al., 2009; Sirmon et al., 2008). Dynamic capabilities play a significant role in value creation processes as they influence performance (Helfat and Peteraf, 2009) and create value in certain sectors of activity (Ethiraj et al., 2005). On the other hand, specific managerial abilities that facilitate value creation include: (a) identifying opportunities and threats regarding the competition, (b) identifying the resources necessary for exploiting the opportunity, and coordinating these resources, (c) integrating resources with processes accordingly to create new organizational capabilities (Fischer and Fischer, 2011).

For organizations in the energy sector, it is equally important on the one hand to assess the level of value created, as well as identify the value captured by stakeholders on the other. Ideally, the economic profitability created by the organization should be equal to the value transferred to stakeholders. Value creation management takes into consideration labour-related value capture, capital engaged by the company, and value captured by delivering benefits to customers (e.g. lower prices). To increase the benefits for consumers, who are significant stakeholders, and to make sure that organizations capture most of the value, certain price mechanisms have been introduced: (a) changing the system of pricing (value-based not cost-based price; demand-based price, the market price that the consumer is ready to pay), (b) changing the payer (the advertiser pays, not the customer), (c) excluding unnecessary elements that increase the price (side-functionality, hidden fees), (d) assuring future streams of cash (selling cheap base products or services with expensive replacements or complementary services), and (e) changing the sector of activity, target groups or markets (Michel, 2014).

Contemporary organizations create value by appropriately managing the elements of the business model (Otola et al., 2021) or combining the resources they control with resources owned or controlled by customers, suppliers or end users (Kyprianou, 2018). The co-creation of value makes it possible for organizations to identify consumers' needs and preferences, which are harder to analyse from a classical perspective (Amit and Han, 2017). Value co-creation increases the overall amount of value that is created for various stakeholders (Tantalo and Priem, 2016).

Value creation and value capture in the energy sector

Contemporary organizations in the energy sector do not act as separate entities, but as networks of organizations that can compete or cooperate with other networks. Through flexible use of the combination of capabilities and resources accessible in the network, they create value and respond to the needs of end users. Liberalization, leading to openness to direct competition (Graf and Helm, 2018), as well as opportunities offered by ICT, aimed at increasing economic efficiency, ensuring security of supply and environmental sustainability (Wissner, 2011), drive energy enterprises to focus on activities that create value and to outsource processes that do not translate into value creation, which enhances network cooperation and participation in a variety of activities, even with competitors (Powell and DiMaggio, 2019). The continuous process of combining company activities and partnering other companies in activities can translate into success or failure of the whole network.

Energy companies are becoming more and more dependent on network actors, which increases the significance of network performance, not just the performance of individual firms.

Analysis of organizations operating in the energy sector (chemical industry, energy production and distribution, fuel production and trade) has revealed that: (a) economic crises influence the proportion of intangible assets that create value, (b) possessing unique capabilities and intangible assets is important in times of an unstable economy and in volatile markets – it is then easier to transfer the necessary resources between network members, (c) macro-elements such as the financing system and related institutions matter as much as the necessary resources, (d) the location and proximity of central network players matters in creating value for the whole network, (e) innovative infrastructure or expensive IT systems do not translate into more efficient use of intangible resources, and (f) the individual characteristics of given companies play a significant role in value creation and capture, especially with regards to experience, know-how, sector, or number of employees (Shakina and Molodchik, 2014).

However, a positive relationship between sustainable development and value creation in energy sector companies is evident. The research indicates that energy companies can only start considering voluntary environmental proactivity after their overall performance reaches a sufficient level (Pätäri et al., 2012). In a research on the evolution of the decommissioning of the Italian energy company, the authors conclude that the proactivity of companies can contribute to the creation of shared value (Arena et al., 2020). Similar results of a recent study on innovative business models suggest that electricity sellers in Europe take a consumer-centric perspective to creating added value, generating social and environmental value in addition to economic value (Karami and Madlener, 2021).

Examining innovation in digital business models, it has been found out that profitability and sustainability of innovation in the energy sector require new strategies that go beyond the boundaries of one company and are based on cooperation between interdependent partners for the creation of mutual value (Dellermann et al., 2017). Similarly, it has been posited that networking forces energy sector companies to broaden their definition of value and include value creation for both the company and for society as an ultimate goal of the business model (Rossignoli and Lionzo, 2018). In a recent conceptualization of renewable energy business models, it is argued that value results from co-creation between multiple stakeholders, so the use of energy consumers' potential may have consequences for the way business models are designed (Mihailova et al., 2022). While stakeholder theory suggests that a company's commitment to society as a whole through ESG issues brings lasting benefits and gains, in the short run, sustainable investments in energy companies may not result in value creation, therefore they should be treated as part of long-term portfolio strategies (Behl et al., 2021).

When creating and capturing value, especially through innovations, complementary resources play a significant role. This mostly concerns resources that are indispensable during the strategic entrepreneurship stage, that is the commercialization of innovation, and include: production propensity, technology, distribution channels, customer service, brand and expert knowledge (Naldi et al., 2014). Complementary resources belong to appropriation mechanisms that make it possible to retain the value created, and are in addition to typical appropriation mechanisms, such as patents, open licenses, leader position, first-mover advantage or time-to-market (Fischer and Fischer, 2011).

In networks, value creation, and more importantly value capture, depend on the quality of relations between stakeholders as well as the level of competition in the task environment. Intraorganizational social capital enhances synergetic value creation, while stakeholder actions determine the value distribution, (pie division, cf. (Blyler and Coff, 2003)). When analysing the quality of network connections, the effect of frictions can be observed, which is caused by incomplete network connections in the value chain of a given sector, translating into higher purchasing power and value capture capabilities for certain organizations in the network (Chatain and Zemsky, 2011).

A variety of tools have been offered for analysing the exact amount of the pie distribution among stakeholders (Ryall, 2013). The central point of the models offered represents a given organization together with other stakeholders (e.g., suppliers, buyers or other partners in the supply chain), as well as consumers, who together create the value pie. Top management decides which significant stakeholders belong to the network and analyses how, how much, and by whom value is being created. In the next step, it is crucial to answer the question of how much of the created value each network partner is supposed to capture. It then becomes possible to answer the following questions for the value creation and value capture processes: (a) which part of the value can be captured, (b) who belongs to the network of significant stakeholders, (c) who belongs to the network peripheries, competing for the value created, (d) what is the proportion of the value created through competition in relation to the entire value created by the network (Ryall, 2013).

The level of competition influences the value pie division between suppliers and buyers in specific sectors. Factors facilitating value capture embrace specific resources, organizational capabilities, expert knowledge, specific knowledge valuable for consumers, social capital, stable relations with consumers, competition among suppliers, concentration on consumer needs, and the ability to offer unique value propositions (Chatain, 2011). When formulating and implementing a strategy, organizations need to identify, analyse and exploit the issues of stakeholder interdependence, complementarity and conflict between groups of stakeholders in order to create value (Priem et al., 2018). Failure to address the interdependence between stakeholders may result in trade-off thinking, and may not make it possible to fully benefit from stakeholder synergy (Tantalo and Priem, 2016). Hence, the

relational view can be used to develop relational orientation that allows to attract stakeholders, build partnerships, enter coalitions, create alliances, use relationships to acquire complementary resources IT solutions or new technologies, benefit from stakeholder synergy in the value pie division (Dyer et al., 2018).

Research Methodology and Materials

Sample and data collection

Based on conclusions from the literature review on value creation and capture, a survey scale was developed with statements describing potential situations in organizations. The respondents' task was to consider their organization's current situation regarding its strategic potential, innovativeness, and relations with stakeholders, as well as the sources of value creation, value capture (retaining the value created), value appropriation (getting most of the pie, also from other stakeholders), and value protection (legal and contractual) mechanisms. These statements were then assessed by respondents on a 7-grade Likert scale. Naturally, assessing statements may seem subjective and qualitative in regard to one respondent, but when carried out on a larger sample, they represent the bigger picture of the branch.

The questionnaire was presented to respondents in 316 randomly chosen organizations in Poland using the PAPI (Pen-and-Paper Interview) method, as part of a larger project concerning value creation and capture. For the sake of this paper, we have filtered 49 companies from the sample (15,5%), active both in production, trade, and services, operate in the energy sector (integrated gas and oil, electric utilities, coal and consumable fuels, renewable electricity, chemistry, oil and gas transportation, gas refining and marketing). Eventually, from the sample of 316 organizations, only 49 were selected as they represent the energy sector in Poland.

One company was represented by one respondent. Overall, 1 CEO, 12 directors, 17 managers, 19 strategic and sales analysts were surveyed. The respondents declared that they had significant experience in the energy sector, are at least experts, know the area or are involved in new product development. Poland was chosen as it is a fast-developing post-accession economy that creates a rich context for studying value creation and value capture processes and mechanisms in organisations. This is because Poland is an EU member since 2004, a country with increasing entrepreneurial opportunities, dynamic GDP growth and low unemployment levels in the last years. Thus, Polish companies are likely to use interesting VCVC processes and mechanisms. The obtained data was analysed using statistical methods. First, the answers to the questionnaire statements were compared to identify value creation and capture activities that managers undertake most frequently. Second, ordered logistic regression was used to analyse the impact of value creation and capture processes and mechanisms on firm performance.

Variables

Table 1 presents the description, labels, types, and main descriptive statistics of all variables used in the regression models. The independent and dependent variables

were measured using a seven-point ordinal scale. In the case of the independent variables, a score of 1 means “I definitely disagree”, and a score of 7 – “I definitely agree”. In turn, in the case of the dependent variables, 1 means “It is definitely worse”, and 7 means “It is definitely better”. We decided to measure dependent variables (y1-y5) with questionnaire statements as well, since previous research suggests that subjective performance indicators are appropriate to pair with subjective independence measures (Antoncic and Hisrich, 2003).

Methods

To analyse the data collected, we used quantitative statistical methods. First, to verify the internal consistency of the applied scales, we used the Cronbach Alpha coefficient. According to Hair et al., the minimal acceptable value is 0.7 (Hair et al., 2019). Second, the Kaiser–Meyer–Olkin (KMO) and Bartlett sphericity tests were conducted to evaluate the sample adequacy for all variables (Dodge, 2010). Third, to analyse the pairwise correlation, and bearing in mind the ordinal scales of all the variables, we used the tau-b Kendall rank coefficient (Dodge, 2010). Fourth, in order to compare two groups in terms of certain quantitative variables, we applied the non-parametric Mann–Whitney U test (Aczel, 2006).

Table 1. Descriptive statistics

Description	Label	Type	Mean	S.E.	M	D	S.D.	SD ²	Skewness	Kurtosis
<i>Independent variables</i>										
Company strategic potential	x ₁	Ordinal (1–7)	5.857	0.132	6.0	6.0	0.924	0.854	-0.923	2.087
Value creation	x ₂	Ordinal (1–7)	5.541	0.123	5.0	5.0	0.859	0.738	-0.080	0.441
Value capture	x ₃	Ordinal (1–7)	5.418	0.118	5.5	5.0	0.825	0.681	-0.337	0.489
Value appropriation	x ₄	Ordinal (1–7)	5.092	0.128	5.0	5.0	0.894	0.799	0.328	0.191
Value protection mechanisms	x ₅	Ordinal (1–7)	4.796	0.175	5.0	5.0	1.224	1.499	-1.580	2.800
<i>Dependent variables (Firm performance indicators)</i>										
Average annual employment growth	y ₁	Ordinal (1–7)	4.735	0.162	5.0	4.0	1.132	1.282	0.283	-0.113
Average annual sales growth (net)	y ₂	Ordinal (1–7)	4.837	0.141	5.0	4.0	0.986	0.973	0.341	-0.743
Average return on sales	y ₃	Ordinal (1–7)	4.776	0.138	5.0	5.0	0.963	0.928	0.475	0.176
Customer loyalty	y ₄	Ordinal (1–7)	5.102	0.168	5.0	4.0	1.177	1.385	-0.045	-0.340
Company growth	y ₅	Ordinal (1–7)	5.020	0.141	5.0	5.0	0.989	0.979	0.092	1.203

This tests a null hypothesis that the probability that a randomly drawn observation from one group is larger than a randomly drawn observation from the other is equal to 0.5, against the alternative that this probability is not 0.5. Fifth, to analyse the

effect of the independent variables on the dependent variables, we used the ordered logistic regression model, which is an extension of the binary model specified for more thresholds. Winkelmann and Boes indicate that models for ordered dependent variables are usually motivated by an underlying continuous but latent process y_i^* given by:

$$y_i^* = x_i' \beta + u_i \quad i = 1, \dots, n \quad (1)$$

with the deterministic component $x_i' \beta$ (the linear index of regressors), and the random terms u_i , which are assumed to be independently and identically distributed with the distribution function $F(u)$ with a mean of zero and constant variance (Winkelmann and Boes, 2006). Since we cannot observe the latent continuous variable y_i^* , but instead observe y_i with discrete values $1, \dots, J$, we need to use a mechanism that relates y_i^* and y_i . A sensible mechanism accounts for the ordering information in y_i . and we assume that:

$$y_i = j \text{ if and only if } k_{j-1} < y_i^* \leq k_j \quad j = 1, \dots, J \quad (2)$$

This mechanism is called threshold mechanism since the J outcomes are obtained by dividing the real line, represented by y_i^* , into J intervals, using $J + 1$ constant but unknown threshold parameters k_0, \dots, k_j (Winkelmann and Boes, 2006).

To estimate all of the models, we used the maximum likelihood estimation method and STATA.16.1 software.

Research Results

Internal scale consistency and sample adequacy

Analysis of the internal consistency of the scales shows the Alpha-Cronbach coefficient to be acceptable (Table 2). The KMO measures were 0.715 and 0.820, and the Bartlett sphericity test (Chi-Square = 94.533 and 11.467) at a significance level of 0.000 confirmed the reliability of the research tool. These values are acceptable for this type of analysis (de Vaus, 2002).

Table 2. Measurement properties indicating questionnaire reliability

Variables	Cronbach's Alpha Test	Kaiser-Meyer-Olkin Test	Bartlett's Test
<i>Independent</i>	0.730	0.715	94.533*
<i>Dependent</i>	0.862	0.820	110.467*

* p -value < 0.000

Correlation analysis

Using Kendall's tau-b coefficient, the correlation between all the variables was analysed. The results are presented in Table 3.

Table 3. Correlation matrix

Variables	y ₁	y ₂	y ₃	y ₄	y ₅	x ₁	x ₂	x ₃	x ₄	x ₅
y ₁	1.000									
y ₂	0.555 **	1.000								
y ₃	0.603 **	0.497 **	1.000							
y ₄	0.325 **	0.295 *	0.633 **	1.000						
y ₅	0.418 **	0.531 **	0.690 **	0.592 **	1.000					
x ₁	0.307 **	0.127	0.284 *	0.104	0.258 *	1.000				
x ₂	0.349 **	0.174	0.348 **	0.323 **	0.314 **	0.443 **	1.000			
x ₃	0.178	- 0.012	0.072	0.096	0.069	0.374 **	0.420 **	1.000		
x ₄	0.261 *	0.130	0.156	0.245 *	0.154	0.349 **	0.247 *	0.458 **	1.00 0	
x ₅	0.126	0.126	0.166	0.029	0.232 *	0.301 **	0.371 **	0.103	0.00 5	1.00 0

** *p-value* ≤ 0.01. * *p-value* ≤ 0.05

As it can be seen, many correlation coefficients between the independent and dependent variables are statistically significant. Nevertheless, the coefficients are always below 0.35, so the relationship is relatively low. Moreover, the coefficients among the independent variables are below 0.5, and the variance inflation factors (VIF) are all below 10 (the highest observed VIF is 3.11), indicating that multicollinearity is not a concern. We can conclude that there are some statistically significant relations between value creation and an increase in employment (0.349) and between value creation and return on sales (0.348).

Analysis of result differentiation

Using the Mann-Whitney U test, we examined whether there was a difference in the dependent variable for the two independent groups. The first group is composed of companies operating in the energy sector (n=49), and the second of companies from other sectors (n=269). For each variable, the null hypothesis is that the distribution of ranks should be the same for both groups. The results are presented in Table 4.

Table 4. U Mann-Whitney

Variables	U Mann-Whitney	W Wilcoxon	SE	Z	Asymptotic significance
x ₁	9864.500	11089.500	587.704	5.654	0.000**
x ₂	929.500	10515.500	587.744	4.677	0.000**
x ₃	9051.000	10276.000	587.258	4.273	0.000**
x ₄	782.500	9045.500	587.411	2.177	0.029*
x ₅	773.500	8955.500	587.835	2.023	0.043*

** p -value ≤ 0.01 . * p -value ≤ 0.05

Table 4 shows that the calculated values of the Mann–Whitney U test are in the range 773.5 to 9051. The U value represents the amount by which the ranks for energy and non-energy companies deviate from what we would expect under the null hypothesis. For a 0.05 significance level, we can reject the null hypothesis if the 2-tailed significance (see Asymptotic significance) is less than 0.05. In this case, as for each variable (x₁ - x₅), the asymptotic significance (2-tailed) is in the range of 0.000 to 0.043, we reject the null hypotheses. Thus, we can conclude that the results obtained for the companies operating in the energy sector differ from the results for those operating outside of the sector.

The impact of value creation and capture on performance:

Ordered logistic regression.

The results of the ordered logistic regression estimates are shown in Table 5, while the values of the odds ratios are in Table 6.

The probability tests indicate the significance of four of the identified models (labelled y₁, y₃, y₄, y₅ in Table 5). The likelihood ratio tests used to verify the null hypothesis indicate that a model with only k thresholds is as good as the estimated model (16.31, 15.27, 19.22 and 14.39, respectively). At five degrees of freedom, the empirical significance level is lower than 0.01, so we can reject the null hypothesis in favour of the alternative hypothesis - that the estimated models for y₁, y₃, y₄, and y₅ are better than those that only account for thresholds.

Analysis of the results suggests that certain value creation and value capture processes have a positive or negative influence on firm performance, indicated by dependent variables.

Table 5. Ordered logistic regression

Variables	y ₁		y ₂		y ₃		y ₄		y ₅	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
x ₁	0.734	0.544	0.407	0.569	0.617	0.591	-1.140**	0.578	0.526	0.589
x ₂	0.846	0.695	0.515	0.680	1.847**	0.761	2.563***	0.757	1.336*	0.732
x ₃	-0.464	0.606	-0.668	0.592	-1.671**	0.657	-1.271**	0.621	-1.266*	0.673
x ₄	0.784	0.576	0.454	0.562	0.792	0.558	1.687***	0.590	0.819	0.600
x ₅	0.133	0.377	0.328	0.391	-0.369	0.383	-0.419	0.377	0.231	0.404
/cut1	6.037	2.854	1.840	2.693	3.377	2.849	2.147	2.873	3.912	3.020
/cut2	7.553	2.746	5.052	2.724	6.067	2.890	3.261	2.758	7.348	3.000
/cut3	1.464	2.927	6.286	2.757	8.355	3.009	5.735	2.761	9.967	3.145
/cut4	11.941	3.033	8.606	2.871	9.933	3.110	7.453	2.826	11.042	3.219
/cut5	13.540	3.177					8.992	2.930		
Log likelihood	-		-		-58.575		-65.489		-55.087	
LR chi2 (5)	16.31		61.369		15.27		19.22		14.39	
Prob > chi2	0.0016		0.2238		0.0093		0.0018		0.0013	
Pseudo R2	0.1134		0.0537		0.1193		0.1279		0.1155	

* *p-value* < 0.1, ** *p-value* < 0.05, *** *p-value* < 0.01; /cut1 – /cut 5 – cut points

Table 6. Odds ratio for the y₁, y₂, y₃, y₄, y₅ models

Variables	y ₁	y ₂	y ₃	y ₄	y ₅
x ₁	2.082	1.502	1.854	0.320 **	1.692
x ₂	2.331	1.673	3.338 **	2.974 ***	3.803 **
x ₃	0.629	0.513	0.188 **	0.281 **	0.282 **
x ₄	2.190	1.575	2.207	3.402 ***	2.268
x ₅	1.143	1.389	0.691	0.658	1.259

* *p-value* < 0.1, ** *p-value* < 0.05, *** *p-value* < 0.01

We can further interpret the models based on the odds ratios (Table 6) in the following way. Firstly, we can conclude that in the case of average return on sales (y₃) — *ceteris paribus*— the chance of an increase in average return on sales is:

- greater by 233.8% in the group of energy sector companies which treat value creation (x₂) as an important strategic process,
- lower by 81.2% in the group of energy sector companies which treat value capture (x₃) as an important strategic process.

Secondly, the chance of an increase in the degree of customer loyalty (y₄) - *ceteris paribus* - is:

- lower by 62% in the group of energy sector companies which consider strategic potential (x₁) as important,
- greater by 197.4% in the group of energy sector companies which consider value creation processes (x₂) as important,
- lower by 71.9% in the group of energy sector companies which treat value capture as an important process,

- greater by 240.2% in the group of energy sector companies that consider value appropriation (x_4) important.

Thirdly, in the case of company growth (y_5) - ceteris paribus - the chance of an increase in the degree of growth is:

- greater by 280.3% among energy sector companies which rate value creation (x_2) as important,
- lower by 71.8% among energy sector companies which treat value capture (x_3) as important.

Overall, we can conclude that value creation processes positively influence a return on sales, while value capture processes negatively impact a return on sales. Furthermore, strategic potential and value capture negatively impact customer loyalty, while value creation and value appropriation affect customer loyalty positively. Value creation positively influences company growth, while value capture limits this growth.

Identifying significant value creation and capture processes

To distinguish the highest-rated components within the analysed constructs (Company strategic potential, Value creation, Value capture, Value appropriation, Value protection mechanisms), the sum of the ratings assigned to them was used. Table 7 shows the top three scores for each construct.

Table 7. Most significant value creation and value capture processes in energy sector companies

Components	Assessment score
<i>Company strategic potential</i>	
In our portfolio we have cash cows – goods or services that sell well, and in which we invested strategically – that is they still represent unique value for customers.	319
Through strategic and market analyses, we can increase the value of our goods and services.	307
We can efficiently minimize and reduce costs connected with identifying and exploiting opportunities that appear in the environment.	296
<i>Value creation</i>	
Value creation, seen as offering unique value for customers, as well as value for the organization (profits) is one of our main concerns.	290
We are able to precisely identify which places in the value chain create most of the value (e.g., logistics, marketing, services, HR).	287
To create value, unique resources and competences are needed, as well as complementary resources.	284
<i>Value capture</i>	
We offer goods or services that are similar our competitors' solutions (we observe best practices and implement them to our portfolio).	291

In value creation and value capture, we are stakeholder-oriented, we take into consideration our stakeholders' expectations in 'dividing the value pie'.	275
We have resources (solutions, employees, ideas) that can be captured by others (competitors, suppliers, sub-contractors).	268
<i>Value appropriation</i>	
We operate in a competitive environment, and the competition can imitate us quickly. We feel that they take our market share.	270
In the energy sector, many companies can imitate our innovations.	270
We have very strong purchasing power in the task environment, so we can appropriate value.	255
<i>Value protection mechanisms</i>	
Our unique value proposition that we offer to customers is protected in various ways (patents, customer loyalty programmes).	282
We have very low staff turnover, so our employees do not leave with our know-how.	278
We have a high level of know-how and a well-developed strategy of how to create and protect value.	275

Discussion

This article focuses on the concepts of value creation and value capture in companies operating in the energy sector. By evaluating the value creation and value capture decisions made by managers in the energy sector, we show how value creation and value capture affect the performance of energy sector firms and increase our knowledge of the actions that such companies could take to improve their performance.

The results of our study suggest that energy sector companies emphasise cost minimisation as a source of value creation, which is consistent with the assumptions of transaction cost theory (Williamson, 1981). At the same time, our study found that companies in the energy sector focus on long-term value creation when making strategic decisions (Priya Seetharaman, 2020) and offer unique propositions to customers by precisely defining the value provided to customers (Kumar V and Reinartz W, 2018). Our findings in this regard are consistent with the previous results of studies in the energy sector, where a consumer-oriented perspective on value creation has been observed (Arena et al., 2020).

Our results show that managers in the energy sector companies have a well-developed competence in identifying value-creating areas in the value chain (Porter M.E., 1985). It is worth noting that they do not consider innovation activities in terms of sources of value creation, as suggested by previous research (Bilton and Cummings, 2010). Due to their traditional profile, energy sector companies are more likely to create and capture value from goods or services once they are introduced, taking advantage of the "cash cow effect". These companies are aware that preparing

for innovation and sustainable investment, while beneficial in the long term, does not create value in the short term (Mihailova et al., 2022).

Our study confirms that performance, which is the focus of energy sector companies in the European Union (Graf and Helm, 2018), is an important indicator of value creation and capture processes (Shakina and Molodchik, 2014). Our study point out that stakeholder orientation is a characteristic of companies in the energy sector and includes collaboration with stakeholders, especially those in the task environment, which can create shared value, as shown by other studies (Karami and Madlener, 2021; Pätäri et al., 2012; Rossignoli and Lionzo, 2018).

The results of our research also show that companies in the sector are aware that their competitors may imitate their solutions, thus weakening the first mover advantage (Cirik and Makadok, 2023), but companies themselves monitor their competitors and look for good practices or solutions to imitate. However, companies need to develop more cooperation with other stakeholder groups to generate stakeholder synergy (Amit and Han, 2017; Ryall, 2013).

Conclusion

The goal of this paper was (a) to demonstrate some common concepts of value creation and value capture regarding companies operating in the energy sector; (b) to present the results of research carried out among 62 companies operating in the energy sector in Poland, (c) to offer a simple framework indicating which activities could be undertaken by companies operating in the energy sector to increase firm performance. In this paper we have posited that companies can look for various sources of value creation, from capital related decisions and cost minimizing, through opportunity identification, innovating and offering unique value propositions for customers, and introducing goods or services that bring value continuously, to strategic decisions.

Our study has shown that companies operating in the energy sector in Poland mostly create value by: (a) earning on goods and services in which investments were made some time ago, and which now generate the cash-cow effect, (b) creating unique value propositions or enhancing use value, (c) analysis and precise identification of which places in the value chain are sources of value, (d) minimizing costs, also costs related to opportunity identification, (e) possessing the necessary resources and competences, (f) imitating best practices from competitors, (g) stakeholder orientation, and taking stakeholders' expectations into account, and (h) possessing strong purchasing power in the task environment.

Based on the results, as well as literature findings (Chatain, 2011), we can offer the value creation framework below (Figure 1). It recommends identifying critical value drivers in the changing sector, analysing customer preferences towards green technologies, entering coalitions with stakeholders to launch environmentally friendly high technologies, and developing best in class performance by innovating ahead of competition, and offering unique use value.

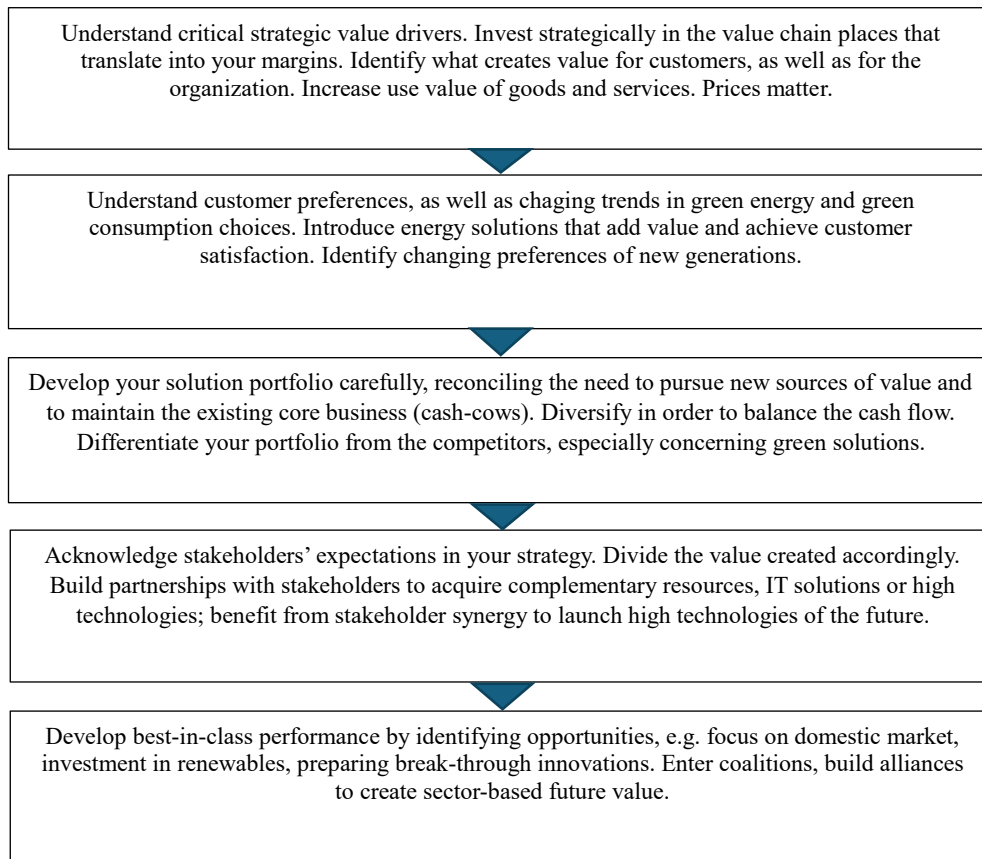


Figure 1: The foundations of value creation and value capture in the energy sector
Source: Own elaboration

In our research, we found some statistically significant relations between value creation and an increase in employment, as well as between value creation and a return on sales. The research results indicate interesting interlinkages where value creation and value capture processes are concerned. Companies that strategically create value have higher chances of increasing a return on sales. However, capturing value does not translate into a return on sales. This can be explained by the time frame. Creating value and offering value to customers translates directly into sales figures. Value capture processes, on the other hand, require a longer time perspective, and take place in the period after a company has gained a return on sales. Strategic potential (valuable resources, competences, strategic innovation processes, opportunity seeking and development of dynamic capabilities) does not translate into an increase in customer loyalty. On the other hand, value creation processes, including unique value for customers, do impact on customer loyalty. This seems natural, as customers are typically not interested in companies' internal strategic

potential, but rather in the value offered, and the use value they will be ready to pay for. When strategically offered in the long run, unique value propositions can bind customers, thus increasing their loyalty.

Overall, we can conclude that value creation processes positively influence a return on sales, while value capture processes impact a return on sales negatively. Also, strategic potential and value capture negatively impact customer loyalty, while value creation and value appropriation affect customer loyalty positively. Finally, value creation positively influences company growth, while value capture limits this growth.

Our study has some limitations: sample limitations, research method limitations, and context limitations. First, the research sample was randomly selected. As a result, out of 316 organizations chosen for the original research, only 49 companies representing the energy sector were selected for the analyses, which might have influenced the final outcomes. The researched organizations were also of various size and age. The survey design, which was based on conclusions from the literature, as well as the measurements used in the survey could also raise some limitations. To address the issues of validity and subjectivity, future research could use known operationalizations and validated scales. The research context creates yet another limitation. Although Poland represents a rich potential for studying value creation and capture in the energy sector, as it is undergoing dynamic transformation, the conclusions from this study will not necessarily be generalizable.

Therefore, future research could address these challenges in several ways. Firstly, a more longitudinal approach to the research could be adopted, or qualitative analyses used. In Poland, there are few energy producers, which would make an interesting sample for a multi-case study. For future quantitative research, more companies could be included in the sample. It could also be useful to carry out a comparative analysis with other CEE countries. Overall, this study represents an attempt to develop new knowledge and a better understanding of the processes and mechanisms of value creation and value capture that improve firm performance in energy sector companies.

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TWORZENIE I PRZECHWYTYWANIE WARTOŚCI W ORGANIZACJACH SEKTORA ENERGETYCZNEGO: DOWODY Z POLSKI

Streszczenie: Turbulencje w gospodarkach światowych znajdują przełożenie na dynamikę środowisk organizacyjnych. W szczególności zjawisko to można zaobserwować w przypadku firm z sektora energetycznego, które ze względu na zmiany na rynkach energii, muszą zmierzyć się z dynamicznymi wyzwaniami. Nasz artykuł ma na celu wykazanie istoty strategicznego tworzenia wartości i przechwytywania wartości w przedsiębiorstwach sektora energetycznego działających w warunkach szybkich zmian. Wyniki sugerują, że aby skutecznie tworzyć wartość, firmy z sektora energetycznego powinny oferować atrakcyjną propozycję wartości, która zrekompensuje wzrost cen; czerpać korzyści z dojnych krów, a także podejmować działania zmierzające do optymalizacji kosztów. Z drugiej strony, aby przechwycić większą wartość, firmy z sektora energetycznego powinny korzystać z silnej siły przetargowej i solidnej współpracy z interesariuszami, a także chronić swoje rozwiązania przed imitacją, jednocześnie wdrażając najlepsze praktyki wykorzystywane przez konkurencję. Na podstawie uzyskanych wyników w artykule zaproponowaliśmy ramy z zaleceniami strategicznymi w celu zwiększenia tworzenia wartości w firmach z sektora energetycznego.

Słowa kluczowe: tworzenie wartości; przechwytywanie wartości; wyniki firmy; sektor energetyczny