

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Resources Policy

journal homepage: www.elsevier.com/locate/resourpol

How do turbulent sectoral conditions sector influence the value of coal mining enterprises? Perspectives from the Central-Eastern Europe coal mining industry

Izabela Jonek-Kowalska

The Silesian University of Technology, Faculty of Organization and Management, Institute of Economics and Computer Sciences, Roosevelt Street 26, 41-800 Zabrze, Poland

ARTICLE INFO

Keywords:

Value and risk management in coal mining
Mining enterprises in Central-Eastern Europe
Mineral economics and finance

ABSTRACT

The main aim of the article is to estimate the value of and indicate the most significant industrial risk factors associated with the Central-Eastern Europe coal mining industry. The research concerns four coal mining enterprises from Poland, Czech Republic, and Ukraine listed on the Warsaw Stock Exchange and excavating coal in underground coal mines. According to the research results, the key national risk factors in a book value creation are the coal share in the domestic energy balance and the domestic coal consumption. With respect to external risk factors, the dominant role belongs to coal prices and its substitutes' prices. Research conclusions allow academics and practitioners to formulate theories on (1) price risk monitoring and hedging, (2) improving and strengthening relations with suppliers and customers, and (3) developing relations with internal and external stakeholders by using CSR assumptions. Such analyses and research contribute to energy economics in the area of value and risk management in mining enterprises. Additionally, it contribute to the non-renewable resources management and could be interesting for managers, investors as well for local governments and communities.

1. Introduction

Value management is one of the most important issues in economics and management. It is still developed and supplemented by new approaches and theories. Modern enterprises try to recognize and implement advanced instruments and methods of value management to increase competitiveness and improve market evaluation as well as their image, so in this case theoretical solutions are widely accepted and adapted in practice (Gorczyńska and Sz wajca, 2011). Research in the area of value management focuses on three main topics, including (1) value measurement (Joos et al., 2016; Hahn and Kuhn, 2012a; Barney, 2001), (2) instruments of value management (Liinamaa et al., 2016; Hahn and Kuhn, 2012b; Dudycz, 2001) and (3) value determinants (Firk et al., 2016; Burkert and Lueg, 2013). Such general perspective—expressed in mentioned research areas—is detailed and examined from an industrial perspective due to the complexity and technological advancement of the contemporary economy and its sectors. Besides general rules and universal mechanisms, the value creation process requires also taking into account sectoral conditions that strongly influence the economic results of enterprises (Kmieciak et al., 2012).

Due to the necessity of developing and analyzing the concept of value management and implementing the industrial approach, this

article analyzes the industrial perspective of value management in the context of the coal mining sector in Central-Eastern Europe. Undertaking research in this area results not only from general reasons but also from practical needs. During the few last years, the coal mining sector in Europe has been treated as a declining one (Michalak, 2015; Turek and Michalak, 2015). Progressive decarbonization has been decreasing coal consumption in European power engineering and, coupled with the collapse of coal prices on the world market, this has dramatically hindered the functioning of coal mining enterprises (Jonek-Kowalska et al., 2014). These conditions increase risk and threaten value creation processes. Furthermore, their accumulation and mutual reinforcement could cause the bankruptcy of the weakest enterprises or even the entire domestic industry (Pyka, 2012a).

In the first part of the article, a theoretical framework for value management is presented to outline the general research concept. In this section we also try to explain why value management in the coal mining sector is such a difficult task by characterizing the essential attributes of the sector. In the second part of the paper, the background research is described and we define research problems, our hypotheses and our research methods, in addition to presenting the research results. In the third part, we discuss policy implication and research limitations.

E-mail address: izabela.jonek-kowalska@polsl.pl.

<https://doi.org/10.1016/j.resourpol.2017.11.003>

Received 4 November 2016; Received in revised form 7 November 2017; Accepted 7 November 2017
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2. How do enterprises create and destroy value? A theoretical framework

Value-based management (VBM) is one of the fundamental theories in contemporary management (Arnold, 1998; Ronte, 1998). According to its key assumptions, enterprises create value using tangible and intangible resources, wherein the leading role in this process is played by unique and rare resources and their inimitable combinations that could provide the enterprise a competitive advantage (Arnaboldi et al., 2015; Hitt et al., 2016; Lado and Wilson, 1994; Copeland et al., 1990; Bartlett and Ghoshal, 1993; Stewart, 1990). This approach has been constantly developed and supplemented over the years. In the context of the process perspective, VBM was dynamized and analyzed in the particular stages of the production process, including supply, production and sale (Zhang et al., 2016; Caputa, 2015b, 2015a; Othman and Sheehan, 2011; Seal, 2010; Lepak et al., 2007; Copeland, 1994; Rappaport, 1986). With the advent of Sustainable Development (SD), value management was enriched by the aspects of the stakeholder theory (Zieliński, 2015; Zieliński, 2014; Kuzior, 2013; Adamczyk, 2008; Nahapiet and Ghoshal, 1998; Pennings et al., 1998; Freeman, 1984; Bloomstrom and Davis, 1975; Kaysen, 1957). This indicates that an enterprise's value is created not only by producers and their clients and suppliers but also by participants in the industrial and economic surrounding. In this way, value creating gained a multifaceted dimension and long-term perspective (De Cole et al., 2010; Bernatt, 2009; Black et al., 2000; Kryk, 2000; Martin and Petty, 2000; Boulton et al., 2001; Cwynar and Cwynar, 2003).

At the basic stage of value management, creating value by using resources engaged in a production process is easy to understand and implement (Barney and Arikan, 2001; Malinowska, 2001; Marciniowska, 2000; Wernerfelt, 1984; Thompson, 1967; Penrose, 1959). Incorporating clients and the supplier into a value chain is also a natural enterprise behavior (Sirmon et al., 2008; Sirmon and Hitt, 2003; Bowman and Ambrosini, 2000). However, perceiving the local and regional communities as support for a value creation is much more difficult because this differs from the concept of *homo oeconomicus* and poses to achieve the objectives of all stakeholders, not simply those associated with the enterprise (Sirmon et al., 2007). Additionally, it should be noted that care for social and ecological surrounding is an investment in future clients, their safety, comfort, and loyalty, but without the rejection of a current profit prioritization, benefiting from this investment will be not possible (Hąbek and Wolniak, 2015, 2016).

A lot of research negates the contribution of SD into value creation because of the lack of direct and measurable influence of this conception on market or book value (Crifo et al., 2016; Ding et al., 2016; Lock and Seele, 2016; Rhou et al., 2016; Hang and Chunguang, 2015; Chen and Gavius, 2015). In the author's opinion such criticism is not well founded and could result from difficulties in isolating the factors that influence the value over too short of a research period. There are also many problems, even with successful and well-understood SD implementation. Therefore, in practice, the relationship between the SD and the value is barely noticeable.

Although the positive relationships between the presented concepts and the value of the company are hard to identify, the negative consequences of ignoring these relationships are obvious and easily noticeable (Bowman and Ambrosini, 2010). An unreliable supplier selection will result in a reduction of quality; disregard for clients may cause them to move to competitors, and destruction of the environment and social relation could threaten reputation. These circumstances directly lead to a reduction in sales and decreased financial results, which consequently decreases the value of the enterprise. Thus it is difficult to deny the contribution of the described factors to the value creation process (Bąk, 2008, 2007; Wawiernia, 2013, 2014).

Over the last century, the specialization of enterprises has been strongly deepened, and nowadays general considerations about economics and management require industrial perspectives, particularly

with regard to resources and production processes (Alazaizeh et al., 2016; Teles et al., 2016; Brzywczy and Lipiński, 2013). In some sectors, relations with social and ecological surroundings are also more complicated than indicated by the general principles (Sienkiewicz-Małyjurek, 2014). This especially applies to traditional industries in which the impact on the environment and local communities can be extremely heavy and burdensome (Burchart-Korol et al., 2016; Keeling and Sandlos, 2016; Bilgen and Sarikaya, 2015; del Carmen Suescun Pozas et al., 2015). In light of this fact and in order to contribute to the general theory of value management, this article was written from the perspective of the coal mining industry.

3. Why is value management in mining enterprises a difficult task? The specifics of the sector

A majority of value measurement methods involve the financial profits of an enterprise (Bąk and Sierpińska-Sawicz, 2016; Kumar, 2016; Blasco and Ribal, 2013; Blanc and Setzer, 2015; Jennergren, 2008). The accounting approach uses data from balance sheets on net assets, but the value of the assets and their changes in time directly depend on the profit amount (Kowalska-Styczeń and Owczarek, 2016; Qu and Zhang, 2015; Kraus and Strömsten, 2012; Brodny, 2012). The income methods are based on the forecasting profits, and mixed methods combine the accounting and income methodologies. In the value estimating process, we could also use a category for market value established on stock exchange prices if the enterprise is listed on a stock market (Mothlagh et al., 2016; Al-Hares et al., 2012; Georgescu et al., 2014; Banz, 1981). In this case an enterprise value depends on investors' expectations, but their decisions are also strictly connected with the financial results, industrial perspectives and economic conditions. So, regardless of the approach, the main determinants of enterprise value are revenues and costs, which determine the final financial value (Sierpińska-Sawicz and Bąk, 2016; Sierpińska and Bąk, 2013).

In mining enterprises—as in most of business units—revenues depend on the volume and price of sales; however, the volume and quality of sales could not be freely shaped by a coal mining enterprise, because these parameters result from geological and mining conditions beyond the control of producers (Nawrocki and Jonek-Kowalska, 2016; Hosseinzadeh et al., 2016; Thistle, 2016). The product is not manufactured but extracted, and its volume and quality (such as calorific value, ash content, and sulfur content) are largely predetermined. Additionally, in a case of market decline, coal mining enterprises could not use a diversification strategy because their product is homogeneous and as a result changing market orientation is impossible. Besides these constant and natural circumstances, in recent years the revenues of mining companies have been exposed to dramatically erratic economic conditions such as dropping prices and consumption reduction caused by increasing shale gas production in the United States and the progressive decarbonization in Europe (Betz et al., 2015; Krzemień et al., 2015; Śmiech et al., 2015).

As mentioned previously, the costs are the second determinants of enterprise value, and in coal mining costs also reveal some specifics influencing the value. Primarily, coal mining costs are difficult to predict and plan because even well-recognized deposits may be more difficult to excavate than previously thought (Korski et al., 2016; Uberman and Naworyta, 2014; Wolny, 2014; Turek, 2013). Furthermore, the production processes in coal mining are accompanied by natural threats that disturb the continuity of excavation and pose a threat for human health and life (Trenczek, 2016; Bondaruk et al., 2015; Zhu-Wu et al., 2011). Such conditions require above-average expenditure on prevention and occupational health and safety, which increases the production cost. The unit cost in coal mining is rarely stable over time and directly comparative because of changing geological conditions and deepening excavation. In addition, unit costs are very sensitive to changes in production levels due to a high share of fixed costs resulting from large

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