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OPTIMISATION OF STRATEGIES FOR WORKING WITH COUNTERPARTIES AND RISK MANAGEMENT AT UTILITY INFRASTRUCTURE ENTERPRISES

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Abstract. The *objective* of this paper is to examine and enhance strategies for managing relationships with counterparties and mitigating risks in utility infrastructure enterprises. The paper seeks to analyse contemporary approaches and challenges faced by these enterprises, offering recommendations for improving their strategies in counterparty interactions and risk management. Ultimately, the goal is to enhance operational stability, competitiveness, and sustainable development in a dynamic business environment. *Methodology.* The research presents a critical review and analysis of the existing risk management and counterparty strategies employed by utility infrastructure enterprises. The methodology comprises an examination of current practices, the identification of key problems, and an evaluation of modern approaches, including digital transformation, process automation, and innovative management methods. By synthesising existing research and case studies, the paper identifies the strengths and weaknesses of various strategies and recommends improvements. *Results.* The analysis identified several key challenges faced by utilities in managing counterparties and risks, including inadequate risk management systems, outdated business processes and poor communication. Process automation, digital transformation and improved stakeholder integration are identified in the document as critical factors for optimising operations. It also emphasises the importance of careful selection of counterparties, performance monitoring and staff development to mitigate risks and foster better partnerships. *Practical implications.* The recommendations set forth in the paper provide actionable strategies for utility infrastructure enterprises to optimise their management of counterparties and risks. The implementation of these strategies, including the utilisation of digital tools, enhanced internal communication and a focus on staff development, can facilitate improvements in efficiency, risk management and long-term sustainability for utility companies. These recommendations are particularly beneficial for those in managerial or decision-making roles who are seeking to navigate the complexities of a rapidly evolving business environment. *Value / Originality.* This paper makes a significant contribution to the field by offering a comprehensive analysis of the strategies available for optimising counterparty relations and risk management in the utility sector. The value of this approach lies in its integration of modern technological solutions with traditional risk management practices. By offering practical, research-based recommendations, the paper addresses current gaps in the literature and provides new insights into how utility enterprises can better manage both internal and external challenges.

Keywords: risks, utility infrastructure, counterparties, optimisation, strategies, economic environment.

JEL Classification: D81, M11, C61

1. Introduction

Effective collaboration with contractors is of paramount importance for utilities, as it ensures the uninterrupted provision of essential services such as water and heat supply, electricity, and waste disposal. The reliability of these services is contingent upon stable collaboration with suppliers of inputs, equipment, and services. The effective management of relations with contractors has the potential to reduce costs and secure favourable contracts, which in turn has a direct impact on the financial stability of enterprises, particularly in the context of constrained budgets and rising prices. The quality of utility services is contingent upon the quality of the materials and workmanship of

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the contractors involved, and thus, careful selection and control are of paramount importance. While collaboration with contractors entails certain inherent risks, such as delays or non-fulfillment of obligations, the implementation of effective interaction strategies and monitoring can help mitigate these risks, thereby ensuring the stable operation of enterprises. In the current context, the optimisation of relationships with counterparties is becoming a crucial factor in maintaining the efficiency and sustainability of utilities.

2. Analysis of Recent Research and Publications

Recent years have been characterised by significant development and implementation of innovative methods in the management of utility companies. Modern approaches to optimising work with contractors and risk management are becoming increasingly important due to the growing demands on efficiency, reliability and quality of service. The studies conducted by the authors of "ProZorro: challenges for digitization of public expenditures in Ukraine" demonstrate the positive impact of digitalisation on the processes of procurement, contract management and performance monitoring. The work, entitled "Organizational and economic support of anti-crisis management of business processes during reengineering of the enterprise", among other things, posits that the deployment of analytical tools facilitates the identification of bottlenecks in the interaction with suppliers and the optimisation of procurement processes. The research project entitled "Lean management as an innovative approach to production management" is concerned with the implementation of lean management principles. The implementation of lean management principles has been demonstrated to facilitate a reduction in operating costs and an enhancement in the quality of services provided by enterprises. In this regard, the following works are of interest: "Outsourcing and outstaffing: how it works", which considers outsourcing and outstaffing; and publications that point to cost reduction and increased flexibility in resource management through outsourcing. The study "Risk management mechanism in the enterprise management system" shows that companies that implement risk management systems are more resilient to unforeseen circumstances and crises. Scientific publications confirm that regular audits and monitoring help to identify problems in time and reduce their impact on the operations of such enterprises. Publications demonstrate that companies that actively engage stakeholders achieve better results in co-operation with contractors.

Utilities are constantly facing various risks that affect their operations. Financial difficulties associated with large investments in infrastructure and possible delays in government funding may adversely affect their development. Military threats caused by Russian aggression threaten the security of operations, which may lead to disruptions in the supply of vital resources. Political instability and changes in regulation may affect the operating environment, in particular through changes in utility tariffs.

There are also technological risks associated with the modernisation of equipment and the introduction of new systems, which requires significant investment. Natural disasters and climate change pose a threat to infrastructure, which could lead to service disruptions. Social risks arise from possible public dissatisfaction with poor service delivery, which may provoke protests and conflicts.

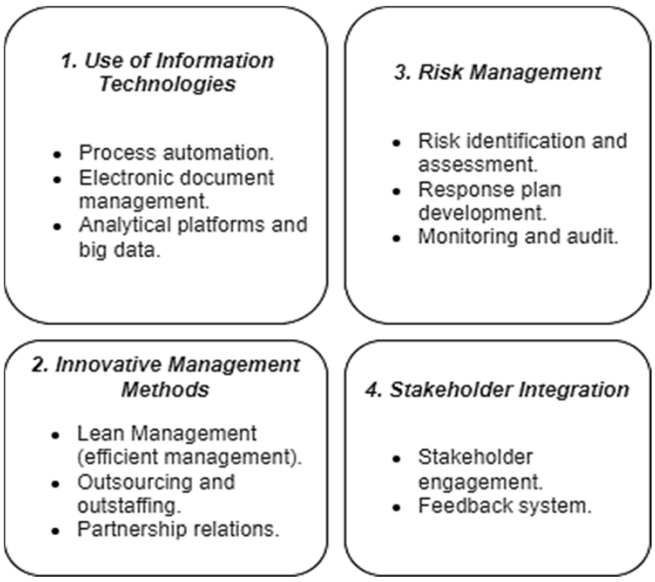

Figure 1. Key approaches to optimising work with counterparties

To mitigate these risks, businesses need to diversify their funding sources, ensure infrastructure security, adapt to political changes, invest in the latest technologies, build resilience to natural disasters, and maintain an open dialogue with the public. This comprehensive approach will help to reduce the impact of risks and ensure sustainable development in an uncertain environment.

3. Methods for Optimising Work with Counterparties

The strategy of optimising interaction with counterparties and risk management at utility companies necessitates a comprehensive approach that encompasses a meticulous assessment of partners, the formulation of efficacious procedures for monitoring and responding to risks, and the active utilisation of contemporary technologies to ensure the stability and advancement of the company.

Thus, optimising the strategy of working with contractors at utility infrastructure companies may include several key aspects aimed at improving the efficiency of interaction and achieving better results in the long term.

Table 1 provides recommendations on how to optimise work with counterparties.

The objective of these recommendations is to enhance the efficiency and stability of procurement and counterparty management within an organisational context. The prudent selection of counterparties, a comprehensive examination of their operations and standing, and the formation of enduring alliances can collectively diminish the likelihood of failure in collaboration.

4. The Method for Finding a Solution Based on Pareto Set Narrowing

The implementation of digital transformation, encompassing the integration of contemporary IT solutions and e-procurement systems, facilitates enhancements in process efficiency, guarantees the integrity of the supplier selection process, and simplifies the administration of contractual documentation.

The solution finding method based on Pareto set reduction using objective programming is a powerful tool for optimising contractor engagement and risk management strategies in utility companies. Such companies often need to balance several conflicting objectives, such as ensuring uninterrupted service delivery, minimising costs, maximising supplier reliability, while managing financial and operational risks.

Consider the possibility of combining goal programming with the method of narrowing the trade-off area based on information about the relative importance of the criteria. In this regard, it is first necessary to determine the possible information about the relative importance of the criteria. In general, this can be a whole set of information. Subsequently, the Pareto set must be narrowed based on the aforementioned set, whereby any vectors that are incompatible with the available information must be removed. Consequently, a specific subset of the original Pareto set will be generated. In the event that the latter set is found to be relatively extensive and no further information regarding the relative importance of the criteria for its subsequent narrowing is available, it is recommended that the objective programming method be employed to complete the process of identifying the optimal solution.

Consider the two-criteria problem of choosing the best design solution for launching a car into mass production. The first criterion will be the cost of organising the production of the car, and the second parameter will be the amount of environmental damage caused by the car production process. Both values will be measured in millions of hryvnias. The relative importance of the criteria is shown below. The RPO is willing to accept a unit increase

Table 1

Recommended methods for optimising work with counterparties

№	Method	Method description
1.	Careful selection of counterparties	Conducting a detailed analysis of potential counterparties through financial audit, reputation and experience checks.
2.	Digital transformation	Establishing long-term partnerships with reliable suppliers and contractors.
3.	Risk management	Digital transformation Implementation of modern IT solutions to automate procurement processes, control service quality and manage contractual documentation.
4.	Improving communications	Use of e-procurement systems to ensure transparency and efficiency of the supplier selection process.
5.	Performance monitoring and evaluation	Developing strategies to minimise the risks associated with non-fulfilment of contracts, changes in resource prices or counterparty insolvency.
6.	Professional development of employees	Creation of backup plans for critical services and materials.
7.	Ethical standards and social responsibility	Establish effective channels of communication with counterparties to promptly resolve issues that arise.

Source: compiled by the authors

in production costs if the amount of environmental damage is reduced by one unit.

Assume that there are three car designs expressed as two-dimensional vectors:

$$y^{(1)} = (30,2), y^{(2)} = (28,4), y^{(3)} = (24,6)$$

Solution.

Each of these vectors must be minimised. All three vectors are Pareto-optimal, meaning that it is impossible to narrow the Pareto set using the Edgeworth-Pareto principle. Under the terms of the problem, the second criterion is more important than the first with a relative importance coefficient of $\theta_{21} = 0,5$.

This coefficient is derived from formula (3.1):

$$\theta_{ij} = \frac{w_j}{w_i + w_j} \quad (3.1)$$

Where θ_{ij} is the coefficient of relative importance of criterion *i* over criterion *j*; *wi* and *wj* are positive parameters that show how much the *i*-th criterion is more important than the *j*-th.

In this case, the calculation of the relative importance coefficient is as follows:

$$\theta_{21} = \frac{1}{1+1} = 0,5$$

The next step is to recalculate the vectors using the formula (3.2).

$$\widehat{f_j} = \theta_{ij} f_i + (1 - \theta_{ij}) f_j \quad (3.2)$$

where θ_{ij} is the coefficient of relative importance of criterion *i* over criterion *j*;

fi, fj - values of criteria *i* and *j*, respectively. The listed vectors will have the following form:

$$\widehat{y^{(1)}} = (16,2); \widehat{y^{(2)}} = (16,4); \widehat{y^{(3)}} = (15,6)$$

Then vector $\widehat{y^{(2)}}$ is not Pareto-optimal, so it can be eliminated from further consideration (this vector is "worse" than $\widehat{y^{(1)}}$). This leaves two vectors, and as there is no further evidence on the pattern of ODA preferences, the goal-directed programming method will be used to make the final choice. The "perfect" vector is the origin (0, 0). This vector will correspond to an ideal situation where there are no costs for the production of a new car and no environmental damage. As a metric, the Euclidean distance $p^{(2)}$ with vector *a* = (1, 1) will be used. As a result of the calculations, the following is obtained:

$$p^{(2)}\left(y^{(1)},0\right) = \sqrt{16^2 + 2^2} =$$

$$= \sqrt{260} < \sqrt{261} = \sqrt{15^2 + 6^2} = p^{(2)}\left(y^{(2)},0\right)$$

This means that according to the modified method of objective programming, the first vector $\widehat{y^{(1)}}$ must be selected. That is, the first car project should be selected for implementation.

Consequently, the utilisation of objective programming methodologies enables the execution of the Pareto set reduction operation, thereby facilitating the selection of a viable alternative.

Nevertheless, the existence of an extensive range of metrics in multi-objective programming gives rise to the challenge of selecting a specific metric. The practical implementation of the objective programming method results in the resolution of a specific extreme problem with a single criterion. The outcome of this process is contingent upon the selection of metrics.

5. The Importance of Optimisation

Risk management and the development of risk mitigation strategies allow to anticipate possible negative scenarios in advance and take timely action to avoid or reduce their impact.

The enhancement of communication and the establishment of efficacious relations with counterparties facilitate the expeditious resolution of existing issues and the sustenance of partnerships.

The processes of monitoring and performance evaluation permit the systematic tracking of the work of counterparties, thereby enabling a timely response to any deviations from the planned indicators.

The advancement of staff capabilities in the domain of counterparty management and ethical standards facilitates the formation of a team that is proficient in negotiating, administering contractual obligations, and guaranteeing adherence to elevated ethical standards in all interactions with counterparties.

Thus, these measures help to improve supply chain management, reduce risks and costs, and ensure stable and effective co-operation with contractors to achieve the organisation's strategic goals.

6. Conclusions

In the context of the evolving economic and legislative landscape, utilities are confronted with challenges that necessitate the implementation of effective risk management strategies and the optimization of strategies for interaction with counterparties. The implementation of a systematic approach to the analysis and improvement of these processes can lead to a notable enhancement in the efficacy of risk management and the optimisation of supply chains, which in turn contributes to the sustainability and reliability of enterprises.

The incorporation of cutting-edge analytical techniques for risk forecasting and the optimisation of contractual practices represents a pivotal element in the enhancement of enterprises' adaptability and flexibility in response to external and internal changes. In light of the aforementioned, it is imperative that the management of enterprises proactively implement these approaches with the objective

of enhancing the quality of services provided to citizens, guaranteeing their accessibility and dependability.

The findings of the study underscore the necessity for unceasing updates to management strategies and interactions with contractors, with the aim of identifying and mitigating potential risks. The involvement of enterprises in the analysis of a wide range of data and the utilisation of advanced analytical techniques can markedly enhance their capacity to predict potential threats and respond to them expeditiously. This, in turn, can ensure a high level of customer satisfaction and maintain the stable provision of utility infrastructure services.

In conclusion, the optimisation of strategies for dealing with counterparties and risk management are critical aspects for ensuring the sustainability, efficiency and reliability of utility companies. The implementation of a systematic approach and innovative strategies serves not only to mitigate risks but also to facilitate the development and enhancement of service quality.

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