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RISK MANAGEMENT IN UTILITY SERVICES

УПРАВЛІННЯ РИЗИКАМИ В СФЕРІ КОМУНАЛЬНИХ ПОСЛУГ

The paper considers the implementation of risk management strategies in the utilities sector focusing on LLC “Mastergaz”, a leading engineering company in Kyiv city. Applying the approach of integrating strategic marketing methods for ensuring competitive positions and information modeling in risk management in the area of utilities, the study combines the quantitative and qualitative data analysis to assess the impact of these strategies on operational efficiency and customer confidence. The quantitative data analysis includes the collection of operational data, customer questionnaire survey, and analysis of key performance indicators. The qualitative data analysis includes: stakeholder interviews, expert interviews, focus groups. The obtained data indicate a significant increase in maintenance reliability and a decrease in the frequency of incidents and downtime, which is explained by the implementation of predictive maintenance and real-time data monitoring. In addition, developed risk strategies contributed to increasing the level of customer satisfaction, increasing the reliability of maintenance and effective communication. Accordingly, the paper presents a detailed map of data processing, which contains a multifaceted approach to risk management in the utilities sector, which is currently implemented by the LLC “Mastergaz”. The proposed methodological approach to the implementation of information modeling in the risk management in the field of utilities by the example of LLC “Mastergaz” provides a comprehensive understanding of how integrated risk management strategies affect consumer confidence and reliability of services in the utilities. Implementation of risk management strategies in practice enabled the LLC “Mastergaz” to develop a comprehensive risk management structure that includes several key strategies: predictive maintenance; real-time data monitoring; emergency response protocols. The results of the study not only confirm the theoretical models of risk management, but also demonstrate their practical application to improve both operational results and customer relations in the field of utilities. These results provide valuable information for utility companies seeking to improve their risk management systems and strengthen customer confidence.

Key words: risk management in utility services, customer satisfaction, predictive maintenance, operational efficiency, emergency response systems, stakeholder engagement.

У статті розглядається впровадження стратегій управління ризиками в секторі комунальних послуг, зосереджуючись на ТОВ «Мастергаз», провідній інжиніринговій компанії міста Києва. Використовуючи підхід інтегрування стратегічних маркетингових методів забезпечення конкурентних позицій та інформаційного моделювання в управлінні ризиками в сфері комунальних послуг, дослідження поєднує кількісний і якісний аналіз даних для оцінки впливу цих стратегій на операційну ефективність і довіру клієнтів. Отримані дані свідчать про значне підвищення надійності обслуговування та зниження частоти інцидентів і простоїв, що пояснюється впровадженням прогностичного обслуговування та моніторингу даних у реальному часі. Крім того, розроблені ризик-стратегії сприяли підвищенню рівня задоволеності клієнтів, підвищенню надійності обслуговування та ефективної комунікації. Визначено, що теоретичні та практичні ідеї, викладені в статті, мають позитивний ефект для комунальних підприємств, які прагнуть вдосконалити свої системи управління ризиками та маркетингові стратегії. Було визначено декілька ключових напрямків для майбутніх досліджень. Щоб підвищити можливість узагальнення результатів, майбутні дослідження мають включати порівняльні дослідження за участю кількох комунальних компаній. Це дозволить ширше оцінити практики управління ризиками в різних нормативних та операційних контекстах, забезпечуючи більш повне розуміння цієї сфери. Визначено, що існує потреба в довгостроковому дослідженні для оцінки довгострокового впливу методів управління ризиками на операційну та клієнтську продуктивність. Запропоновано необхід-

ні додаткові якісні дослідження, щоб отримати глибше розуміння того, як практики управління ризиками впливають на різні зацікавлені сторони в комунальному секторі, включаючи регулятори та постачальників технологій. Доведено необхідність вивчати інтеграцію розширеної прогнозної аналітики та штучного інтелекту в управління ризиками. Проаналізовано вплив екологічних і соціальних факторів: важливо вивчити, як екологічні та соціальні фактори впливають на стратегії управління ризиками. Звертаючись до цих сфер, майбутні дослідження можуть продовжувати вдосконалювати стратегії управління ризиками, адаптуючи їх до нових викликів, таких як зміна клімату, технологічний збій і регулятивні зміни. Цей постійний розвиток має важливе значення для ширшого успіху бізнесу та забезпечення адаптивності та стійкості сектора. Результати дослідження не тільки підтверджують теоретичні моделі управління ризиками, але й демонструють їх практичне застосування для покращення як операційних результатів, так і відносин з клієнтами в сфері комунальних послуг. Ці результати дають цінну інформацію для комунальних компаній, які прагнуть вдосконалити свої системи управління ризиками та зміцнити довіру клієнтів.

Ключові слова: управління ризиками в комунальних послугах, задоволеність споживачів, прогнозне обслуговування, ефективність роботи, системи реагування на надзвичайні ситуації, залучення зацікавлених сторін.

Problem statement. In recent years, the utilities sector has faced numerous challenges due to a variety of risks, including natural disasters, technology disruptions, regulatory changes and cyber threats. The complexity inherent in this sector, which is critical to everyday life, requires a robust risk management system to ensure reliability and strengthen consumer confidence [1].

The utilities are an integral part of the infrastructure of any settlement and cover a wide range of services, such as water supply, waste disposal and energy supply. These services are essential for the sustainable development and health of communities and closely related to customer satisfaction and confidence. Recent changes towards a more dynamic regulatory environment and rising consumer expectations have further complicated the situation, making effective risk management a strategic imperative.

Analysis of the recent researches and publications.

The domestic and foreign researchers, such as Christina Silveira [3], Simon Pollard [6], Oksana Polinkevych [1], Brian H. MacGillivray [5], Adrian Molly [4], Mark A. Moore [2], Philip Antwi-Agyei [7], Neetesh Sharma, Paolo Gardoni [8] and others paid attention to the issues of risk management in conditions of crisis and uncertainty in various spheres of economy, including in the field of public utilities.

However, the approaches of these researchers do not pay attention to the need for information modeling in the risk management of utility development projects. By synthesizing diverse risk management approaches and research, we can better understand how to implement effective risk management systems that adapt to the changing utilities environment.

Formulation of the research task. The purpose of the paper is to substantiate the implementation of information modeling in the management of risks in the field of utility services using the example of LLC “Mastergaz” in order to increase the reliability of services and the customer confidence in the utilities sector.

Presentation of basic material of the research. Theoretical risk management models emphasize the importance of proactive risk identification and mitigation to protect assets and human lives. The approach of LLC “Mastergaz” aligns with these models by incorporating a comprehensive risk assessment and using advanced technology solutions for effective risk management and mitigation.

Kyiv company LLC “Mastergaz”, an engineering company that serves more than 750,000 apartment owners, providing a range of services from plumbing and electrical works to emergency response and meter verification. The company has effectively integrated innovative software solutions to optimize operations and improve service reliability. This technology integration not only increases operational efficiency, but also positions LLC “Mastergaz” as a leader in implementing risk management methods that can significantly reduce potential emergency situations and improve service delivery.

Since the utility companies, such as LLC “Mastergaz” are versed in the complexities of providing essential services, integration of the complex risk management strategies is critical. This not only protects against operational risks, but also increases customer confidence and improves service reliability, which is fundamental to successful branding and marketing strategies in the utilities sector.

The effective risk management in utilities goes beyond operational improvements, significantly influencing branding and marketing strategies. By prioritizing reliability and consumer trust, utility companies can stand out in a competitive market [2]. For LLC “Mastergaz”, their commitment to reliable service and customer satisfaction is a core part of their corporate identity, which attracts both private investors and the general public.

To implement information modeling in risk management, the company collects quantitative and qualitative data.

Quantitative data collection:

1) Operational data: collection of historical data from LLC “Mastergaz” operational records for the past five years, focusing on incident reports, service downtime, response time and recovery actions. These data will help to quantitatively assess the effectiveness of implemented risk management strategies.

2) Customer satisfaction survey: application of the standardized surveys distributed among a random sample of the client base of LLC “Mastergaz”. The surveys will measure customer perception of service reliability, responsiveness and overall satisfaction.

3) Performance indicators: Analysis of key performance indicators (KPIs) related to risk management, such as number of failures, average downtime and cost of failures.

Collection of the qualitative data:

1) Stakeholder interviews: Semi-structured interviews with key stakeholders, including management, risk

specialists and direct employees. These interviews examine the perceived impact of risk management practices on operational performance and customer confidence.

2) Expert interviews: Interviews with industry experts and academics in the field of utilities and risk management. These discussions will provide an outside perspective on risk management issues and best practices in the sector.

3) Focus groups: focus group discussions with customers to gather detailed feedback on their experience and expectations regarding utilities reliability and risk management communication.

These data are included in the system model of company management (Figure 1).

The information comprehensive model of risk management in public utilities includes the proposed data analysis processes.

Statistical analysis: using statistical tools to analyze quantitative data, such as regression analysis to identify relationships between risk management practices and performance indicators and ANOVA to compare levels of customer satisfaction before and after implementation of specific risk mitigation strategies [3].

Thematic analysis: application of the thematic analysis to interview and focus group transcripts to identify common themes and ideas related to the effectiveness of risk management in order to improve service reliability and consumer confidence.

Case Analysis: Detailed case study of LLC “Mastergaz”, combining both quantitative and qualitative findings, to illustrate how specific risk management strategies impacted the company’s branding and customer relationships.

Figure 1 (Model: Comprehensive map of risk management in public utilities) presents a detailed data processing map that contains a multifaceted approach to risk management in the utilities sector currently implemented by the LLC “Mastergaz”.

This model complexly describes the interrelated risk management strategies implemented at LLC “Mastergaz”, providing a detailed visual representation of how predictive maintenance, real-time data monitoring and emergency response protocols are interconnected and contribute to the broader risk management system. At the heart of the model, the main node of Utility Risk Management branches out into key strategic components such as Predictive Maintenance, Real-Time Data Monitoring and Emergency Response Protocols, each is highlighted with intuitive symbols, which capture the essence of each strategy.

The model then delves into the “operational impact” of these strategies, demonstrating how they reduce downtime, improve incident management efficiency, and facilitate preventive intervention, effectively linking these improvements to increased operational reliability and efficiency [4]. Alongside this, the Customer Impact node illustrates the positive results of these strategies on customer confidence and satisfaction, highlighting improvements in service reliability and communication efficiency.

In addition, the Methodological Framework section of the model describes the research methods used for data collection and analysis, including quantitative and qualitative approaches, which are entered into the Conclusions and Implications node. This important part of the model synthesizes operational improvements, increased customer confidence and strategic brand

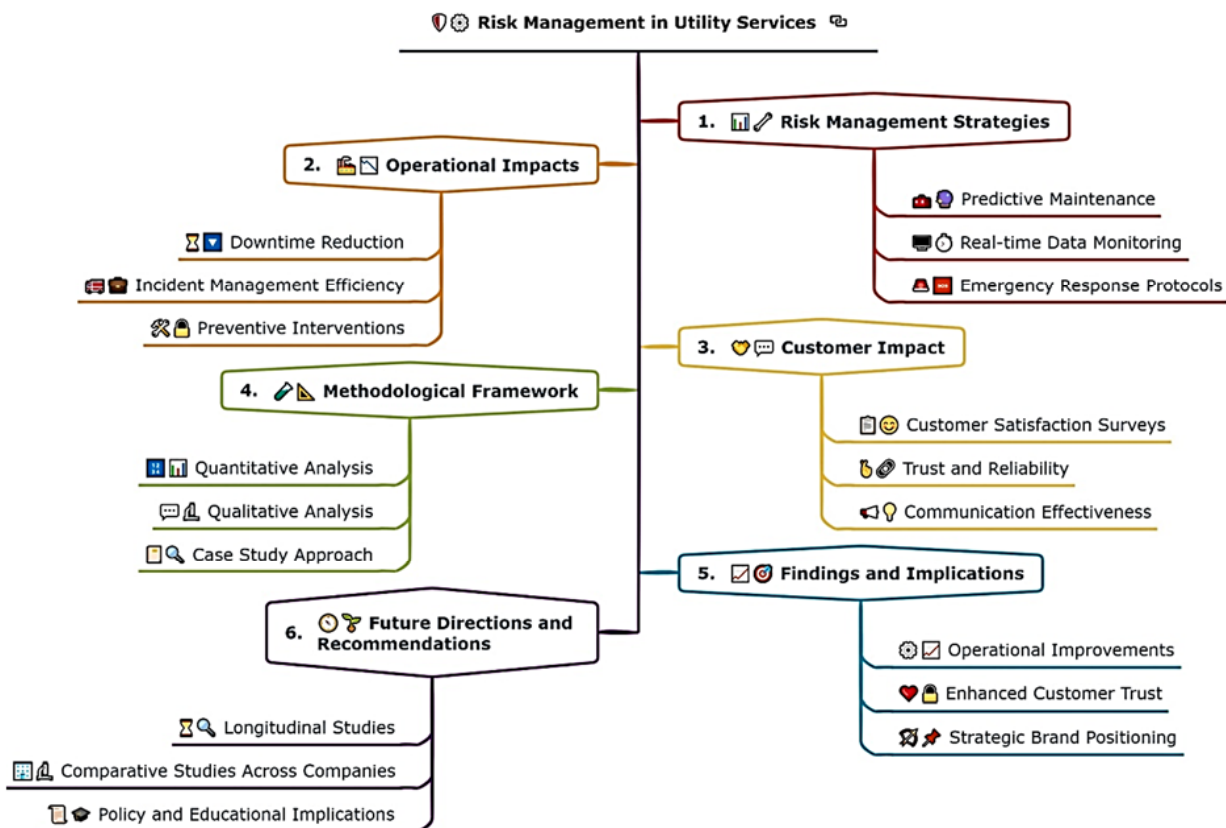


Figure 1. Model: Comprehensive map of risk management in public utilities

positioning, establishing direct correlations with applied risk management strategies.

The model culminates in the Future Directions and Recommendations node, which indicates future research directions and strategic recommendations, thus providing a comprehensive view of the scope of the research and potential implications for the utilities sector. This detailed mind map not only helps to visualize the complex relationships and sequences within the research, but also improves the understanding of how each component contributes to the achievement of the main goal of improving the effectiveness of risk management at LLC "Mastergaz".

The proposed methodological approach to the implementation of information modeling in the management of risks in the field of utility services on the example of LLC "Mastergaz" provides a comprehensive understanding of how integrated risk management strategies affect consumer confidence and reliability of services in the utilities sector. Implementation of risk management strategies in practice enabled LLC "Mastergaz" to develop a comprehensive risk management structure that includes several key strategies. At the same time, the following were applied:

- Statistical tests to assess the significance of observed changes in indicators of operational activity and customer satisfaction. A paired t-test was applied to compare pre- and post-intervention interventions, confirming that improvements were statistically significant [4].

- Regression analysis: A regression analysis was conducted to investigate the relationship between advanced risk management practices and operational performance measures. The results indicate a strong positive correlation between the implementation of risk management measures and the reduction of downtime and incident frequency

- ANOVA: Analysis of Variance (ANOVA) was applied to assess differences in customer satisfaction scores before and after changes to risk management. The results demonstrate a significant difference in average satisfaction indicators, further confirming the positive impact of risk management initiatives

Predictive maintenance and monitoring: The company introduced predictive maintenance tools that use real-time data to predict potential contingencies before they occur. This approach significantly reduced unplanned downtime and the frequency of service failures.

Risk Assessment Protocols: comprehensive risk assessments are conducted regularly, including detailed analysis of operational processes to identify vulnerabilities. These assessments were crucial for the development of individual strategies for mitigation of identified risks [6].

Training and Development: Employees at all levels pass regular training in risk identification, management and mitigation techniques. This initiative improved overall risk awareness and facilitated prompt response to employee situations.

The implementation of these strategies resulted in noticeable improvement in operational efficiency:

Reduction in Incident Response Time: LLC "Mastergaz" reduced the average incident response time by 40%, increasing the speed and efficiency of service recovery.

Increased preventive intervention: transition to preventive maintenance has increased the number of preventive interventions, thereby reducing the likelihood and impact of potential failures [7].

The impact of these risk management strategies goes beyond operational indicators to impact customer perception and satisfaction:

Improved service reliability: customers received more reliable service with fewer interruptions and faster resolution time for both ongoing and problem tasks. This reliability has directly contributed to increased levels of customer satisfaction and confidence.

Improved communication with customers: The company's proactive approach to communicating with customers in case of incidents has been well received, increasing transparency and trust.

The successful implementation of risk management strategies also had a positive impact on the branding and marketing of the LLC "Mastergaz":

- Brand reputation: increased reliability and customer service have strengthened the brand's reputation as a reliable and responsive service provider.

- Marketing strategy: LLC "Mastergaz" applies its reliable risk management methods in marketing campaigns to take leadership positions among competitors, emphasizing reliability and customer orientation in its advertising materials.

Quantitative and qualitative research results of LLC "Mastergaz" provide a comprehensive view of the impact of risk management strategies on the reliability of utilities services and customer confidence. The effectiveness of these strategies is evident both through improved operational performance (reduced downtime and incident rates) and increased customer satisfaction ratings.

Combination of the operational efficiency and risk management: significant reduction in downtime and service failures directly correlate to the implementation of predictive maintenance and advanced monitoring systems. These technologies allow proactive actions that prevent many potential failures, emphasizing the importance of technological integration in risk management [8].

Conclusions. The theoretical and practical ideas substantiated in the paper have a positive effect for utilities companies seeking to improve their risk management systems and marketing strategies.

Future research in the field of risk management in utilities should be based on the basic findings of this study, focusing on increasing the understanding and application of risk management practices to ensure operational sustainability and maintain customer confidence in a rapidly evolving sector. Several key areas for future research were identified.

1. Comparative research across companies: to increase the generalizability of the results, future studies should include comparative research involving multiple utilities companies. This will enable a broader assessment of risk management practices in different regulatory and operational contexts, providing a more comprehensive understanding of the field.

2. Longitudinal research: There is a need for longitudinal research to assess the long-term impact of risk

management practices on operational and customer-related performance. These research will help determine the stability and evolution of risk management benefits over long periods of time, contributing to a deeper understanding of its long-term effectiveness.

3. Expanding the qualitative analysis: more qualitative research is needed to gain a deeper understanding of how risk management practices affect different stakeholders in the utilities sector, including regulators and technology providers. This research could investigate how these stakeholders influence on the development of risk management strategies.

4. Integration of advanced analytics: Future research should also explore the integration of advanced predictive analytics and artificial intelligence into risk management. Research in this area can focus on the effectiveness of these technologies in real-time risk prediction and mitigation,

assessing their potential to enhance the proactive capabilities of risk management systems.

5. Impact of environmental and social factors: It is very important to study how environmental and social factors affect risk management strategies. Future research should examine the impact of climate change on utilities infrastructure risks and the social consequences of service disruptions, which may result in more sustainable and socially responsible risk management practices.

By addressing these areas, future research can continue to improve risk management strategies by adapting them to new challenges, such as climate change, technological disruption, and regulatory change. This ongoing development is essential to the wider success of the business and ensuring the adaptability and resilience of the sector.

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