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ТИПОЛОГІЯ ТА ТАКСОНОМІЯ КРИЗ ДЛЯ СЕРВІСНИХ ІТ-КОМПАНІЙ CRISIS TYPOLOGY AND TAXONOMY FOR IT SERVICE COMPANIES

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У сучасному швидкоплинному та взаємопов'язаному світі ІТ-сервісні компанії відіграють важливу роль у підтримці інфраструктури різних галузей. Від хмарних обчислень та управління даними до кібербезпеки та розроблення програмного забезпечення, ці компанії надають важливі послуги, що забезпечують роботу бізнесу. Однак динамічний характер ІТ-сектору робить його особливо вразливим до різних криз. Ефективне управління кризами є життєво важливим для підтримання безперервності роботи, захисту активів і забезпечення довіри клієнтів. Попри критичну важливість управління кризами, існує нестача комплексних структур, спеціально адаптованих до унікальних викликів, з якими стикаються ІТ-сервісні компанії. На ІТ-сервісну індустрію впливає чимало потенційних криз, зокрема фінансові спади, технічні збої, порушення кібербезпеки та геополітичні потрясіння. Відсутність чіткої типології та таксономії цих криз ускладнює здатність компаній готуватися до них, реагувати на них і відновлюватися після таких подій. Це дослідження прагне заповнити цю прогалину, розробивши детальну типологію та таксономію криз, специфічних для ІТ-сервісних компаній. Ефективна категоризація криз дозволяє ІТ-сервісним постачальникам краще передбачати ризики та впроваджувати цілеспрямовані стратегії для їх пом'якшення та відновлення. Основні цілі цього дослідження включають виявлення та категоризацію різних типів криз, з якими можуть стикатися ІТ-сервісні компанії, розроблення всеосяжної таксономії, що класифікує ці кризи на основі їх характеристик та впливу, аналіз кейс-стадій минулих криз для перевірки запропонованої типології та таксономії, а також надання практичних рекомендацій ІТ-сервісним компаніям для покращення їх стратегій управління кризами. Це дослідження має відповісти на такі питання: а) з якими основними типами криз стикаються ІТ-сервісні компанії; б) як ці кризи можуть бути систематично категоризовані у всеосяжну таксономію; в) які уроки можна винести з минулих кризових подій в ІТ-секторі; г) як запропонована типологія та таксономія можуть покращити готовність і реагування на кризи в ІТ-сервісних компаніях?

Значення цього дослідження полягає у його потенціалі покращити можливості управління кризами ІТ-сервісних компаній. Запропонована типологія та таксономія слугуватимуть цінними інструментами для академічних дослідників і практиків галузі, сприяючи загальному полю управління кризами та підтримуючи стійкість ІТ-сервісної індустрії. Це дослідження має на меті заповнити критичну прогалину в літературі та надати практичні інсайти, які можуть допомогти ІТ-сервісним компаніям орієнтуватися у складнощах сучасного бізнес-середовища.
Ключові слова: управління кризами, ІТ-сервісні компанії, типологія криз, таксономія криз, проактивне управління ризиками, аналітика даних у реальному часі, новітні технології, безперервність бізнесу.

Despite extensive research on crisis management, significant gaps still need to be discovered, particularly in the context of IT service companies. This study addresses two primary deficiencies: the need for industry-specific frameworks and a comprehensive crisis typology and taxonomy. This research aims to develop a detailed crisis typology and taxonomy specific to IT service companies, enhancing their preparedness, response, and recovery capabilities. The study identifies five primary crisis types: financial, operational, reputational, geopolitical, and natural disasters. Each crisis type is defined, with examples and recommendations for effective management. The developed taxonomy uses criteria such as nature, causes, impact, duration, frequency, and manageability to classify crises. Through literature review and case study analysis, the research reveals diverse crises faced by IT service companies and offers practical strategies for crisis management. Theoretical contributions include a sector-specific crisis taxonomy and integration of practical insights, bridging the gap between theory and practice. This research emphasizes proactive risk management and robust systems, contributing to the resilience of IT service companies.

Keywords: Crisis Management, IT Service Companies, Crisis Typology, Crisis Taxonomy, Proactive Risk Management, Real-time Data Analytics, Emerging Technologies, Business Continuity.

Statement of the problem

In today's fast-paced and interconnected world, IT service companies play a crucial role in supporting the infrastructure of various industries. These companies provide essential services that keep businesses operational, from cloud computing and data management to cybersecurity and software development. However, the dynamic nature of the IT sector makes it particularly vulnerable to various crises. Effective crisis management is vital for maintaining continuity, protecting assets, and ensuring customer trust. Despite the critical importance of crisis management, there needs to be more comprehensive frameworks specifically tailored to the unique challenges faced by IT service companies. The IT service industry is exposed to various potential crises, including financial downturns, technical failures, cybersecurity breaches, and geopolitical disruptions. A clear typology and taxonomy for these crises is necessary for companies to prepare for, respond to, and recover from such events. This research seeks to address this gap by developing a detailed typology and taxonomy of crises specific to IT service companies. By categorizing crises effectively, IT service providers can better anticipate risks and implement targeted strategies for mitigation and recovery.

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The main objectives of this research are to identify and categorize the

different types of crises that IT service companies may face, develop a comprehensive taxonomy that classifies these crises based on their characteristics and impacts, and analyze case studies of past crises to validate the proposed typology and taxonomy, as well as to provide practical recommendations for IT service companies to enhance their crisis management strategies. This study aims to answer the following key questions:

- What are the primary types of crises that IT service companies encounter?
- How can these crises be systematically categorized into a comprehensive taxonomy?
- What lessons can be learned from past crisis events in the IT service sector?
- How can the proposed typology and taxonomy improve crisis preparedness and response in IT service companies?

The significance of this study lies in its potential to enhance the crisis management capabilities of IT service companies. By providing a structured approach to identifying and categorizing crises, this research will help companies better understand the risks they face and develop more effective strategies for managing them. The proposed typology and taxonomy will serve as valuable tools for academic researchers and industry practitioners, contributing to the broader field of crisis management and supporting the resilience of the IT service industry. This study aims to fill a critical gap in the literature and provide actionable insights to help IT service companies navigate the complexities of the modern business environment.

Literature Review. Crisis management has been a critical focus in various fields, with numerous theories and frameworks developed to address the complexities of crises. The three-stage crisis management model proposed by Mitroff consists of three stages: pre-crisis (preparation and prevention), crisis (response), and post-crisis (recovery and learning). It emphasizes the need for organizations to have robust plans and procedures to manage crises effectively [1]. The four-phase model, often attributed to the Federal Emergency Management Agency (FEMA), includes mitigation, preparedness, response, and recovery. Each phase represents a critical component of comprehensive crisis management, aiming to reduce the impact of crises and enhance organizational resilience [2]. Systems theory views organizations as complex systems that interact with their environment. According to this theory, effective crisis management requires understanding and managing the interdependencies within the organization and its external environment. This approach highlights the importance of holistic and integrated crisis management strategies [3]. Situational Crisis Communication Theory (SCCT), developed by [4], focuses on the role of communication in managing crises. It provides a framework for selecting appropriate communication strategies based on the nature of the crisis and the organization's responsibility. Numerous studies have explored crisis types and management strategies across various industries, including IT. Some key findings include:

1. Financial Crises: Research has shown that financial crises, such as the 2008 global financial crisis, significantly impact IT service companies by reducing client budgets and increasing financial instability (Gates, 2010). Studies emphasize the importance of financial risk management and diversification strategies to mitigate these impacts [5].

2. Operational Crises: Studies on operational crises, such as technical failures and supply chain disruptions, highlight the need for robust IT infrastructure and effective supply chain management. For example, a study by Racherla and Hu (2009) found that companies with proactive maintenance and backup systems were better able to manage operational disruptions [6].

3. Reputational Crises: Research on reputational crises, such as data breaches and service outages, indicates that these crises can have long-lasting effects on customer trust and company reputation. Studies suggest transparent communication and swift corrective actions are crucial in managing reputational damage [7].

4. Geopolitical Crises: Studies on the impact of geopolitical crises, such as wars and regulatory changes, show that these events can disrupt business operations and supply chains. For instance, a study [8-11] found that companies operating in politically unstable regions faced higher risks and needed contingency plans to manage these crises.

5. Natural Disasters: Research on natural disasters, such as earthquakes and hurricanes, highlights the importance of disaster recovery planning and infrastructure resilience. Studies [12-13] suggest that companies with comprehensive disaster recovery plans can better resume operations quickly after natural disasters.

The insights from Turlakova's works [14], [15] can be juxtaposed with typical crisis management theories, which suggest that irrational behaviors such as panic buying or sudden market sell-offs can be prevalent during crises. Reflexive management models proposed by Turlakova can be particularly effective in crisis management as they emphasize the need to understand and influence individuals' psychological and informational states. Using reflexive models, managers can better predict and control herd behavior, mitigating negative impacts during crises.

Gaps in the Literature. Despite the extensive research on crisis management, several gaps remain, particularly in the context of IT service companies:

1. Most existing frameworks and studies are generalized and not tailored to the unique challenges of the IT service industry. There is a need for research that addresses the specific types of crises faced by IT service companies and their unique vulnerabilities.

2. While various studies have categorized crises, a comprehensive and integrated typology and taxonomy that includes all relevant crisis types for IT service companies is needed. Such a framework would provide a more holistic understanding and better preparation strategies.

3. With the increasing reliance on real-time data and analytics, more research is needed on how these technologies can be leveraged for proactive crisis management in IT service companies. Real-time monitoring and predictive analytics could enhance early warning systems and response strategies.

4. The rapid evolution of technologies such as artificial intelligence, cloud computing, and IoT introduces new risks and opportunities for crisis management. There is a need for research on how these emerging

technologies can be integrated into crisis management frameworks for IT service companies.

The purpose of the research

By addressing these gaps, this research aims to develop a detailed and specific typology and taxonomy of crises for IT service companies, enhancing their ability to prepare for, respond to, and recover from various crises.

Presentation of the main research material

Crisis typology refers to the systematic classification of different types of crises that organizations may face. This classification helps understand various crises' nature, causes, and potential impacts, thereby enabling more effective preparation, response, and recovery strategies. A well-defined crisis typology (in Table 1) is crucial for IT service companies due to their reliance on technology, data, and continuous service delivery.

Table 1. Crisis Typology

Crisis Types	Definition	Examples	Recommendations
Financial Crises	Financial crises in IT service companies involve significant disruptions to financial stability, affecting the company's ability to meet its financial obligations and maintain operations. These can arise from broader economic conditions or specific financial mismanagement.	Economic Recessions: During economic downturns, IT service companies may experience reduced service demand as clients cut back on IT spending. This can lead to decreased revenues and financial instability. Cash Flow Problems: Poor financial planning or unexpected expenses can lead to cash flow issues, where the company struggles to cover its immediate costs, such as payroll, operational expenses, and debt repayments.	Enhance Financial Planning: Develop comprehensive financial plans that include provisions for economic downturns and liquidity management. Diversify Revenue Streams: Reduce dependency on a few significant clients by diversifying the client base and revenue streams.
Operational Crises	Operational crises refer to disruptions in IT service companies' internal processes and systems that affect their ability to deliver services effectively. These crises can stem from technical failures or issues within the supply chain.	Technical Failures: Hardware malfunctions, software bugs, and network outages can severely impact service delivery. For instance, a data center outage can lead to significant downtime, affecting clients' operations. Supply Chain Disruptions: Dependency on third-party vendors for hardware, software, or other critical components can lead to operational crises if these suppliers face disruptions, such as manufacturing delays or quality issues.	Invest in Infrastructure: Ensure that technical infrastructure is robust, with redundant systems and backup facilities. Supply Chain Management: Strengthen relationships with suppliers and develop contingency plans for supply chain disruptions.
Reputational Crises	Reputational crises occur when events or actions negatively impact the public perception of an IT service company. These crises can erode customer trust and damage the company's brand and market position.	Data Breaches: Unauthorized access to sensitive data can lead to significant reputational damage. For example, a major cybersecurity breach can result in losing customer trust and legal repercussions. Service Outages: Prolonged or frequent service outages can damage an IT service provider's reputation, especially if the downtime affects critical business functions of their clients.	Strengthen Cybersecurity: Implement advanced cybersecurity measures to protect against data breaches and other cyber threats. Effective Communication: Develop and maintain clear communication protocols to manage public relations and customer communications during crises.
Geopolitical Crises	Geopolitical crises involve external political factors that impact IT service companies. These can include wars, conflicts, and changes in regulatory environments.	Wars and Conflicts: Geopolitical tensions or armed conflicts in regions where IT service companies operate can disrupt business activities, including workforce safety, logistics, and client relations. Regulatory Changes: New regulations or changes in existing laws can impose additional compliance requirements or restrictions, potentially increasing operational costs and complexity.	Monitor Regulatory Changes: Stay informed about potential regulatory changes and political developments impacting operations. Diversify Operations: Consider geographical diversification of operations to mitigate the impact of regional geopolitical issues.
Natural Disasters	Natural disasters are events caused by natural phenomena that can significantly disrupt IT service operations. These disasters can cause physical damage to infrastructure and impact service continuity.	Earthquakes: Seismic activities can damage data centers, communication networks, and office buildings, leading to operational shutdowns and data loss. Floods and Hurricanes: Severe weather events can cause widespread damage to infrastructure, power outages, and personnel displacement, hindering the company's ability to maintain services.	Disaster Preparedness: Create detailed disaster recovery and business continuity plans to address potential natural disasters. Employee Training: Train employees on emergency procedures and ensure all staff know disaster response protocols.

Source: developed by author

Crisis taxonomy provides a structured classification system for different types of crises that IT service companies might encounter. This systematic framework helps understand the nature, causes, impacts, and appropriate management strategies for various crises, enabling better preparedness and response. To create a comprehensive taxonomy, the following criteria are used for classifying crises:

- Nature of the Crisis: Identifying whether the crisis is financial, operational, reputational, geopolitical, or

natural.

- Causes: Determining the underlying factors that trigger the crisis, such as economic downturns, technical failures, cyberattacks, regulatory changes, or natural disasters.
- Impact: Assessing the extent and scope of the crisis's impact on the organization, including financial loss, operational disruption, reputational damage, or legal consequences.
- Duration: Considering the expected duration of the crisis, whether it is a short-term disruption or a long-term challenge.
- Frequency: Evaluating how often similar crises have occurred in the past and the likelihood of their recurrence.
- Manageability: Analyzing the organization's ability to anticipate, prevent, and manage crises effectively.

A comprehensive crisis taxonomy helps IT service companies understand and categorize various crises, enhancing their ability to prepare for, manage, and recover from them. By systematically classifying crises into financial, operational, reputational, geopolitical, and natural categories, companies can develop targeted strategies to mitigate risks and ensure business continuity. In reviewing existing literature and analysis of case studies, several vital insights emerged regarding the classification and management of crises in IT service companies. The literature reveals various crisis types these companies may face, ranging from financial and operational to reputational, geopolitical, and natural disasters. Financial crises often stem from broader economic conditions affecting client budgets, whereas operational crises are frequently the result of technical failures or supply chain disruptions. Reputational crises typically involve data breaches or service outages, while geopolitical crises are linked to political tensions or regulatory changes. Natural disasters, though less frequent, can have severe impacts on physical infrastructure and service continuity. The case studies provided real-world examples of these crisis types, illustrating how they manifest in IT service companies and the strategies to mitigate their impacts. For instance, the 2008 Financial Crisis forced many companies to restructure their financial strategies, while a significant data center outage in 2016 highlighted the importance of redundancy and disaster recovery plans. The practical implications of this research for IT service companies are significant. Firstly, understanding the different types of crises and their characteristics enables companies to develop more targeted and effective crisis management strategies. For financial crises, companies can enhance financial planning and liquidity management. Investing in robust technical infrastructure and supply chain management can mitigate risks for operational crises. In the case of reputational crises, strengthening cybersecurity measures and communication protocols is essential.

Early warning systems and proactive risk management must be considered. By monitoring relevant indicators and establishing contingency plans, companies can better anticipate and respond to crises, minimizing their impacts. The case studies further underscore the need for flexibility and adaptability in crisis management and the value of learning from past experiences to improve future preparedness.

Conclusions and prospects for further research

This research comprehensively examines crisis typology and taxonomy specifically for IT service companies. Through a detailed literature review and analysis of case studies, we identified and categorized various types of crises these companies may encounter, including financial, operational, reputational, geopolitical, and natural disasters. Each crisis type was examined for its characteristics, causes, impacts, and examples from real-world scenarios. Our findings underscore the importance of understanding these different crisis types to develop targeted crisis management strategies.

This research makes several theoretical contributions to the existing body of knowledge on crisis management in IT service companies. Firstly, it provides a comprehensive taxonomy of crises specific to the IT services sector, filling a gap in the literature where previous studies have often focused on broader industry contexts. By detailing the characteristics, causes, and impacts of various crisis types, this research enhances our understanding of how different crises affect IT service companies uniquely. Furthermore, the integration of real-world case studies offers practical insights that bridge the gap between theory and practice. These case studies illustrate the proposed taxonomy's applicability and highlight best practices and lessons learned from actual crisis management experiences. This dual approach enriches the theoretical framework with practical relevance, making it more useful for researchers and practitioners. Finally, focusing on IT service companies addresses a critical but underexplored area in crisis management research. Understanding how these companies can effectively manage crises is increasingly vital as the reliance on IT services grows across all sectors. This research thus contributes to developing more resilient IT service organizations capable of withstanding and recovering from various crises. The synthesis of literature and case studies findings highlights the diverse nature of crises faced by IT service companies and underscores the need for tailored crisis management strategies. The practical implications emphasize the importance of proactive risk management and the implementation of robust systems and processes. The theoretical contributions expand the existing body of knowledge by providing a detailed taxonomy of crises and integrating practical insights, ultimately aiding in developing more resilient IT service companies.

We highlighted the need for robust early warning systems, proactive risk management, and flexible crisis response plans tailored to the unique challenges of the IT services sector. While this research provides a robust framework for understanding and managing crises in IT service companies, several areas warrant further exploration:

1. Advanced Early Warning Systems: Investigate the development and implementation of advanced technologies and analytics for early detection of potential crises.

2. Impact of Emerging Technologies: Study how emerging technologies such as artificial intelligence and blockchain can enhance crisis management capabilities.
3. Cross-Industry Comparisons: Conduct comparative studies across different industries to identify best practices and innovative approaches to crisis management.
4. Longitudinal Studies: Perform longitudinal studies to examine the long-term effectiveness of various crisis management strategies and their impact on organizational resilience.

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