

Ensuring Clean and Safe Water Supply in The Context of Crisis: Case Study on The Adaptability of Ho Chi Minh City Water Supply Company During the Covid-19 Pandemic

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Abstract. The COVID-19 pandemic has posed unprecedented challenges to various sectors worldwide, including the water sector. This study delves into the strategies and adaptation measures applied by water utilities in Ho Chi Minh City to overcome the complex difficulties brought about by the pandemic. This study applies qualitative research method, data is collected by conducting in-depth interviews with participants. The target audience of the study is employees, managers, and directors at water supply companies. The research focuses on exploring innovative and creative approaches used in both operations and management practices to respond to crises. By analyzing the data collected, this study aims to provide a comprehensive understanding of the multifaceted responses to the pandemic in the water sector. These findings contribute to the knowledge base surrounding crisis management and organizational resilience, providing valuable insights for decision makers and stakeholders in similar industry. Ultimately, this research aims to facilitate informed decision-making and promote effective strategies to address future challenges arising from pandemics or other crises.

1 Introduction

More recently, crises have become more complex and have broader impacts. In 2021 the impact of the COVID-19 pandemic has affected the whole world. Therefore, actions to mitigate or adapt to crises must be taken. Several research articles have been published on how to mitigate the damage caused by the crisis to the water sector, but due to a lack of international consensus, implementation remains lacking. It is time to accept that all future crises cannot be prevented and that action to adapt to these crises is essential for the urban water sector. In many cases, urban water agencies operate in response to crises rather than taking a direct approach to confront and prepare for long-term challenges [1].

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However, it is important to acknowledge that these changes vary from place to place. As a result, operational adjustments have become critical for water utilities to maintain service delivery during the pandemic.

The COVID-19 pandemic has drawn attention to the importance of responding to crises and adapting measures for urban water utilities in crisis situations. The pandemic has caused significant disruptions in these utilities' operations, including supply chain disruptions, workforce reductions, and revenue reductions. As a result, water utilities have had to quickly adjust operations and implement new strategies to ensure continuous service delivery during the pandemic.

Ho Chi Minh City water supply industry identifies digital transformation as one of the key tasks that need to be carried out soon. In operational management, Ho Chi Minh City's water supply industry has focused on using sensors to monitor water quality, energy savings, drainage, and equipment status. Ho Chi Minh City's water supply industry is also building a data management system to track and store information related to customers, supplies, standards, and projects. The government cooperates closely with water supply companies to build smart water supply systems [2].

1.1 General impact of COVID-19 pandemic

The water utility sector is extremely important as it provides essential drinking water and wastewater services to various sectors of the economy and society. The impact of COVID-19 on water businesses and stakeholders is significant [3]. Rachel Fletcher, Chief Executive Officer of the Water Services Authority (Ofwat), emphasized that water utilities are facing unprecedented challenges in water supply, water treatment, and protecting their workers during the pandemic [3]. Companies have had to adopt a variety of measures, including experimenting with new ways of working and new technologies to monitor and manage water, manage employees, and hold remote meetings. Some jobs that require employees to be physically present have not been done due to social distancing policies [3].

However, there are several big challenges such as employees feeling isolated, inadequate initial IT infrastructure, not making full use of software, and technical problem [4]. Additionally, the pandemic has led to changes in water consumption patterns [5], with many people staying at home and using more water than usual. This has put additional strain on the water supply system and made it more difficult for utilities to ensure a consistent water supply.

2 Research Methods

2.1 Research object

This study aims to identify challenges faced by water supply companies during the COVID-19 crisis and examine the managerial, organizational, and technological measures adopted to overcome these challenges. Focused on SAWACO Water Supply Corporation and its subsidiaries in Ho Chi Minh City, Vietnam, the study involves directors, managers, and both field and office staff. Data is collected through a mix of primary sources, including surveys and interviews with staff, and secondary sources such as journals, articles, textbooks, working papers, research reports, and annual reports related to crises, management, and company transformations. The study aims to provide concise insights into how water utilities manage crises, particularly amid the unique challenges posed by the COVID-19 pandemic.

2.2 Method

The research utilized a qualitative approach, with data gathered through in-depth interviews. Forty interviews were carried out, involving 20 employees, 10 managers, and 10 directors from SAWACO and its subsidiaries. Following the framework proposed by [6], the interviews ceased once data saturation was achieved after 40 participants, signifying no new insights were obtained. To further validate this, the researcher conducted an additional five interviews, confirming the absence of novel information.

2.3 Data collection

Data were collected over a three-week period in August 2023, with each interview lasting between 15 and 30 minutes. All interviews were recorded using a single recording device and subsequently transcribed verbatim. The study will adhere to ethical standards, ensuring participant anonymity and confidentiality. Prior to conducting interviews, the researcher will seek permission from interviewees to record the session, clarify the purpose of the interview, and provide the final recording for their confirmation. Any unclear or suspicious content will be addressed with the interviewee at the conclusion of the interview.

The semi-structured interviews encompassed various topics concerning the responses of employees, managers, and directors in water utilities, along with the challenges encountered and strategies employed during the Covid-19 pandemic. For instance, questions included, "Could you briefly outline your role/position?", "What difficulties did your company/department/personnel face during the pandemic?", "What advantages did the company possess in responding to the epidemic?", "What operational changes were implemented by the company during the pandemic?", "How was coordination and communication managed across different departments or teams during the crisis?", "Did the pandemic expose any longstanding weaknesses or gaps in the company's operations or management?", "Following the pandemic, has the company strengthened, or is it still grappling with the aftermath?", "Could you offer recommendations to the company if another epidemic were to occur?" These inquiries are grounded in theories of crisis management [7], adaptation, and recovery [8].

All interviews were conducted in Vietnamese and transcribed verbatim to facilitate the analysis and research process.

2.4 Data analysis

Interview data were meticulously collected from each organization and subsequently analyzed manually. The researcher conducted multiple readings, meticulously analyzing the interviews to identify recurring patterns, which were then organized into thematic categories. Phrases and words pertinent to the research were meticulously highlighted and selected for further examination. Noteworthy topics that emerged from the examination of interview data included: (a) the impact of the crisis, (b) measures implemented for operational continuity and employee welfare, and (c) the organization's resilience in recovering from the crisis.

To ensure the rigor and accuracy of the data, reliability and confirmability criteria were rigorously applied. Validity of the data was assessed through a triangulation strategy, involving input from water industry executives and experts. Additionally, semi-structured interviews, along with meticulous notetaking during interviews and data collection from water companies, were utilized to corroborate the findings. Initial study findings and

thematic analyses were presented to experts for feedback. Furthermore, key segments of the data were reviewed by water company managers who were not directly involved in the interviews. The evaluations and results gleaned from the interviews consistently aligned, affirming the reliability of the findings.

3 Result

3.1 The impact of the crisis

3.1.1 Construction and water supply

The COVID-19 pandemic has exerted a significant impact on the water supply industry, particularly in major urban centers. A primary concern revolves around the challenges encountered in repairing damaged water pipes, exacerbated by staffing issues due to the implementation of social distancing measures. Consequently, the company's projects have experienced delays.

Expressing his perspective, a construction worker stated, "While the preventive measures against disease have been instrumental in safeguarding my health, my colleagues and I have encountered several challenges during our work. Wearing protective gear and masks during construction not only makes us uncomfortable but also diminishes our productivity."

Furthermore, unresolved issues with the pipelines have led to employees facing negative feedback from customers, causing the customer service department to receive complaints related to pipeline issues.

3.1.2 Psychology and health

Additionally, workers are also grappling with psychological and health issues during this period. The complex nature of the epidemic has led to confusion and has taken a toll on the morale of both officials and employees. The COVID-19 pandemic has presented challenges across all fronts for companies and workers alike, necessitating measures to mitigate its impact.

One employee expressed, "I feel extremely concerned about my health and that of my family, as the epidemic has claimed numerous lives. This has made it challenging for me to concentrate and work effectively."

Sharing a similar sentiment, a manager disclosed, "Our company tragically lost an employee to the epidemic, which has left us deeply worried and saddened."

3.1.3 Finance

Fortunately, the crisis did not cause a significant financial impact on SAWACO and its subsidiaries. The main reason is because water is an essential product and everyone uses it, so the company's business activities are not stagnant. Furthermore, revenue increased significantly as people stayed home and used more water, ensuring a stable revenue stream for the company.

Company leaders shared: "We are very lucky because the product we provide is water - an essential product that everyone uses, so we do not face many financial difficulties during the epidemic season."

Overall, SAWACO and its subsidiaries have effectively managed the financial impacts of the crisis by taking advantage of the essential nature of water supply services, making positive contributions to the community.

A director said: "The water supply company is currently not growing significantly in the number of customers because this number has stabilized or only increased slightly. Therefore, efforts are being made to enhance the company's reputation in the perception of customers."

3.2 Measures applied in operations and employee support

3.2.1 Change working methods

During the COVID-19 pandemic, SAWACO prioritized addressing operational challenges by switching from working in person to working online. This transformation mainly applies to office departments. For field work and water supply activities, the company has implemented shift scheduling to reduce the risk of exposure and transmission.

A person who went directly to the field during the epidemic season shared: "Ten employees will work at the company for two weeks, then personnel will be rotated."

Field workers will stay and live on the company campus, and meals will be provided by the company. In case of illness, they will be immediately quarantined, and replacement will ensure smooth operations.

A manager said: "I worked at the company for two weeks, the company provided us with protective equipment, hand sanitizer and food during our time working at the company. Every time a new employee comes in for a shift, we are given a health check to avoid infecting everyone."

To ensure smooth operations during the pandemic, weekly meetings were held between the board of directors and managers. Employees and managers will work and exchange information daily. Emergency information will be updated during emergency meetings. For partners, leaders will arrange a meeting time based on the company's operating situation. All meetings are conducted online to avoid problems related to disease spread.

The company director shared: "Every week we hold internal meetings to update and announce the week's tasks, helping us capture information and disseminate work within the company effectively."

During the pandemic, water use in businesses decreased significantly due to business and service shutdowns, while water use in households increased significantly. Furthermore, water companies have difficulty recording water meter readings due to social distancing orders. With technological advances, companies can record water meter readings for certain households using smartphones. Additionally, water companies partner with services such as e-banking or water bill collection services to enable online water bill payments. For households without smartphones, water companies must use measures to estimate water consumption. This leads to significant differences in meter readings.

A director said: "We have increased the application of technology in water bill collection to minimize the amount of revenue lost due to not collecting water bills. We have provided QR codes for customers, as well as created support websites for customers to pay water bills online. We also actively promote water payment, notify water indexes and incidents online through the media and our website."

3.2.2 Support measures

However, remote workers face challenges due to lack of necessary tools, difficulty in communication, and adapting to new technology. To solve this problem, the company has equipped remote employees with tools such as computers and phones. The internal focus is to maintain online status and resolve calls promptly to avoid delays. For important documents that require a handwritten signature, a professional team will collect and deliver them to the company. In addition, the IT department also makes video tutorials on technology applications to help employees work online effectively.

An older employee shared: *"I receive a lot of support from the IT department in using technology applications at work and connecting with people."*

Companies also took various measures to support employees affected by the epidemic, such as providing medicine, medical equipment, and food to those infected. In addition, the company also ensures to pay employees in full and on time so they can work with peace of mind.

Furthermore, companies also cooperate with other partners to receive additional support. Because water is an essential product, problems related to water loss must be resolved quickly. To solve these problems, water supply companies have cooperated with local authorities to apply for permits to work directly at the company and on site during the social distancing period. Additionally, the company's labor union worked with medical facilities and food stores to provide medical equipment, medicine, and food to infected employees.

An employee who was infected with Covid-19 shared: *"I received a lot of support from the company, especially medicine and food during my illness. Leaders must also show concern for their employees and motivate them during difficult times. Employees must maintain a high sense of responsibility and work hard."*

3.3 The organization's resilience in recovering from the crisis

After the pandemic period, water companies have had a rapid recovery. Many interviewees attributed this rapid recovery to the implementation of information technology measures in the organization's operations. Furthermore, water is an essential product, so the recovery process does not require much time and effort because most people need to use water and the financial aspect is not seriously affected. Importantly, effective crisis management during the pandemic minimized loss of life, enhanced corporate reputation, and prevented chaos within the organization.

A leader said: "Because the product we provide is clean water, this is an essential and exclusive product, so we do not face many difficulties due to economic impacts like other companies. I think this is a strong point and also a key point that helps us manage the epidemic crisis better."

In addition, water utilities saw an opportunity in quickly adopting advances in information technology. As a result, these companies have developed technology-based policies to manage water networks and interact with customers. One leader mentioned that after the pandemic, the water supply company recovered quickly and exceeded its set targets. In addition, the company also outlined new strategies to promote technology application and automate network operations. While this may result in a reduction in the workforce, it is considered necessary currently and is important to have more resources and be more proactive in the face of crises in the future.

3.4 Discussion

During the COVID-19 pandemic, SAWACO encountered operational challenges, including temporary suspension of maintenance activities and disruption of water infrastructure. To mitigate these challenges, the company quickly moved online and implemented staggered schedules, demonstrating its commitment to ensuring continuous water supply while prioritizing the safety of its workforce.

The study highlights the key role technology plays in facilitating remote work and maintaining operations. The challenges that employees face in adapting to new technologies highlight the need for adequate tools and training, but using technology not only helps businesses optimize work processes but also creates more flexible production operating models [9]. Notable initiatives, such as video tutorials and IT support,

illustrate the proactive steps taken to raise the technology level of the workforce. The emphasis on technological advancement, process automation, and strategic planning for potential crises demonstrates a forward-looking approach to ensuring long-term sustainability and resilience [10].

The study highlights the psychological and health challenges faced by SAWACO's workforce, underscoring the company's commitment to employee wellbeing in times of crisis. Support measures, including providing healthcare, food assistance and mental health support to employees are highlighted during the crisis. In addition, support from stakeholders also contributes to creating great opportunities for companies to adapt and overcome the crisis [11].

Effective communication has emerged as a key element in crisis management. Regular internal meetings, use of online collaboration tools, and coordination with external partners demonstrate the importance of staying connected and informed. Customer complaints related to water meter readings are approached with a customer-centric strategy, including negotiation, financing, and payment flexibility. Committing to supporting customers experiencing financial difficulties will enhance the company's reputation.

Crisis management is an ever-evolving field with limited data, posing challenges for rigorous research and drawing accurate conclusions. Predicting and preventing crises is inherently difficult due to their unpredictable nature. Effective crisis management and assessment remains elusive. The evolving nature of crises, influenced by organizational characteristics, makes it difficult to identify research methods and generalize findings. External factors and stakeholder influence further complicate organizational crisis management, limiting the generalizability of the research.

The study was conducted 2 years after the social isolation period due to the Covid-19 epidemic. Therefore, half of the participants said that they had forgotten some issues and work done during the epidemic. This limits the information and diversity of research. Next, the study has geographical limitations as it was only conducted in Ho Chi Minh City, Vietnam. Future researchers need to conduct larger geographical studies to have a more comprehensive view. Besides, this research has not focused on water consumers during the crisis and provided assessments through the sharing and feelings of consumers. Therefore, future researchers need to develop research with a broader audience to be able to have a more objective assessment of the effectiveness of these measures.

4 Conclusion

During the COVID-19 pandemic, water utilities implemented effective strategies to mitigate its impact, some of which continue to deliver benefits. Information technology plays an important role in facilitating work and minimizing the spread of disease during social distancing. Support from the organization and improving employee morale help employees be more motivated to work and work more effectively. Inter-institutional and international cooperation becomes important as crises spread beyond individual companies. Company leaders emphasized coordinating with the government to apply for field survey permits and establish links with the supply chain of essential goods. Collaboration is seen as a strong support for crisis response and recovery, as it provides essential resources to organizations during these times. These lessons provide valuable insights into future crises, improving flexibility and efficiency in crisis management for water utilities to protect employees and communities.

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