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Article

Analysis of the government's strategy and capacity in reducing the risk of fire disasters in the Indonesian capital

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Abstract: Urban areas are increasingly vulnerable to fire disasters due to high population density, sprawling infrastructure, and often inadequate safety measures. This study aims to analyze the capacity of the DKI Jakarta government in terms of human resource capabilities, asset readiness, and budget planning capabilities. Furthermore, it measures the government's success as evidenced by the public response to the achievement of firefighter performance. This study uses qualitative analysis with a content analysis approach. Data sources come from annual performance report documents and the content of the DKI Jakarta Fire Department website containing city disaster information. Performance report and website data are analyzed and used as research data to support qualitative analysis. This research shows that command decisions are essential in the organizational structure of the fire brigade. Both laboratory services are carried out optimally as a concrete effort to map fire potential. The laboratory tests the safety and suitability of firefighting equipment. Available budgetary support provides broad operational powers for the fire service. The government's strength in minimizing or overcoming fire problems has received a positive response from the public. The operational achievements of firefighting continue to be consistent and increase. Ultimately, this research provides scientific insight into disaster mitigation and reducing the fire risk in cities.

Keywords: disaster management; government; management; risk management

1. Introduction

Urban areas worldwide are increasingly vulnerable to fire disasters, posing significant threats to lives, property, and economic stability. Historic urban areas are particularly vulnerable to fire disasters due to their architectural complexity and the presence of combustible materials (Gernay et al., 2016; Jigyasu, 2016). As cities expand and populations grow, the complexity of managing fire risks intensifies, necessitating comprehensive and adaptive strategies for mitigation. Effective fire-risk reduction alternatives are needed as part of a comprehensive fire management plan (Syphard et al., 2013). Governments play a critical role in developing and implementing measures to prevent and respond to fire incidents, yet their capacity to effectively reduce fire disaster risks varies widely.

Case studies of cities with varying success in fire disaster risk management provide valuable insights into effective strategies. Mumbai, India, utilized a novel framework to reduce fire susceptibility through cost-effective redevelopment, emphasizing medium-rise buildings (Kumar et al., 2020). Karachi, Pakistan, highlighted the need for comprehensive disaster management plans for industrial units, stressing coordination between infrastructure, rescue agencies, and government institutions (Waheed, 2014). Seixal, Portugal, and Valparaíso, Chile, demonstrated the

value of integrating GIS platforms and comprehensive risk management assessments, respectively, to enhance urban safety (Diaz and Olavarría, 2020; Ferreira et al., 2016). Lao PDR (Lao People's Democratic Republic) improved student fire prevention knowledge through integrated disaster policies in schools (Kanyasan et al., 2018). Communities in the Kathmandu Valley region emphasize the need for adaptive and agile disaster preparedness approaches using network analysis and new technologies (Carpenter and Grünewald, 2016). These cases show that strategic urban planning, comprehensive assessments, community involvement, and coordinated efforts are crucial for effective fire disaster risk management. By dissecting these critical components, this analysis offers a comprehensive overview of how governments can strengthen their strategies and capacities to reduce the risk of fire disasters in urban areas. Ultimately, the goal is to contribute to the development of more resilient cities, better prepared to prevent and respond to fire emergencies, thereby safeguarding lives and enhancing urban sustainability. Indonesia faces significant challenges in managing fire disasters in urban settlements due to gaps in policy, infrastructure, and public awareness. In cities like Surabaya, high population density and poor environmental design increase fire risk. Improved urban planning incorporating safety principles can enhance resilience (Navitas, 2013, 2014). Furthermore, there is a lack of integration of fire risk management within broader local development strategies, requiring a holistic approach (Nugroho, 2017). Current strategies often emphasize response over prevention, leading to recurrent fire disasters. A shift towards preventive disaster management is necessary (Prayoga and Koestoer, 2021). Local community involvement and awareness are crucial, especially in high-density areas like Jakarta's Menteng Atas (Sukmajati and Muladi, 2010).

The city of Jakarta, as Indonesia's bustling capital, faces numerous challenges due to its dense population, rapid urbanization, and complex infrastructure. Among these challenges, the risk of fire disasters stands out as a critical concern. Fires in urban environments can lead to devastating consequences, including loss of life, property damage, and severe disruptions to daily activities. lasting social and economic impacts on affected communities (Doubleday et al., 2021). To address these issues, the government of Jakarta has implemented various strategies and built capacities aimed at reducing the risk of fire disasters. In South Jakarta, a detailed fire risk assessment was conducted to identify high-risk areas and recommend specific actions such as creating evacuation plans, conducting routine inspections, and raising public awareness about fire risks (Fauzia et al., 2022). Jakarta is working on integrating wildland and urban fire risks into local development strategies to manage fire hazards effectively (Nugroho, 2017).

The study "Analysis of Government Strategy and Capacity in Reducing the Risk of Fire Disasters in DKI Jakarta Province" significantly contributes to the international literature on urban fire risk management. Focusing on one of Southeast Asia's most densely populated and rapidly growing urban areas, this research highlights urban fire disaster prevention and response challenges. It offers a detailed analysis of the effectiveness of governmental policies and strategies, providing empirical evidence on successful measures and areas needing improvement. The study emphasizes the critical role of institutional capacity and readiness in managing fire risks, making it particularly relevant for developing countries and emerging economies. Its

interdisciplinary approach, integrating insights from urban planning, public policy, disaster management, and environmental science, enriches the literature by demonstrating the interconnectedness of various factors influencing fire risk and management. The detailed case study of DKI Jakarta serves as a valuable benchmark for comparative analysis with other global cities, aiding in developing context-sensitive fire risk reduction strategies. Additionally, the research's data-driven insights underscore the importance of evidence-based decision-making in disaster risk management, making this study a valuable resource for academics, policymakers, and practitioners.

This analysis examines the existing capacity of the Jakarta Special Capital Region (DKI Jakarta) government to reduce fire risks. The article examines the preventive measures and emergency response systems that have been developed and assesses their impact on reducing fire incidents and improving public safety. The analysis also considers the role of the Fire and Rescue Department in Jakarta Special Capital Region (DKI Jakarta), which plays a critical role in implementing these strategies. Through this study, we aim to understand the strengths and weaknesses of Jakarta's approach to fire disaster management, provide insights into areas for improvement, and offer recommendations to strengthen the city's resilience to fire-related hazards. In doing so, we contribute to the broader discourse on urban disaster management and ongoing efforts to protect Jakarta's residents and infrastructure.

2. Literature review

2.1. Government strategies for fire risk reduction

Government strategies for fire risk reduction have evolved significantly, integrating policy initiatives, land use planning, community involvement, and technological advancements to effectively mitigate fire hazards (Eccleston et al., 2023; Lecina-Diaz et al., 2023; Nyimbili et al., 2023). Recent research provides valuable insights into these strategies and their effectiveness. Advances in fire-simulation software and quantitative risk-based approaches have enabled fire-management agencies in Australia to make more transparent and cost-effective decisions about fuel treatment and fire suppression (Penman and Cirulis, 2020). These strategies have demonstrated significant risk reduction in landscapes with a history of effective fire management (Penman and Cirulis, 2020). Additionally, a comprehensive approach that includes retrofitting-built environments, landscape buffering, and community education is essential for mitigating wildfire risks. This method, known as the Regional Wildfire Mitigation Program, addresses multiple fire-related risks beyond traditional fuel reduction techniques (Moritz et al., 2022). Probabilistic approaches to fire risk assessment in industrial buildings enhance design flexibility and cost efficiency. Methods such as event trees assess the frequency and consequences of fire events, optimizing fire protection strategies for sustainable manufacturing (Dârmon, 2020). Effective land use planning and regulations, tailored to local conditions and involving community participation, are also crucial for wildfire risk reduction. Communities that adopt both regulatory and voluntary approaches can better manage fire risks (Edgeley et al., 2020). Community-based risk reduction programs like the Community Fire Unit (CFU) in New South Wales, Australia, demonstrate that

community-led initiatives, supported by training and equipment from fire services, can enhance local fire preparedness and social capital (Haynes et al., 2020). In historic centers, balancing fire safety with preservation requires tailored strategies. Studies in places like Guimaraes, Portugal, show that targeted interventions can significantly reduce fire risks while maintaining historical integrity (Tozo Neto and Ferreira, 2020).

2.2. Government capacity in fire risk management

Government capacity in fire risk management is essential for effectively preventing, preparing for, responding to, and recovering from fire-related disasters (Krogh and Røiseland, 2024). Effective management necessitates robust inter-agency cooperation among fire services, emergency medical services, law enforcement, and other relevant entities to ensure comprehensive disaster response and preparedness (Smith et al., 1996). Local governments play a critical role, though their capacity often varies due to resource and training limitations. Strengthening strategic frameworks, financial support, and training can enhance these capacities (Anantasari et al., 2017). Public communication by government agencies is crucial for educating communities about fire risks, although it often overemphasizes agency capacities and underemphasizes shared community responsibility, leading to inadequate preparedness (Johnston et al., 2020). Governance and policy integration are also vital, with cross-sectoral cooperation needed to embed fire management within broader policy frameworks, as seen in Australian examples where laws may hinder community resilience (Eburn et al., 2011). Additionally, community-based groups such as fire safe councils play a significant role in enhancing fire management by leveraging local needs and social capital (Everett and Fuller, 2011). These collective efforts are crucial for improving preparedness and resilience against fire disasters.

Government capacity in fire risk management is crucial for addressing fire-related disasters effectively (Cvetković et al., 2021). Recent studies highlight the importance of strong corporate governance to prevent crises, as seen in the Grenfell Tower fire, where governance failures severely compromised safety measures (Khan and Haynes, 2021). Effective public communication by government agencies is essential, yet it often overemphasizes agency capabilities and underplays community responsibility, leading to insufficient preparedness (Johnston et al., 2020). Improved fire risk communication models, especially involving micro-entrepreneurs, can lead to better fire management outcomes through enhanced community engagement and law enforcement (Nyame-Asiamah et al., 2023). In Canada, the shift towards a security apparatus for wildfire governance involves a balance between public and private responsibilities, emphasizing economic freedom and indirect government intervention (Asiyanbi and Davidsen, 2023). These aspects collectively underscore the need for robust governance, effective communication, and strengthened local capacities to manage fire risks successfully (Asiyanbi and Davidsen, 2023; Johnston et al., 2020; Khan and Haynes, 2021).

3. Method

This research uses qualitative analysis to explore the research results. This research uses a content analysis approach (Hsieh and Shannon, 2005). The research

data source comes from the official government website to be collected with relevant types of narrative and data (Fournier-Tombs, 2011; Neumann et al., 2022; Shen et al., 2009). This research uses the official DKI Jakarta government website https://pemadam.jakarta.go.id. The official report document belonging to the DKI Jakarta Fire Department is used as a complete data source in this research with the name of the DKI Jakarta Provincial Fire and Rescue Service Performance Report document. This research chose the DKI Jakarta Provincial Government as the object of research on minimizing the risk of fire disasters. DKI Jakarta Province was chosen based on the capital city of Indonesia which has the largest population compared to other provinces. Apart from that, DKI Jakarta also has public housing areas that have the potential for fires. This research examines the 2022 Fire Service documents in a scientific manner that is accountable and open to the public. The research flow can be presented in **Figure 1** below:

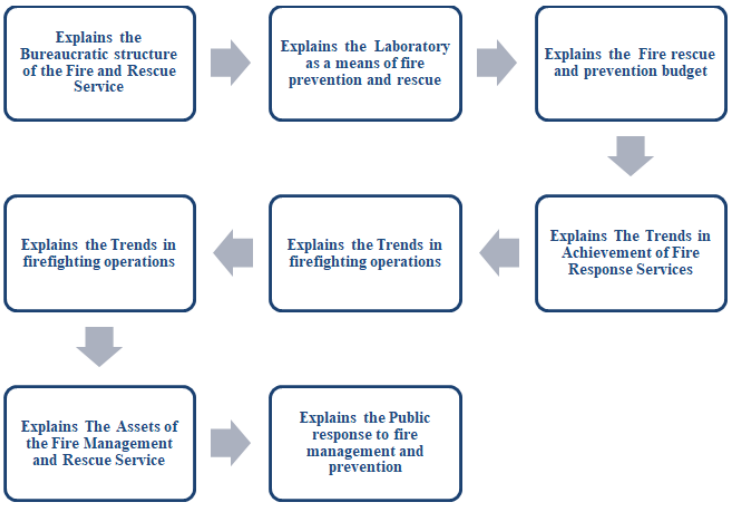

Figure 1. Flow of research discussion.

The diagram in **Figure 1** shows the flow of a comprehensive explanation of various aspects of fire and rescue services. This research begins with an explanation of the bureaucratic structure of the fire and rescue service, highlighting how the organization is structured and managed. The second stage explains the laboratory used for fire prevention and rescue, illustrating the role of scientific research and experiments in improving fire safety measures. The third stage explains the fire rescue and prevention budget, detailing financial aspects and resource allocation that are important for adequate fire prevention and management efforts. Stage four explains trends in firefighting operations, showing developments in strategies and technology for fighting fires. In the fifth stage, this research explains the trends in the achievements of fire response services, emphasizing the progress and improvements achieved in terms of response time and effectiveness of fire services. The sixth stage explains the assets of the Fire Response and Rescue Services, which include various tools, equipment, and facilities used in firefighting and rescue operations.

4. Result

4.1. Human resource capacity of the DKI Jakarta government in dealing with fires

Firefighting management is about advanced equipment and technology and how human resource capacity is managed well. The success of firefighting operations is highly dependent on a solid organizational structure and clear division of tasks at each level. The following table will look at the various positions and sub-divisions within a fire department that are essential in maintaining public safety and security. This well-organized structure reflects how each position and sub-division is interconnected and works together to achieve common goals. From the Head of the Department, who leads all operations, to sub-divisions that handle technical, planning and operational aspects, each position has specific responsibilities that support the efficiency and effectiveness of teamwork. The importance of effective human resource management cannot be overstated. Everyone, from secretariat staff to rescue technicians, brings valuable skills and experience. The synergy between various sub-divisions, such as the Fire Prevention Division, which is tasked with supervising and empowering the community, and the Fire Control Division, which focuses on operational planning and control, ensures that this department can respond quickly and precisely when needed. In a broader context, managing human resources within a fire department demonstrates the importance of strategic planning, ongoing training, and coordination. This all aims to build a team that is strong and ready to face various challenges that may occur. Let us examine the following **Table 1** to understand further how these positions and sub-divisions contribute to human resource capacity within a fire department.

The complex organizational structure in the **Table 1** shows various divisions and sub-divisions with specific roles, from Department Heads to training and technical education units. The Head of the Department holds a strategic role that requires high managerial and leadership skills and deep experience in the fire and rescue field (Freeman, 2022; Muardi and Rohmawan, 2022; Shen et al., 2009). To maximize its capacity, leadership and crisis management training is very necessary (Thielsch and Hadzihalilovic, 2020). The Department Secretariat, which consists of general personnel, planning and budgeting, and finance sub-sections, requires administrative solid, budget management and personnel management skills. Further development can be achieved through public administration, finance, and employment law training (Muardi and Rohmawan, 2022). The Fire Prevention Division, which focuses on technical supervision and community empowerment, requires good technical and communication skills. Fire technical training, as well as communication and public relations skills, are critical to increasing the effectiveness of the division (Butler et al., 2020). The Fire Control Division requires high operational skills, including emergency operations management and tactical communications (Thielsch and Hadzihalilovic, 2020). Intensive fire operations tactics and emergency communication technology training are needed to increase human resource capacity (Thielsch and Hadzihalilovic, 2020). Meanwhile, the Rescue Division, which handles rescue operations and emergency medical treatment, requires training in rescue techniques, emergency

medical response, and rescue operation management (Welling et al., 2005). The Infrastructure and Facilities Division, which focuses on procuring and maintaining facilities, requires logistics and engineering management skills. Training in facilities management, maintenance techniques, and procurement of goods/services is essential to increase human resource capacity (Ntshebe et al., 2022; Sridarran et al., 2023). Sub-departments located in various areas of Jakarta require managerial and technical capabilities that can be adapted to the needs of their respective regions. Therefore, adapting training to local conditions and region-specific needs is essential (Sample et al., 2022). Other units, such as the Fire Fighting Training and Education Center and the Fire Fighting Laboratory Technical Implementation Unit, require education and training skills and technical research capabilities.

Table 1. Bureaucratic structure.

Position	Sub-divisions/sections
Head of Department	
Department Secretariat	• General Sub-section • Personnel Sub-section • Planning and Budgeting Sub-section • Finance Sub-section
Fire Prevention Division	• Technical Planning and Cooperation Section • Fire Safety Supervision Section • Publication and Community Empowerment Section
Fire Control Division	• Operational Planning Section • Operational Control Section • Operational Communication Section
Rescue Division	• Technical Rescue Planning Section • Rescue Operation Assistance Section • Emergency Medical Section
Infrastructure and Facilities Division	• Provision Section • Utilization Section • Maintenance Section
Sub-departments	• Central Jakarta Fire and Rescue Sub-department • North Jakarta Fire and Rescue Sub-department • West Jakarta Fire and Rescue Sub-department • South Jakarta Fire and Rescue Sub-department • East Jakarta Fire and Rescue Sub-department
Other Units	• Center for Fire and Rescue Training and Education • Technical Implementation Unit for Fire and Rescue Laboratory

Source: Performance Report Document, 2022.

4.2. Laboratory assets as a means of fire prevention and rescue

The laboratory is an essential asset in fire prevention and rescue (Wahyudi et al., 2023). As a research and development center, the laboratory plays a crucial role in creating fire prevention technologies such as smoke sensors and sprinkler systems and testing the resistance of building materials to fire (Garcia and Ibarra, 2023). The laboratory is also a training ground for firefighters and rescue workers through realistic fire scenario simulations (Булгаков, 2023). In rescue efforts, the laboratory contributes by developing innovative rescue tools, post-fire forensic analysis to identify causes, and information technology support that facilitates coordination and decision-making; by making optimal use of laboratories, we can improve safety and

effectiveness in responding to fires, creating a safer environment for all. Below is **Figure 2** about service distribution

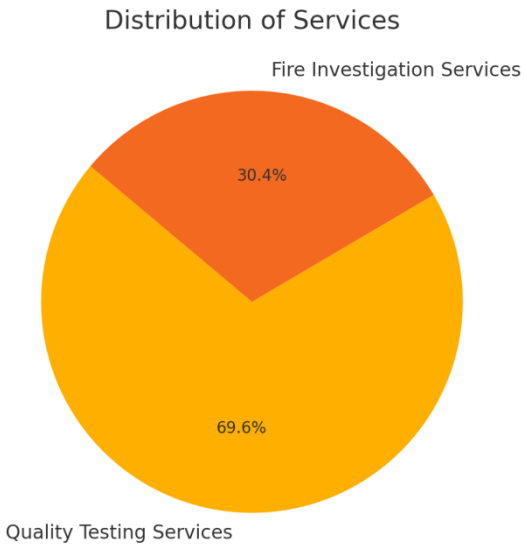

Figure 2. Distribution of services.
Source: Performance Report Document, 2022.

Figure 2 above shows that understanding the distribution of services offered by an organization is crucial for strategic planning and resource allocation. The pie chart titled distribution of services provides a visual representation of how two primary services fire investigation services and quality testing services are distributed within an organization. Fire investigation services, which involve determining the causes and origins of fires, account for 30.4% of the services. These services are critical for legal purposes, insurance claims, and improving fire safety protocols. Quality testing services, which encompass activities aimed at ensuring products or services meet specified standards, make up 69.6% of the total distribution. These services are vital for maintaining product integrity, customer satisfaction, and regulatory compliance. the pie chart of service distribution provides valuable insights into the strategic priorities of an organization. With 69.6% dedicated to quality testing services and 30.4% to fire investigation services, it is clear that the organization emphasizes quality assurance while also recognizing the importance of safety and risk management. This balanced approach can enhance the organization's reputation, ensure regulatory compliance, and contribute to its long-term success. Understanding and analyzing such distributions allows stakeholders to make informed decisions and strategically allocate resources to support the organization's goals.

4.3. Fire rescue and prevention budget

The budget for fire rescue and prevention is a crucial component in ensuring the safety and well-being of communities. It encompasses the allocation of financial resources to various aspects such as purchasing and maintaining firefighting equipment, training personnel, and conducting public awareness campaigns on fire safety. Effective budgeting in this area not only strengthens the operational capacity of fire departments but also enhances their ability to respond swiftly and efficiently to

emergencies, thereby minimizing potential losses and safeguarding lives and properties. Properly funded fire rescue and prevention programs are integral to fostering resilient and secure environments. The following is **Table 2** data on the budget of the DKI Jakarta Provincial Fire and Rescue Service for 2022:

Table 2. Fire rescue and prevention budget.

No	Strategic goal	Supporting program	Initial budget	Revised budget
1	To create a city safe from the dangers of fire and other disasters	Fire Prevention, Mitigation, Fire Rescue, and Non-Fire Rescue Program	545,520,084,272	367,483,259,563
2	To achieve improved readiness in fire and rescue services	Fire Prevention, Mitigation, Fire Rescue, and Non-Fire Rescue Program	545,520,084,272	367,483,259,563
3	To establish a transparent and accountable regional government administration and financial management	Support Program for Provincial Government Affairs	764,915,068,545	769,259,494,297
		Support Program for District/City Government Affairs	67,450,814,372	61,152,076,415
Total			1,377,885,967,189	1,197,894,830,275

Source: Performance Report Document, 2022.

Table 2 shows that the budget allocation data shows significant changes, with substantial cuts in funding for fire prevention and rescue programs, reducing their budgets by approximately 32.6%, which may impact the city's disaster preparedness and response capabilities. Meanwhile, the budget for improving readiness in fire and rescue services also faced identical cuts, necessitating resource optimization to mitigate risks. Conversely, there is a slight increase (0.6%) in the budget for provincial government affairs, indicating a focus on enhancing transparency and accountability in regional governance. However, the district/city government affairs program saw a 9.3% budget reduction. Overall, the total budget decreased by approximately 13%, emphasizing the need for strategic prioritization and careful resource management to maintain critical services and minimize adverse impacts on public safety and governance.

4.4. Trends in achievement of fire response services

The analysis of the Trend in Achievement of Fire Response Time Services (15 min 2018–2022 provides crucial insights into the effectiveness and efficiency of fire response operations over a five-year period. Understanding these trends is vital for evaluating the progress made in achieving the critical benchmark of a 15-min response time, which is essential for minimizing damage and saving lives during fire emergencies. This period encompasses various operational challenges and improvements, reflecting the dynamic nature of fire services and their adaptation to evolving urban demands. By examining the data from 2018 to 2022, this analysis aims to highlight the successes, identify areas needing improvement, and provide actionable recommendations for enhancing fire response times in the future. **Figure 3** shows data on response trends in serving fires.

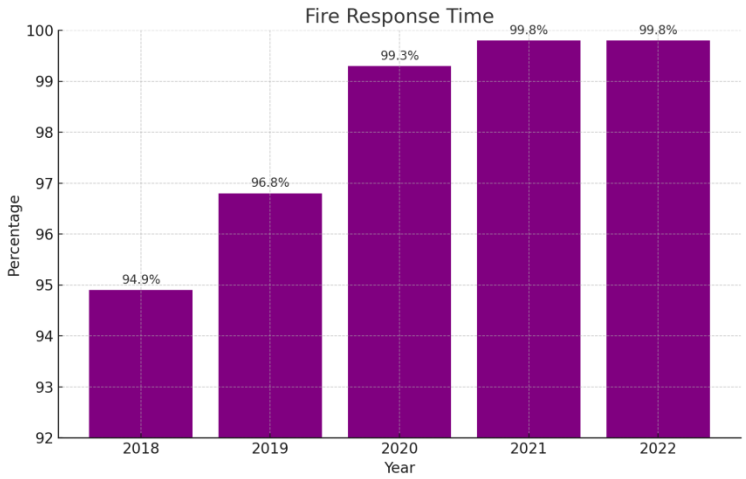

Figure 3. Fire response time.

Source: Performance Report Document, 2022.

Figure 3 titled fire response time the percentage of fire incidents responded to within 15 min over the five-year period from 2018 to 2022. In 2018, the percentage of incidents responded to within the 15-minute benchmark was 94.9 %. This relatively high rate indicates a strong initial performance in meeting response time goals. However, there was room for improvement, as nearly 5% of incidents did not meet the target. By 2019, the response time performance improved to 96.8%, reflecting a positive trend. This increase suggests that measures may have been implemented to enhance response efficiency, such as better resource allocation, improved training, or optimized dispatch procedures. The most significant improvement occurred in 2020, with the percentage jumping to 99.3%. This sharp increase indicates that the efforts to improve response times were highly effective, resulting in nearly all incidents being addressed within the desired timeframe. In both 2021 and 2022, the percentage of responses within 15 min remained stable at 99.8%. This consistency at a near-perfect rate demonstrates that the improvements made in previous years were sustainable and that the fire response services had reached an optimal level of efficiency. Maintaining this high level of performance suggests robust operational processes, effective management, and possibly technological advancements that support rapid response. the trend from 2018 to 2022 shows a marked improvement in fire response times, culminating in a nearly perfect response rate in the last two years. This upward trend reflects the successful implementation of strategies aimed at enhancing the speed and efficiency of fire services, ultimately contributing to improved public safety and reduced damage from fires.

4.5. Trends in firefighting operations

Firefighting operations have evolved significantly over the years, driven by advancements in technology, changes in urban landscapes, and a deeper understanding of fire behavior. Modern firefighting now incorporates sophisticated equipment, advanced training programs, and integrated communication systems to enhance efficiency and safety. Trends such as the use of drones for aerial surveillance, the implementation of smart sensors for real-time data analysis, and the adoption of eco-friendly firefighting foam represent the cutting edge of the field. This ongoing

transformation not only improves response times and outcomes but also ensures the protection of firefighters and communities alike. below **Figure 4** about trend fire exitinguishing operations in DKI Jakarta.

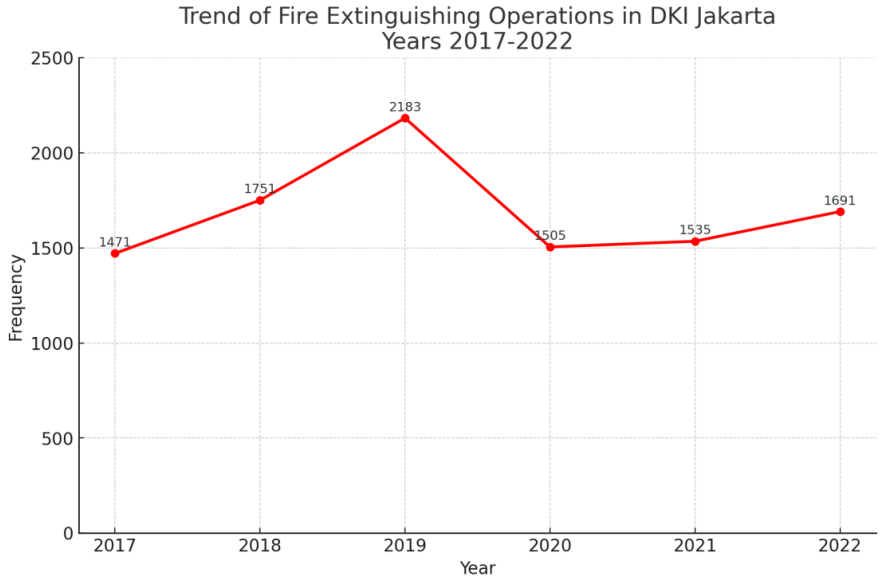

Figure 4. Trend fire exitinguishing operations in DKI Jakarta.
Source: Performance Report Document, 2022.

Figure 4 on fire fighting operation trends in DKI Jakarta 2017–2022 illustrates the frequency of fire fighting operations over the past six years, which reveals several key trends. From 2017 to 2019, there was a steady increase in the number of operations, increasing from 1471 in 2017 to 1751 in 2018, and peaking at 2183 in 2019. This upward trend indicates an increase in fire incidents or improvements in reporting and response mechanisms during these years. However, in 2020, there was a significant decrease to 1505 operations, which was caused by changes in urban activity patterns due to the COVID-19 pandemic, thereby potentially reducing fire incidents or disruption to emergency reporting and response systems. The frequency of firefighting operations began to recover in 2021, with a slight increase to 1535 operations, and a more pronounced increase to 1691 in 2022. This recovery may indicate a return to normal urban activity post-pandemic or improvements in fire safety measures and response protocols. Despite these fluctuations, the overall trend from 2017 to 2022 shows a general increase in firefighting operations, which may reflect factors such as urban growth, increased population density, and better detection and response capabilities. These data indicate that fire safety and prevention strategies require ongoing evaluation and adaptation to address the evolving dynamics of the urban environment. The sharp increase in 2019 and subsequent fluctuations highlight the need for consistent fire safety education, infrastructure improvements, and resource allocation for fire services.

4.6. Assets of the fire management and rescue service

Table 3. Assets of the Fire Management and Rescue Service.

Vehicle Type	Quantity
Fire Engine 10,000 liters	37
Fire Engine 4000 liters	117
Fire Engine 2500 liters	74
Large Bus/Mini Bus	20
Command Vehicles	33
Public Education Vehicles	4
Investigation Vehicle	1
Aerial Ladder 104 meters	2
Aerial Ladder 90 meters	1
Aerial Ladder 55 meters	1
Aerial Ladder 47 meters	1
Aerial Ladder 40 meters	1
Aerial Ladder 32 meters	13
Strong Arm Vehicle	4
Submersible Vehicle	19
Smoke Removal Vehicle	10
Fast Attack Vehicle	10
Rapid Response Vehicle	12
Quick Response Vehicle	78
Water Mist Vehicle	89
Hose Retrieval Vehicle	17
Rescue Vehicle	72
Sector Operational Vehicle	33
Breathing Apparatus (BA) Vehicle	9
Heavy Foam Vehicle	1
MRT Rescue Vehicle	1
Traffic Jam Clearing Vehicle (Dokking)	1
Ambulances	12
Cargo Vehicles	19
Heavy Terrain Vehicles	10
Tow Trucks	5
Mobile Fire Posts	5
Other Support Vehicles	44
Honda CB 100 Motorcycles	98
UPRC Motorcycles	84
GW 250 Motorcycles	20
Viar Motorcycles	110
Rapid Response Motorcycles (Motor Cycle)	8
Road Opening/Coverage Motorcycles	9

The fire management and rescue service (FMRS) is equipped with a comprehensive array of assets that are essential for effective emergency response and disaster management. These assets include state-of-the-art fire engines, specialized rescue vehicles, advanced firefighting equipment, and modern communication systems. The FMRS also boasts a highly trained and dedicated workforce, skilled in various aspects of firefighting, rescue operations, and emergency medical services. This sub-chapter delves into the specific resources and technologies at the disposal of the FMRS, highlighting their pivotal role in ensuring public safety and swift response to emergencies. Below is **Table 3** about the assets of the fire management and rescue service.

Table 3 data on official vehicles provides a comprehensive overview of the various types of vehicles and their numbers used for emergency and fire response services. This dataset reveals a significant reliance on mid-capacity fire engines, particularly the 4000-liter type, with 117 units in service. This suggests a strategic choice for vehicles that balance capacity and maneuverability. The specialized vehicles include a range of aerial ladder heights, with 32-meter ladders being the most common, reflecting a preference for medium-height ladders suitable for diverse urban structures. Other specialized vehicles, such as strong-arm vehicles, submersible vehicles, and smoke removal vehicles, are present in moderate quantities, indicating their use in specific challenging environments. The dataset highlights a substantial emphasis on quick deployment with a notable number of quick response vehicles (78 units) and water mist vehicles (89 units). This focus on rapid initial action is crucial for effective emergency response. Rescue and support vehicles, including 72 rescue vehicles and 33 sector operational vehicles, are essential for operational support, ensuring efficient management and specialized rescue capabilities during emergencies. The presence of 12 ambulances indicates an integrated approach to emergency response, providing immediate medical support alongside firefighting and rescue operations. Motorcycles, including Honda CB 100, UPRC, GW 250, Viar, rapid response, and road opening/coverage types, total 329 units. These motorcycles are likely used for quick navigation through traffic, particularly in urban settings. Miscellaneous and support vehicles, such as other support vehicles (44 units) and cargo vehicles (19 units), though fewer in number, play crucial support roles in operations. comprehensive preparedness strategy with a well-rounded and strategically diverse fleet. The variety of vehicles ensures the capability to handle a wide range of emergency scenarios, from firefighting and rescue operations to providing medical support and specialized rescues. The strategic deployment of mid-capacity fire engines and quick response vehicles indicates a focus on rapid response times and effective incident management, while the specialized equipment and support vehicles ensure sustained operations and logistical assistance as needed.

4.7. Public response to fire management and prevention

Effective fire management and prevention are crucial components of urban safety and public health. This sub-chapter delves into the results of a comprehensive survey conducted to assess the current practices, awareness levels, and challenges faced by fire management services. By examining the data collected from various stakeholders,

including fire department personnel, community members, and local businesses, this survey aims to provide a nuanced understanding of the strengths and weaknesses in existing fire prevention strategies. The insights garnered will serve as a foundation for recommending improvements and implementing best practices to enhance fire safety and minimize the risk of fire-related incidents. Below is **Figure 5** about public satisfaction survey results.

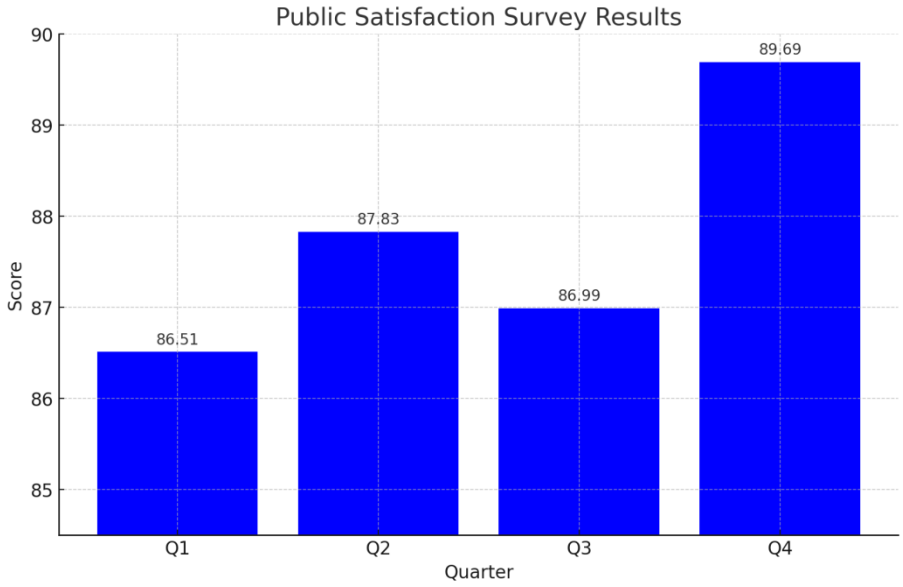

Figure 5. Public satisfaction survey results.
Source: Performance Report Document, 2022.

The **Figure 5** below displays Community Satisfaction Survey results for four quarters (Q1, Q2, Q3, Q4) in 2022. The overall trend shows an increase in community satisfaction scores from Q1 to Q4, with the highest score in Q4 indicating an increase in community satisfaction over time. In terms of quarterly performance, Q1 had the lowest score of 86.51, indicating that people's satisfaction was relatively lower at the beginning of the year. In Q2, the score increased to 87.83, indicating improvement. However, there was a slight decline in Q3 to 86.99, although it was still higher than Q1. The 4th quarter then peaked at 89.69, indicating the highest level of public satisfaction of the year. Interpreting these changes, a significant increase from Q1 to Q2 indicates successful interventions or improvements in services that have a positive impact on community satisfaction. A slight decrease in Q3 may indicate temporary challenges or problems that are affecting public perception. The substantial improvement in Q4 indicates that effective steps have been taken to overcome mid-year challenges, resulting in the highest level of satisfaction at the end of the year.

5. Discussion

The bureaucratic structure of the fire and rescue service is designed to facilitate efficient and effective emergency response. Proactive responding to emerging emergencies by effectively intervening and combating hazardous incidents, which by their nature are qualified for elimination by fire protection units (FPUs), place the area of fire protection within the framework of state security structures (Berus et al., 2022).

Each level of the hierarchy has specific roles and responsibilities that contribute to the overall mission of protecting life, property, and the environment. Understanding this structure is essential for evaluating the service's capability to respond to emergencies and for identifying areas for improvement. Discussion points to consider include the impact of the hierarchical structure on decision-making during emergencies, potential challenges in maintaining effective communication and coordination, improvements in training and development programs, the role of technology in supporting operations, and ways to increase public awareness and engagement in fire prevention efforts. Laboratories also serve as training centers for firefighters and other emergency personnel. Personnel training and awareness education aim to enhance safety consciousness and emergency response capabilities (Hailing et al., 2023). Simulated fire ground scenarios (SFGS) provide firefighters with an opportunity to maintain skills, receive feedback, and optimize performance (Johnson et al., 2020). This practical training is essential for preparing firefighters to respond effectively to real emergencies. Additionally, Educational laboratories require a high-level safety measure against potential fire hazards due to the nature of the activities and equipment used. A reliable fire protection system and fire safety maintenance program are essential to provide a comprehensive safety working environment (Novanandini et al., 2021).

The DKI Jakarta Fire Department's budget allocation reflects strategic adjustments in funding to balance between safety, readiness, and administrative efficiency. If the budget allocation is efficient, then the state can optimize the limited sources of funds to fund strategic activities (Digdowiseiso, 2022). While budget cuts in fire prevention and rescue services may pose challenges, strategic investments in provincial government affairs could lead to improved overall governance and resource management. Continuous evaluation and adaptation are necessary to ensure that these budget changes do not compromise the city's safety and disaster preparedness. Local adaptation planning in large cities often requires improvement in financing, regulatory context, monitoring, and evaluation to ensure long-term sustainability and effectiveness (Olazabal and Ruiz De Gopegui, 2021). The trend in the achievement of fire response time services in DKI Jakarta from 2018 to 2022 indicates a remarkable improvement, especially notable between 2019 and 2020. The sustained high performance in the subsequent years demonstrates the fire department's commitment to excellence in emergency response. effective communication and information integration in fire emergency response, which are crucial for maintaining high performance standards (Toups Dugas and Kerne, 2007). Continuous efforts in technological upgrades, personnel training, and strategic resource allocation are essential to maintaining these high standards and ensuring the safety and well-being of Jakarta's residents. Effective human resource management strategies, including recruitment and training, are essential for improving technology and innovation, thus contributing significantly to organizational performance (Del Prado and Rosellon, 2017). resource allocation in firefighting emphasizes the importance of efficient allocation of resources such as equipment and personnel to improve emergency response capabilities (Eslamzadeh et al., 2022).

This increasing trend in response and prevention underscores the importance of continued fire prevention efforts, adequate resource allocation for fire services

discipline and training significantly improves firefighter performance (Muardi and Rohmawan, 2022), and continued public education about fire safety. the fire service's role extends beyond emergency response to include vital prevention efforts and public education, which are crucial for reducing fire-related injuries and deaths (Frattaroli et al., 2011). Understanding these patterns can help in formulating strategies to reduce fire risk and improve emergency response in Jakarta. Community Satisfaction Survey results show a positive overall trend with fluctuations that provide valuable insight into community response to various initiatives. The highest scores in Q4 highlight the potential success of actions taken and serve as a benchmark for future efforts. Analyzing the reasons behind these scores will help in formulating strategies to consistently maintain or increase people's satisfaction. clarity of service procedures, employee capabilities, and speed of handling complaints are very important for public satisfaction (Hidayat, 2023). Staff professionalism and clear communication can increase satisfaction (Hardiyansyah et al., 2018). Similar factors, such as response time, communication, and accessibility, can be important for firefighting services (Garrido et al., 2014). The assets of the Fire Management and Rescue Service reflect a well-rounded and comprehensive emergency response capability. The diversity and quantity of vehicles ensure preparedness for various types of emergencies, from high-rise fires to underwater rescues. Continuous evaluation and upgrading of these assets will be essential to maintaining and improving the service's effectiveness in safeguarding public safety.

6. Conclusion

Strategies for reducing the potential for fire disasters are an essential concern for the DKI Jakarta government. The population density and standard of houses prone to fire are high. The government's attitude in developing a strategy to reduce potential disasters is carried out. In terms of bureaucratic structure, the Fire and Rescue Service is structured in stages, starting from the highest leadership to the person in charge at the sub-district level, which is strengthened by proving the seriousness of the DKI Jakarta government in reducing the risk of fire disasters. The laboratory is one of the facilities prepared by the DKI Jakarta government to minimize the potential for fire. The laboratory offers two types of services: quality testing services and fire investigation services. Intentionally testing the quality of fire extinguishing equipment is carried out. The following strategy for the DKI Jakarta government is to carry out optimal budget planning to support firefighting operations. The budget is prepared based on the principles of efficiency and appropriate targets, as well as budget reductions when the annual budget changes are carried out based on efficiency and appropriate budget. The ability of the DKI Jakarta fire department to receive a positive response from the public illustrates the speed of response time by officers in dealing with fire problems. Furthermore, it was found that the trend of DKI Jakarta's fire extinguishing operations continues to be high from year to year, showing consistency in overcoming fire risks and acting in extinguishing fires. The final capability is prepared in vehicle assets and equipment whose quality and quantity have been prepared optimally. Finally, a community survey regarding strategies and abilities in reducing the risk of fire received a positive assessment. This research provides a

theoretical contribution to developing scientific insight into disaster mitigation and minimizing the risk of fire, more specifically to the study of strategies and planning for fire disaster mitigation. This research limits the discussion of government strategies and capacity to minimize fires. This research recommends further research discussing comparative studies on disaster risk management between countries and other large cities.

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